VISISCHEDULE™

AUTOMATIC PROJECT SCHEDULING & JOB COSTING

VISICORP™
PERSONAL SOFTWARE™

VISISCHEDULE™

AUTOMATIC PROJECT SCHEDULING & JOB COSTING

User's Guide
for the IBM® Personal Computer

Program by
Dr. Michael Posehn

Manual Written by
Richard Ewing and Kate Carroll

Published and Distributed Exclusively by
VisiCorp

VISICORP™
PERSONAL SOFTWARE™

CONTENTS

ABOUT THIS MANUAL

ABOUT THE PROGRAM

PART I: THE LESSONS

LESSON 1
GETTING STARTED

LESSON 2
CREATING A SCHEDULE

LESSON 3
HANDLING FILES AND MEMORY

LESSON 4
REVIEWING AND UPDATING SCHEDULES

LESSON 5
PREPARING AND PRINTING REPORTS

CONTENTS

PART II: THE REFERENCE

MENUS

OPTIONS

CONTENTS

REPORTS

APPENDIX A

APPENDIX B

APPENDIX C

APPENDIX D

APPENDIX E

BIBLIOGRAPHY

GLOSSARY

INDEX

FIGURE   TITLE

CONTENTS

TABLE   **TITLE**

ABOUT THIS MANUAL

The VisiSchedule™ User's Guide teaches you how to use the VisiSchedule program and gives you a quick reference to all functions of the program. Lessons One through Five teach you the program, and the Reference lists alphabetically each menu, option and printed report. The Appendices cover related topics that you'll need to refer to only occasionally. The following brief table of contents outlines the manual's organization:

About the Program
Part I: The Lessons
   Lesson One: Getting Started
   Lesson Two: Creating a Schedule
   Lesson Three: Handling Files and Memory
   Lesson Four: Reviewing and Updating Schedules
   Lesson Five: Preparing and Printing Reports
Part II: The Reference
   Menus
   Options
   Reports
Appendices A Error Messages
          B The IBM Keyboard
          C Printers
          D Transferring VisiSchedule Data to the VisiCalc Program
          E Useful Facts About the VisiSchedule Program

In addition, the Bibliography lists books and articles on the topic of scheduling, and the Glossary defines terms used in the VisiSchedule program that may be new to you. The Index helps you find any topic in the manual.

To use this manual most effectively, follow these suggestions:

If you have never used a computer, read "About the Program," and Lessons One through Three. The detailed instructions begin with loading the Program Diskette and cover the basics of the program. You can go on to read Lesson Four to learn more advanced uses of the program. Then, Lesson Five helps you create the VisiSchedule reports on your screen or on your printer. After you've used and understood the lessons, you can use the Reference to answer any detailed questions you have.

If you're familiar with your IBM Personal Computer™, but have never used a VisiCorp product, read "About the Program" and skim Lesson One. Read Lessons Two and Three for basic program information. You can go on to read the remainder of the lessons, or you can look up information as you need it in the Reference.

If you're an old hand with personal computers and menu-driven programs, skim Lesson One for loading instructions. Then, look at the VisiSchedule Menu Flow fold-out (Figure 2-1). You can begin using the program immediately after loading. You'll find that the VisiSchedule program is well-prompted on the screen. You can look up any piece of information in the Reference, which is organized into three sections: Menus, Options, and Reports.

Use this manual as a flexible guide that can be adapted to your own level of experience.

The IBM keyboard has several keys marked with arrows. This manual tells you to press these keys at certain times. To prevent any confusion, this manual represents the keys as follows:

Key	Meaning	Manual Representation
↵	enter	↵
←	backspace	BKSP
↑	up arrow	↑
↓	down arrow	↓
←	left arrow	←
→	right arrow	→

ABOUT THE PROGRAM

Complex projects involving many tasks, people and costs are often difficult to manage. Some tasks within the project can't be started until others have been finished. It may take you days or weeks to estimate when a project can be completed. Then, delivery delays or unexpected equipment failures may destroy your schedule.

The VisiSchedule program shows you how to break complex projects into a series of simple jobs, how to indicate dependencies between jobs, how to figure the costs of the project, and what happens if one job slips. It calculates the final completion date automatically and lets you revise the project schedule easily and quickly. It displays the entire project schedule graphically by days or weeks. On one schedule graph you can track, modify, update and control the schedule for even the most complex projects. You can try out different courses of action to see how they might affect the completion date of the schedule.

If you want to know which jobs within the project need to be closely managed, the VisiSchedule program helps you. It determines automatically which jobs can or cannot be delayed for the project to be completed on time. The jobs that can't be delayed are on the *critical path*.

The *project* and *job* are key concepts in the VisiSchedule program. A *project* is the entire amount of work covered by a schedule. A typical project is shown in Figure A. In the example, the project has the title "First Street Water Main." The project is to install a new water main. There are many steps or tasks to the project: buying the pipe, digging trenches, laying the pipe, repaving the street, and so forth. Each of these steps is a *job*.

Job Number

Job Name

Legend

```
First Street Water Main. Revision 4.  1/ 1/82. File EXAMPLE1.DATA

                                 Jan        Feb      Mar             Apr         May
Job Description                  4  11 18 25 1  15 22 1  8  15 22 29 5  12 19 26 3
                                 0  1  2  3  4  5  6  7  8  9  10 11 12 13 14 15 16
   1 Purchase pipe               0-------->.....>  .  .  .  .  .  .  .  .  .  .  .
   2 Dig 1st part of trench      0-------->..>  1  .  .  .  .  .  .  .  .  .  .  .
   3 Purchase fittings           0----------->..>  .  .  .  .  .  .  .  .  .  .  .
   4 Lay 1st part of pipe        .  .  .  .  >----->..>  .  .  .  .  .  .  .  .  .
   5 Dig 2nd part of trench      .  .  .  >..>-------->  .  .  .  .  .  .  .  .  .

   6 Fill 1st part of trench     .  .  .  .  .  1  >----->.....>  .  .  .  .  .  .
   7 Lay 2nd part of pipe        .  .  .  .  .  1  .  >========>  .  .  .  .  .  .
   8 Fill 2nd part of trench     .  .  .  .  .  1  .  .  .  .  >=====>  .  .  .  .
   9 Repave street               .  .  .  .  .  1  .  .  .  .  .  >===========>
  10 Repair sidewalk             .  .  .  .  .  1  .  .  >----->..................>

  11 Project completed           .  .  .  .  .  1  .  .  .  .  .  .  .  .  .  .  X

            Operating Engineer=1    1     1     2     0     2     3     3     0
                                 1     0     1     1     0     2     3     3
                  Laborer=3       3     3     7     5     4     2     0     0     0
                                 3     0     7     6     4     2     0     0
                   Welder=0       0     0     2     0     2     0     0     0     0
                                 0     0     2     2     2     0     0     0
        Project manpower level=4    4    10     7     6     4     3     3     0
                                 4     0    10     9     6     4     3     3
        Project manpower cost=2.5K 2.5K 6K   4.5K 3.5K 3K    3K    3K   0
                                 2.5K 0    6K    5.5K 3.5K 3K    3K   3K
           Project direct cost=80K   0   18K  10K  5K   10K  30K  0    0
                                 0    0    0    0    0    0    0    0
            Project total cost=82K  2.5K 24K  14K  8.5K 13K  33K  3K   0
                                 2.5K 0    6K   5.5K 3.5K 3K   3K   3K

Sorting order is Current order
From the first job to the last job
Jobs using all skills

Symbol-Explanation
>-->     Duration of a normal job
>..>     Slack time for a normal job
>==>     Duration of a critical path job
>::>     Duration of a completed job
*        Job with zero duration
+        Job deadline
0-->     Job with no prerequisites
>--X     Job with no successors
1        Time break due to holiday or week-off
```

Time Line

Schedule

Manpower Levels

Costs

013-001

Figure A. Sample Schedule

Figure B shows how the program uses the information that you enter to produce calculations and prints results for you.

Main Menu

You Start a Project:
"First Street Water Main"

Modify Menu

You Choose:
Time Units (Days or Weeks)
Start Date
Costs Units ($, K$, or M$)
Types of Workers Needed
Salaries
Days or Weeks Off

Schedule Menu

You Enter Job Information:

Job	Job Name	Duration (Weeks)	Prerequisites	Direct Costs (in K$)	Skills Needed
1	Purchase pipe	3	0	50	n/a
2	Dig 1st part of trench	3	0	5	3 Laborers
3	Purchase fittings	4	0	25	n/a
4	Lay 1st part of pipe	3	1, 2, 3	13	4 Laborers
5	Dig 2nd part of trench	3	2	5	3 Laborers

Program Displays Schedule Graph:

```
Project schedule  Jan          Feb              Mar
....................  5  12  26  2  9  16  23  2  9
Job description   0  1   2   3  4   5   6  7  8
1 Purchase pip   0--------->..>  !
2 Dig 1st part   0--------->..>  !
3 Purchase fit   0=========>  !
4 Lay 1st part                >=========>.
5 Dig 2nd part                >..>-------->
```

You Print:

Project Description

Job Descriptions

Tables

Schedule Graph

009-003

Figure B. VisiSchedule Diagram

xvii

PART I: THE LESSONS

The Lessons are designed to teach you how to use the VisiSchedule program. *Lesson One: Getting Started* shows you how to set up your computer, load the program, and start using the VisiSchedule program. *Lesson Two: Creating a Schedule* shows you how to enter the project and the jobs (you can begin experimenting on your own after you complete Lesson Two). *Lesson Three: Handling Files and Memory* shows you how to store and retrieve your schedules. *Lesson Four: Reviewing and Updating Schedules* goes beyond the basics to more features you can use. Finally, *Lesson Five: Preparing and Printing Reports* shows you how to print the four types of reports produced by the VisiSchedule program.

LESSON ONE: GETTING STARTED

SETTING UP YOUR COMPUTER

To use the VisiSchedule program, your IBM Personal Computer™ must have:

- 64K bytes or more of RAM (random access memory).

- A video monitor.

- At least two disk drives. The floppy drives can be either one-sided or two-sided, but the VisiSchedule Program Diskette and the Example Diskette are single-sided diskettes.

- The VisiSchedule Program Diskette and the Example Diskette. These diskettes are included in the VisiSchedule package.

- A printer, which is not required, but is recommended to make full use of the VisiSchedule report capabilities. See Appendix C for a list of the printers that have been tested with the program.

If you are using your IBM Personal Computer for the first time, follow the IBM *Guide to Operations* for instructions on how to set up the system unit, the keyboard, the video monitor, and the floppy disk drives.

If you have trouble setting up your computer, see your computer dealer. **Do not load the VisiSchedule program until the computer is set up and operational.**

HANDLING DISKETTES

A diskette is a small, magnetically coated plastic disk, sealed in a protective square plastic cover. Through the oval cutout in the square cover, you can see the magnetic surface of the actual diskette. To protect yourself against data loss or program damage, handle your diskettes with extreme care.

Never touch the exposed magnetic surface with your fingers or any implement; you could lose data. Protect the diskette from dust by storing it in the paper sleeve it comes in. Keep it at least six inches from magnetic fields such as those generated by your video monitor or a television. Extremes of temperature (such as on a car dash on a warm day) can damage a diskette, destroying valuable data or your VisiSchedule program. Don't bend, staple, or write on the square plastic cover with a hard pen or pencil (use only a soft felt-tip pen).

Program Diskette Serial Number

When you load the VisiSchedule program, you see the Startup menu screen. It displays your program diskette serial number in the upper-right corner of the screen. Include the serial number on the Warranty Registration Card, which is at the back of the VisiSchedule manual binder. Mail in the Warranty Registration Card to take advantage of the diskette support policy in the event your VisiSchedule program diskette is ever lost or damaged. You will also be informed of new versions of the VisiSchedule program.

LOADING THE PROGRAM

1. With the computer power turned off, place the VisiSchedule Program Diskette in Drive A with the label side facing up and the label entering last, and close the door. Put the Example Diskette in Drive B, and close the door. Turn on the System Unit power switch.

2. After several seconds, the program copyright information appears on the screen. Then, after a minute, your screen should look like Figure 1-1.
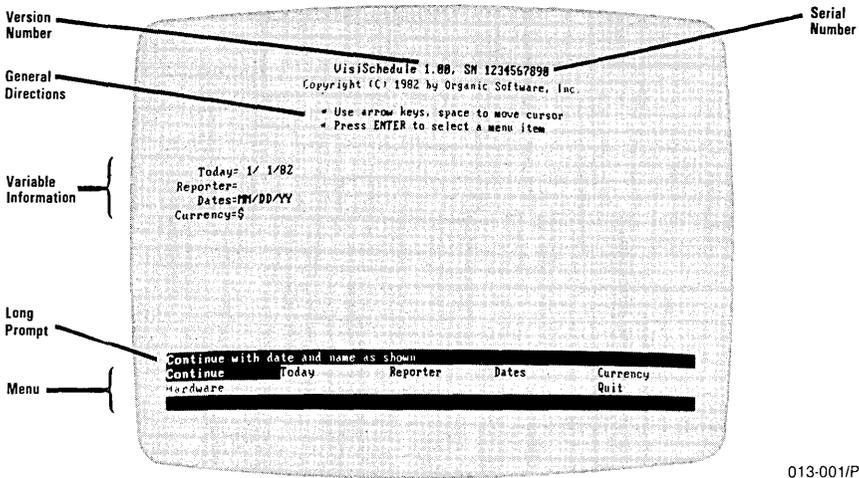
013-001/P

Figure 1-1. Startup Menu Screen

THE STARTUP MENU

The top of the Startup menu screen contains the version number, the program diskette serial number, the copyright notice and general directions on using a menu.

The middle of the screen display contains four items of information: the current date, the reporter's name, how the program displays dates, and the currency symbol to be used. The display shows the current value of each.

At the bottom of the screen is a seven-option menu. It contains two types of options: Continue, Hardware and Quit take you out of the menu, and Today, Reporter, Dates, and Currency let you enter data.

To select a menu option, highlight it with the cursor, and press the ↵ key. The cursor is the highlighted rectangle on the menu screen. In Figure 1-1, the cursor is highlighting Continue.

The top line of the menu (called the long prompt) is a description of the option that the cursor is highlighting. When the cursor is on Continue, the long prompt reads Continue with date and name as shown.

Press the → key on the keyboard. The cursor moves to the word Today. If the cursor doesn't move, press the **Num Lock** key once, and press the → key.

Each time you press the **Num Lock** key, you alternately switch the numeric key pad from entering numbers to performing the functions printed under the numbers on each key. So, with **Num Lock** in one position, the → key is active. If you press **Num Lock** once after that, the number 6 is active. For the VisiSchedule program, leave the **Num Lock** key in the position that activates the arrow keys and the other special keys (**Home, PgUp, End,** and so forth).

With the cursor on Today, the long prompt changes to Today's date.

MOVING THE CURSOR

You can move the cursor in three ways. You can type the first letter of the option name. You can use the arrow keys to move it in any one of the four directions. Or, you can press the space bar to switch the cursor up and down between menu lines.

Continue to press the → key until the cursor reaches the last option on the top line: Currency. Now press the → key once more. The cursor jumps down to the first option on the bottom line. Press the → key two more times to make the cursor jump to the first option in the top line. This is called wraparound.

Cursor wraparound works in both directions. Press the ← key when the cursor is at the upper-left corner of the menu. It jumps to the last option on the bottom line.

Move the cursor to Today, and press the ↓ key. The cursor jumps to Quit. Press the ↑ key, and the cursor jumps back to Currency in the top line. When you press the ↓ key with the cursor in the top line, the cursor jumps to the option immediately below. If there is no option immediately below, it jumps to the first option below and to the right. If the cursor is in the bottom line and you press the ↑ key, the cursor jumps to the option immediately above or to the first option above and to the left.

You can use the space bar rather than the ↑ or ↓ keys if you find it more convenient. The space bar switches the cursor back and forth between menu lines. With the arrow keys or the space bar, you can quickly move the cursor to any desired option.

The most convenient way to move the cursor is usually to type the first letter of the option name. Type T—the cursor jumps to Today. If more than one selection begins with the same letter, the cursor jumps to the first option that begins with the letter.

ENTERING STARTUP INFORMATION

With the cursor on Today, press the ↵ key. Enter the current date by typing one or two digits, as necessary, for the month and day and two digits for the year, separated by slashes. If you hear a beep, check the numbers to make sure your date is a real date. You can correct any mistakes by pressing the **BKSP** key and retyping the characters. If you still have trouble, refer to the Today option in Part II, The Reference.

When you are satisfied with your date entry, press the ↵ key to record it. Now, the program displays the date you entered to the right of Today= on the screen. Note that the cursor is highlighting Reporter. In many of the VisiSchedule menus, the cursor automatically moves to the next option after the one you just selected. Press the ↵ key, and type your name. The name can be up to 24 characters long, including blanks. If you continue typing beyond that point, the computer beeps.

As with all of the options in the program, you can cancel your new entry and bring back the previous value by pressing the **Esc** key; you must do so before pressing the ↵ key. Press the ↵ key; the name is displayed on the screen after Reporter= .

If you had typed the name incorrectly, you could edit it without retyping the entire entry. Move the cursor back to Reporter, and press the ↵ key to select the option. Suppose you typed the second-to-last character incorrectly. Move to that character by pressing the → key until the underscore is flashing under that character. Then, retype the end of the entry, and press the ↵ key to accept it. You can use this editing technique with all of the VisiSchedule options that allow you to enter data. It can save you time, especially if your entry is long.

On the next two lines of screen text, Dates=MM/DD/YY and Currency=$ show the way that the program displays dates and monetary values. For our purposes, leave these settings as they are. If you did want to change either setting, you would use the Dates and Currency options. For an explanation of these options, find them under "Options" in Part II, The Reference.

Type **H** to move the cursor to Hardware. Then, press ↵. The Hardware option takes you to the Hardware Options menu where you set up the program for your printer and for your computer's memory size.

The program is initially set up for an IBM Personal Computer with 64K of RAM (random access memory). With the cursor on Memory, press the ↵ key. You can see that the initial value is 64. If you have another amount of memory, type in the amount, which is a multiple of 32, and press ↵. Otherwise, just press ↵ to accept 64.

If you try to use your VisiSchedule Program Diskette with an IBM Personal Computer that has less memory than the current value of the Memory option, the program will not load. Be sure to change the Memory option to accommodate the computer you will be moving to if you will be changing computers.

There is no need to change any other values in the Hardware Options menu at this time. The Hardware option is explained in Appendix C, Printers. Type **Q** to highlight Quit, and press ↵ to return to the Startup menu. If you changed the value for the Hardware option, press ↵ to respond YES to the choice of restarting the system to incorporate the change. Then, hold down the **Ctrl** and **Alt** keys, and press the **Del** key to restart the program.

The Startup screen is now complete. Move on to the Main menu by selecting Continue (just press ↵, because Continue is already highlighted). You also have the option of exiting the VisiSchedule program by selecting Quit.

THE MAIN MENU

The program displays the Main menu as shown in Figure 1-2.


```
Program
Status
Area
                                    VisiSchedule Main Menu

                 Program Status:

                    Memory=Cleared
                    Room=50 more jobs
Project
Status            Project Status:
Area
                  Title=
                    Rev#=0
                    File=SCROLL.DATA
                  Prefix=B:
                  Changed=No
                    Size=0 jobs


                  Load a project from disk into memory
Menu             Load          Modify      Clear       Delete      Format
                 Save          Print       Prefix      WriteDOS    Quit
```

013-002/P
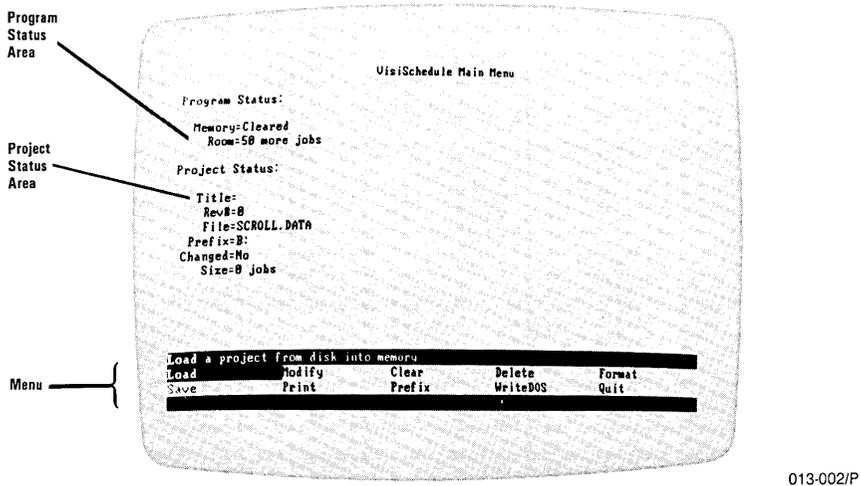
Figure 1-2. The Main Menu

The Main menu screen display has three parts:

- The Program Status area tells you whether a project is loaded into the computer memory and how many jobs can be added to the project.
- The Project Status area lists the project's title, its revision number, its file name, the disk drive prefix, whether the project has been changed since it was loaded, and the number of jobs in the project. If no project file is loaded, some of these fields will be blank.
- The Main menu at the bottom of the screen displays the options.

Like the Startup menu, the Main menu displays a long prompt for each option. The program enters this menu with the cursor on Load, which has the long prompt Load a project from disk into memory. Move the cursor to each menu option, and read the other long prompts to show you what each option does.

LESSON TWO: CREATING A SCHEDULE

By the end of Lesson Two, you will know enough about the VisiSchedule program to experiment with it on your own. You'll create a project from the start. If you have an IBM 80 CPS Matrix Printer, you'll print the Schedule graph.

If you are not continuing directly from Lesson One, bring the Main menu onto your screen. The computer memory must be clear before you can begin entering a new file. If the first line in the Program Status area does not read Memory=Cleared, move the cursor to Clear, and press ↵.

In Lesson One, you learned how to move the cursor to highlight a menu option. You also learned that you select the highlighted option by pressing the ↵ key. From now on in this manual, "Select Clear" will be used in place of "Move the cursor to Clear, and press ↵." Likewise, "Enter **ABC**" will be used in place of "Type **ABC** and press the ↵ key."

Many of the VisiSchedule options can be selected by pressing one of the function keys alone, without pressing ↵. You will learn the uses of the function keys through the course of the lessons. Appendix B, The IBM Keyboard lists all of the special keys and their uses. The VisiSchedule Pocket Reference, which is at the back of the VisiSchedule manual binder, also provides a quick reference to the special keys.

The project you are going to enter in this lesson is the schedule for creating a magazine advertisement. You will not enter the entire schedule, only the first four jobs. However, you will learn all you need to know to schedule a more complex project.

ENTERING THE PROJECT DESCRIPTION

To create a new project, select Modify. You could move the cursor to Modify, and press ↵, but you can select the Modify option just by pressing the **F3** key. The Modify menu appears on your screen. It has four options:

- The Descrip option takes you to the Project Description menu where you set options that apply to the project in general, such as the title, the unit of time to be used, and the start date.

- The Manpower option takes you to the Occupation menu where you specify up to nine occupation categories and the salaries for each.

- The Work option takes you to the Workweek menu where you specify which days or weeks employees will not be working.

- The Schedule option takes you to the Schedule menu where you enter the specifics for each job in the project. This menu is the heart of the VisiSchedule program. In this menu, you create the Schedule Graph by entering the jobs, their prerequisites, their durations, and other information.

Select Descrip. Figure 1-3 shows the Project Description menu.

Project Description:

```
    Title:
   Leader:
    Time:Days
    Start: 1/ 1/82  Fri Jan 1
Manpower:$
    Cost:K$
Critical:Yes
Revision:0
```

```
Project title
Title         Leader      Time        Start
Manpower      Cost        Critical    Rev         Quit
```
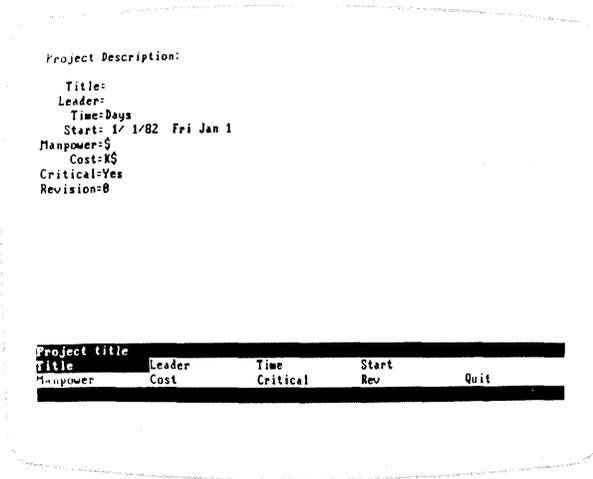
013-003/P

Figure 1-3. Project Description Menu

The menu at the bottom of the screen contains eight options in addition o Quit. The initial value for each option is listed at the top of the screen.

The options are listed below:

▸ Title is the name of the project. You can use up to 30 characters for the title. It is printed on reports the program generates.

Select Title and enter **Widgit Advertisement**. Use the **Shift** key for capital letters. If you make a mistake, press the **BKSP** key to erase the mistake. Then, retype the information. When the line is correct, press the ↵ key. Now, the screen reads Title = Widgit Advertisement. The cursor has automatically jumped to the second menu option; Leader.

▸ Leader is the name of the project leader. You can use up to 24 characters. The leader name also appears on the program's printed reports. This name can be a different name than the one entered for Reporter in the Startup menu.

Select Leader, and enter **B.Wilson**.

▸ Time is the time unit for the project, either weeks or days.

Select Time, move the cursor to Weeks, and press ↵. This project will be measured in weeks.

- Start is the date when the project is scheduled to begin. At the top of the screen, it is listed in the current date format (MM/DD/YY, in this case). This date is followed with a spelled out date that includes the day of the week. If you change the start date, all jobs in the schedule change relative to the new date.

  Select Start, and enter **1/18/82** for the start date of this project.

- Manpower is the monetary unit for salaries. You can choose dollars (\$), thousands of dollars (K\$), or millions of dollars (M\$) for this option. Later, you can enter up to four digits for salary figures. Negative numbers and decimal points are not allowed. So, you should select a unit that is meaningful for the manpower costs in each project. For example, if your salaries are in the \$100 range, you would not want to use thousands or millions of dollars as your monetary unit.

  The screen shows Manpower = \$. Because this monetary unit is appropriate for this project, leave the Manpower option as it is.

- Cost is the monetary unit for direct, one-time costs (any costs other than for salaries). The Cost option follows the same format as the Manpower option. You can choose dollars (\$), thousands of dollars (K\$), or millions of dollars (M\$) as the monetary unit. Again, cost values that you enter later are limited to four non-negative integers.

  Costs are already in K\$, which is the unit needed for this project. Leave the Cost option as it is.

- Critical indicates whether the critical path is calculated for the project. If you set this option to no, critical and noncritical jobs are displayed with the same symbol, and slack times are not displayed.

  As the screen shows, Critical = Yes. Do not change the Critical option for this project.

- Rev is the revision number of the project. This value is automatically increased by one each time the project file is saved. You can set the revision number to any integer between 0 and 999.

  For now, leave the Rev option as it is.

Your Project Description should now look like the one in Figure 1-4.
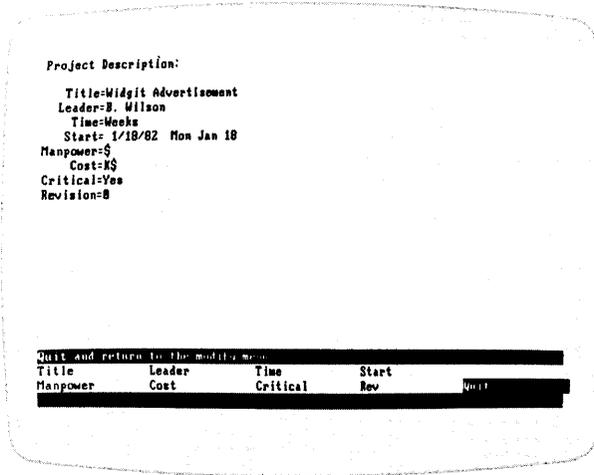
013-004/P

Figure 1-4. Updated Project Description Menu

If you see a mistake, select the appropriate option and reenter the value. When the description is correct, select Quit to return to the Modify menu.

ENTERING THE OCCUPATIONS AND SALARIES

The Modify menu returns with the cursor on Manpower. Select Manpower.

The left side of the screen lists the occupations assigned to each of the nine skills levels. You need not assign a name to each; however, it makes a report more understandable if the job calls for two engineers rather than two people in skill #1.

The right side of the screen lists the salaries for the occupations. The salaries are listed in manpower-cost units per time unit. For example, if manpower costs are defined in dollars ($) and the time unit is weeks, the salaries are listed in dollars per man-week.

To enter or change an occupation name or salary, you can use the ↑ or ↓ keys to move the cursor to the appropriate skill. You can also type the skill number, or the first letter of the skill name to move the cursor. Move the cursor to the top line, Skill # 1, and press ↵.

Now, three options are displayed at the bottom of the screen: Occupat, Salary and Quit.

1-13

Select Occupat. The current name is displayed in the entry window. For this project, change the name by typing **Copywriter**, and pressing the ↵ key.

The cursor moves to Salary. Press the ↵ key. The program asks for a salary. If you cannot express the salary accurately in a four-digit number, the salary cost unit for the Manpower option ($, K$, or M$) in the Project Description menu should be changed.

For this example, type **1000**, and press the ↵ key.

Now, the cursor highlights Quit. Press the ↵ key to quit working with skill level #1. The cursor moves to highlight Skill # 2.

Follow the same procedure to type in the occupation names and salaries listed below.

Table 1-1. Occupations and Salaries

Skill #	Occupation	Salary
2	Photographer	$1000
3	Designer	$1500
4	Model Builder	$900

The program asks for salaries in dollars per man-week, because you set Time to weeks and Manpower to dollars in the Project Description menu.

Figure 1-5 shows the Occupation listing after it is filled in. Yours should look like this. If it does not, select the appropriate skill or skills, and make the necessary changes.
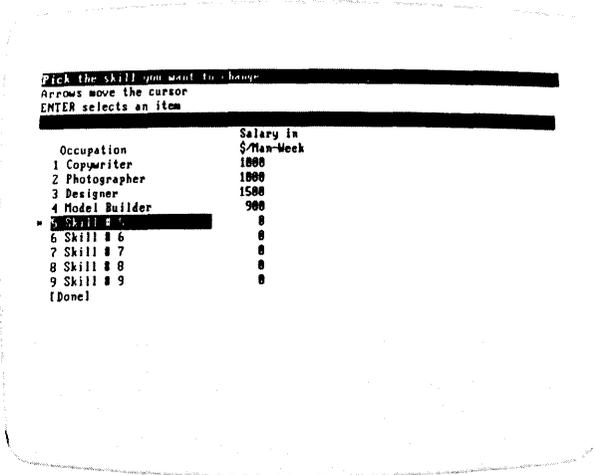
013-005/P

Figure 1-5. Completed Occupation Listing

Select [Done] to return to the Modify menu.

ENTERING THE WORKWEEK INFORMATION

The Modify menu returns with the cursor on Work. Select Work.

The Workweek menu lets you specify the working days for a normal workweek (Normal), the holidays and other days off (Days), and the non-working weeks within the project (Weeks).

Because this announcement project is measured in weeks, you can use only one option from this menu: Weeks. The Normal and Days options can be used only if you selected Days for the Time option in the Project Description menu. Refer to the Reference for an explanation of the Normal and Days options.

The Weeks option lets you identify nonworking weeks for vacations, shutdowns for retooling, and the like.

This project has one nonworking week. Select Weeks. Type 2/15/82, and press the ↵ key. 2/15/82- 2/21/82 is on the screen.

1-15

This menu works differently from other menus. As the bottom line of the screen prompts, you press the **Esc** key when the list of nonworking weeks is correct. Instead, press the ⏎ key to see what happens. The nonworking week you just entered is removed from the list. Press the ⏎ key again to put it back on the list. The ⏎ key alternately adds and removes weeks in this menu.

Your screen should look like Figure 1-6.
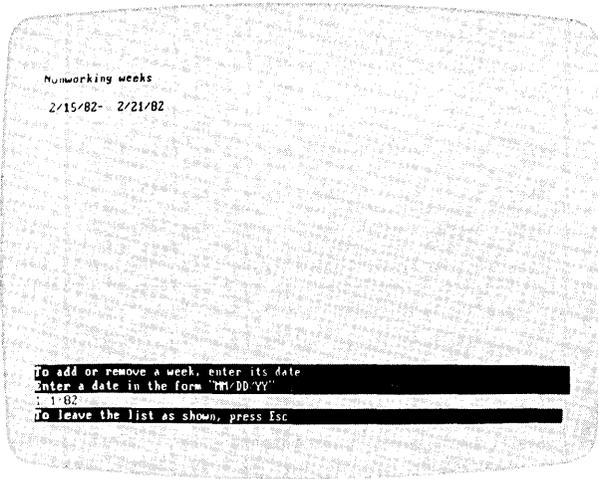
013-006/P

Figure 1-6. Nonworking Weeks Display

Press the **Esc** key to accept the nonworking week. Select Quit to return to the Modify menu. You have entered all the preliminary information necessary for the Widgit Advertising schedule. You are now ready to enter the individual jobs that make up the project.

ENTERING THE JOBS

The Modify menu returns with the cursor on Schedule. Select Schedule. Figure 1-7 shows the Schedule menu.

```
Project Schedule Jan   Feb      Mar           Apr        May         Jun
.---------------- 18 25 1  8  22 1  8  15 22 29 5  12 19 26 3  18 17 24 31 7
Job Description  8  1  2  3   4  5  6   7  8  9  18 11 12 13 14 15 16 17 18 19 Job
```

```
Add a new job to the list
Add           Insert        Erase        Move         Complete
Modify        Goto          Schedule     More         Quit
To scroll, enter a number then U D L R
```
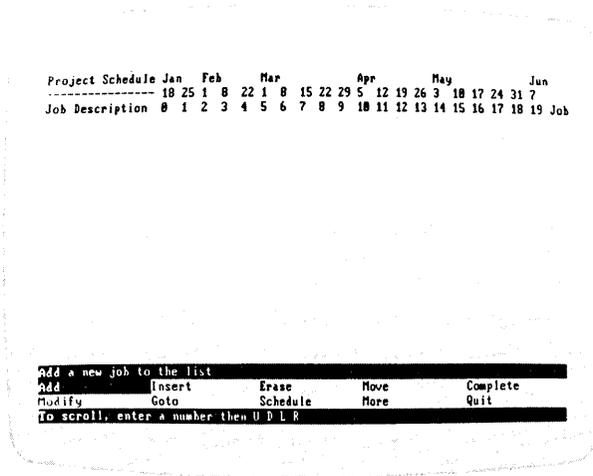
013-007/P

Figure 1-7. Schedule Menu

The Schedule menu is the core of the VisiSchedule program. From the Schedule menu, you define each job by number, name, duration, pre-requisites, earliest start times, costs, and other important factors. You enter the data; the program calculates and displays the results.

The top of the screen contains the time line in weekly units starting at 0. When you enter each job, the job's line extends from under one time unit to another in the time line, reflecting the number of weeks it takes to complete the job. Because you chose Weeks for the Time option in the Project Description menu, the time line counts each week as one time unit. Because you typed 1/18/82 for the Start option, week 0 in the time line is Jan 18.

No jobs are defined yet. All you see on the schedule area of the screen are the dates from Jan 18 through Jun 7, the 19th week after the start date.

Select Add. The program displays the Job Location menu. With the Job option, you can specify a job number. If you do not enter a job number, the program uses the number of the last job entered. When no jobs have been entered, it uses 0. Then, you specify whether the new job is placed Before or After the job number. Select After. The job you'll add will be placed after job 0.

After you specify where to add the job, the program displays the Job Specification menu as shown in Figure 1-8.
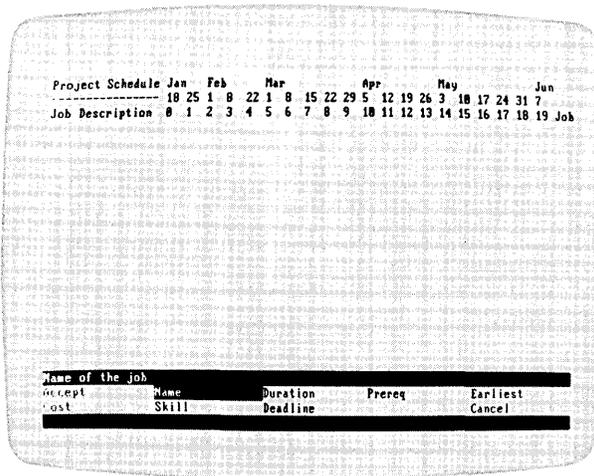
013-008/P

Figure 1-8. Job Specification Menu

This menu lets you define all details of an individual job. These details are discussed below:

- Name is a 1- to 30-character name of the job. The name is listed at the left side of the schedule. On the screen, only the first 12 characters of the name are displayed; however, the whole name is included in reports.

  Select Name, and enter Build model of product. Nothing shows on the screen until you enter all the information and select Accept in a few minutes.

- Duration is how long the job takes. The duration is expressed in a whole number of weeks or days, depending on the time unit used in the project. In this case, it is expressed in number of weeks.

  Select Duration, and enter 3 (for three weeks).

- Prereq is a list of jobs that must be completed before this job can begin. You can specify no more than nine prerequisites for a given job. The initial entry for this option is the number of the preceding job, or if no other jobs exist, the initial entry is 0.

  No other jobs are defined, so no prerequisites exist for this job. Go on to the next option.

- Earliest is the earliest date at which this job can begin. If you do not enter a date for this option, the job begins after the last prerequisite is completed.

  This job must start at the beginning because several other jobs will depend on it. Go on to the next option.

- Cost is the direct cost associated with the job. This cost is expressed in the cost units defined in the Project Description menu. For this project, it is thousands of dollars (K$).

  Material and setup costs of $10,000 are associated with this job. Select Cost, and enter 10.

- Skill lets you specify the occupational skills required for the job along with the number of people needed for each skill category. From this information, the program calculates the manpower cost for each week.

  Select Skill. The program displays the Skill menu shown in Figure 1-9.

```
Project Schedule Jan   Feb      Mar           Apr       May           Jun
--------------- 18 25 1  8  22 1  8  15 22 29 5  12 19 26 3  18 17 24 31 7
Job Description 8  1  2  3   4  5  6   7  8  9  18 11 12 13 14 15 16 17 18 19 Job
```

```
Leave skill levels as shown below
Continue        1:8.8          2:8.8          3:8.8          4:8.8
5,8.8           6:8.8          7:8.8          8:8.8          9:8.8
```
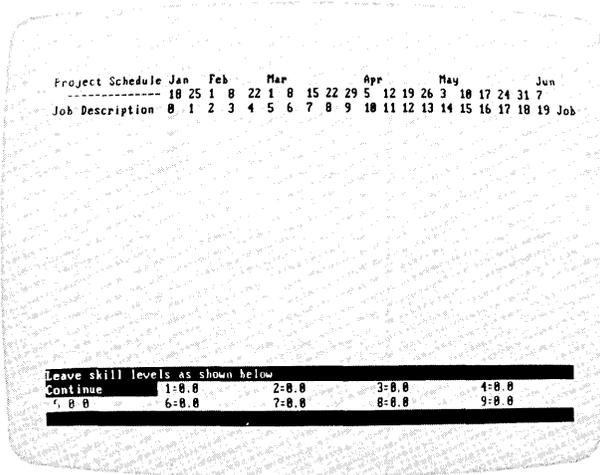
013-009/P

Figure 1-9. Skill Menu

As you move the cursor to each skill number, the program displays the assigned title in the top line of the menu. You can move the cursor in this menu with the arrow keys or by typing the skill level number. Select 4 (Model Builder) and enter 1, indicating that one model builder is needed for this job. Select Continue.

* Deadline lets you specify the date by which the job must be done. You specify the date by its day or week number on the time line. The deadline date shows on the graph as a plus sign (+), but it does not affect the scheduling. If you set a deadline beyond the project end date, it will be shown on the screen display, but will not be shown on the printed schedule.

Select Deadline. Enter **8** to mark a deadline at week 8.

You have entered all the values for job 1. If you wished, you could cancel all these values and return to the Schedule menu by selecting Cancel. Instead, select Accept to record the values. The program displays the job on the schedule and returns to the Schedule menu as shown in Figure 1-10.
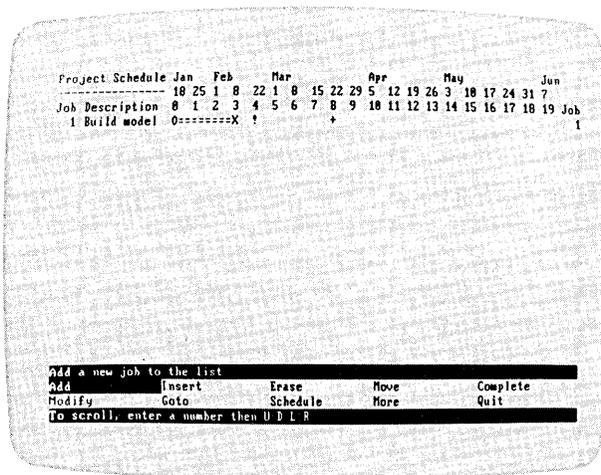
013-010/P

Figure 1-10. Schedule Menu With a Job Added

Job 1 is on the critical path, because it cannot be delayed without delaying the project. Two calendar weeks (Feb 8-22) are between time-line weeks 3 and 4, because one week (Feb 15-21) is a nonworking week. The exclamation point at week 4 marks the holiday week. The plus sign at week 8 marks the deadline for the job. Table 1-2 describes all graph symbols and how each is used.

1-20

Table 1-2. Schedule Symbols

Symbol	Description
>========>	A critical job. A critical job cannot be delayed without delaying the entire project.
>-------->	A noncritical job. Slack time is associated with a noncritical job. This symbol is used for all jobs when you choose not to show the critical path.
>........>	Slack time for a noncritical job. A job can be delayed up to its total slack time without delaying the project.
>::::::::>	A completed job.
>::::====>	A partially-completed job. The uncompleted portion could be critical or noncritical.
0========> 0--------> 0::::::::>	Jobs with no prerequisites. These jobs are scheduled to begin on a specific date, and do not depend on the completion of another job.
>========X >::::::::X	Jobs with no successors. No other jobs name these jobs as prerequisites. The last job in a project normally ends with an X. A project can have multiple finishes.
*	A zero-length job with successors. A job with zero duration marks an important event or shows a job that does not require an entire time unit.
X	A zero-length job with no successors, usually the end of a project.
+	A deadline. This marks the date when the job must be completed.
!	A break in the schedule. If the time unit is days, this marks holidays and nonworking weeks. If the time unit is weeks, this marks nonworking weeks only.

Adding vs. Inserting a Job

The Schedule menu gives you two options with which you can create jobs: Add and Insert. You can define any job with either option. Add is typically used to append a new job to the end of a schedule. Insert is used to put a new job into the middle of a schedule.

The major difference between the two options is in how they affect the scheduling of later jobs. Add puts the new job into the list of jobs, but does not have any effect on the schedules of existing jobs. Insert puts the new job between two jobs on the time line, and does affect the schedules of jobs that follow. Figure 1-11 shows the difference between the two options.

```
1   0========>
2               >====>

    Original Schedule



1   0========>          1   0========>
3           >====>      3           >====>
2           >====>      2                   >====>

Job 3 Added             Job 3 Inserted
After Job 1             After Job 1
```
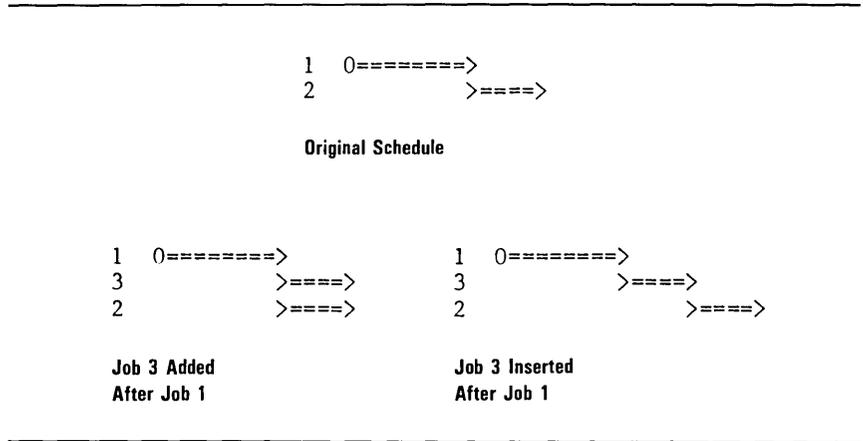
007-003

Figure 1-11. Add vs. Insert Options

When you add or insert a new job, it assumes prerequisites depending on the option used to create it and on whether it is located before or after a specific job. Figure 1-12 shows the assignment of prerequisites for all combinations.

This assignment of prerequisites is done to save you time as you enter jobs. If the prerequisites are not correct for your project, you can always change them with the Prereq option.

Initial Job List

```
1  0-->..>
2  0=====>
3        >==X            Job 3 has 1 and 2 as prerequisites
```

Adding Job 4 After Job 2

```
1  0-->..>
2  0=====>
4        >==X            Job 4 has 2 as a prerequisite
3        >==X            Job 3 has 1 and 2 as prerequisites
```

Adding Job 4 Before Job 3

```
1  0-->..>
2  0=====>
4        >==X            Job 4 has 1 and 2 as prerequisites
3        >==X            Job 3 has 1 and 2 as prerequisites
```

Inserting Job 4 After Job 2

```
1  0-->.....>
2  0=====>
4        >==>            Job 4 has 2 as a prerequisite
3           >==X         Job 3 has 1 and 4 as prerequisites
```

Inserting Job 4 Before Job 3

```
1  0-->..>
2  0=====>
4        >==>            Job 4 has 1 and 2 as prerequisites
3           >==X         Job 3 has 4 as a prerequisite
```

007-004

Figure 1-12. The Effect of Before and After on Prerequisites During Add and Insert

Adding Jobs

Now, you have one job in the schedule. When you entered job 1, it made no difference whether you used Add or Insert to enter it. Beginning with the second job, you must decide which option to use. When the new job goes on the end of the list, Add is usually used.

Select Add. Then, select After. Enter job 2 according to Table 1-3.

Table 1-3. Job 2 Data

Select Option	Enter
Name	Write copy
Duration	5
Prereq	0 (no prerequisites)
Skill	Skill 1 (Copywriter) = 1
	Continue
Accept	

The last selection is Accept from the Job Specification menu. This time you made an entry for Prereq. The program assumes a prerequisite as described in the preceding section. In this case, the assumption is wrong. There is no prerequisite, so you had to enter 0 for the Prereq option.

Your schedule should now look like Figure 1-13.
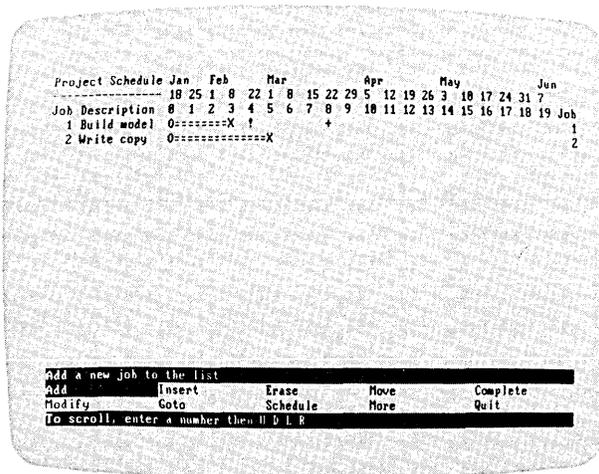
013-011/P

Figure 1-13. Schedule Menu With 2 Jobs Added

Select Add. Then, select After. Enter job 3 according to Table 1-4.

Table 1-4. Job 3 Data

Select Option	Enter
Name	Take photos of product
Duration	2
Prereq	1,2
Skill	Skill 2 (Photographer) = 1
	Skill 3 (Designer) = 1
	Continue
Accept	

This job caused quite a change in the schedule as shown in Figure 1-14. Because both jobs 1 and 2 must be completed before the photos can be taken and job 2 is two weeks longer than job 1, job 1 is no longer on the critical path. Now, two weeks of slack time are indicated by the dotted line following the normal completion. If necessary, job 1 can begin as late as week 2 (Feb 1) and not affect the schedule.

```
Project Schedule Jan   Feb        Mar                Apr         May              Jun
----------------- 18 25 1  8  22 1  8  15 22 29 5  12 19 26 3  18 17 24 31 7
Job Description   8  1  2  3  4  5  6  7  8  9  18 11 12 13 14 15 16 17 18 19 Job
   1 Build model  0--------).....)         +                                   1
   2 Write copy   0=============)                                              2
   3 Take photos              !  )=====X                                       3
```

```
Add a new job to the list
Add          Insert        Erase        Move        Complete
Modify       Goto          Schedule     More        Quit
To scroll, enter a number then U D L R
```
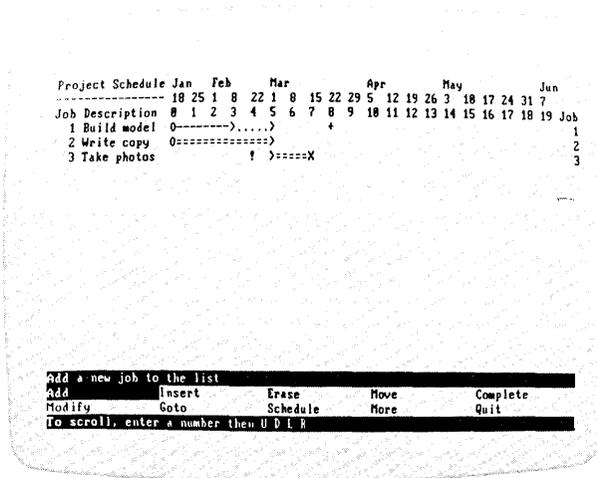
013-012/P

Figure 1-14. Schedule Menu With 3 Jobs Added

Inserting a Job

Suppose that you forgot a job. The copy must be reviewed before the photo session can take place. This job must fall between jobs 2 and 3. Job 2 has to be done before the new job can be started. The new job and job 1 have to be finished before job 3 can be started.

You could Add job 4, set its prerequisite, and use the Modify option to change the prerequisites for job 3. Or, you could Insert job 4 after job 2 and let the program do most of the work.

The VisiSchedule options that you have used so far were selected by moving the cursor to the option and pressing ↵. Insert is one of the options that can be selected by pressing only one key. Press the key on the numeric key pad that is labeled **Ins**. The screen immediately switches to the Job Location menu.

The **Ins** key works only when the Schedule menu is on the screen. Other special keys select certain options with only one keystroke; they will be explained as you use them.

Select Job and enter 2. Then, select After. Enter job 4 according to Table 1-5.

Table 1-5. Job 4 Data

Select Option	Enter
Name	Review Copy
Duration	2
Skill	Skill 3 (Designer) = 1
	Continue
Accept	

This job also caused a change in the schedule as shown in Figure 1-15. The program inserted job 4 between two jobs. Because of the change in prerequisites and the addition of two extra weeks, four weeks of slack are in job 1.

```
Project Schedule Jan  Feb     Mar          Apr       May        Jun
-.------------- 18 25 1  8  22 1  8  15 22 29 5  12 19 26 3  18 17 24 31 7
Job Description  8  1  2  3  4  5  6  7  8  9  18 11 12 13 14 15 16 17 18 19 Job
  1 Build model  0--------),..........) +                                   1
  2 Write copy   0:=============)                                           2
  4 Review copy            !  )=====)                                       4
  3 Take photos           !        )=====X                                  3
```

```
Insert a new job into the job sequence
Add          Insert          Erase      Move       Complete
Modify       Goto            Schedule   More       Quit
To scroll, enter a number then U D L R
```
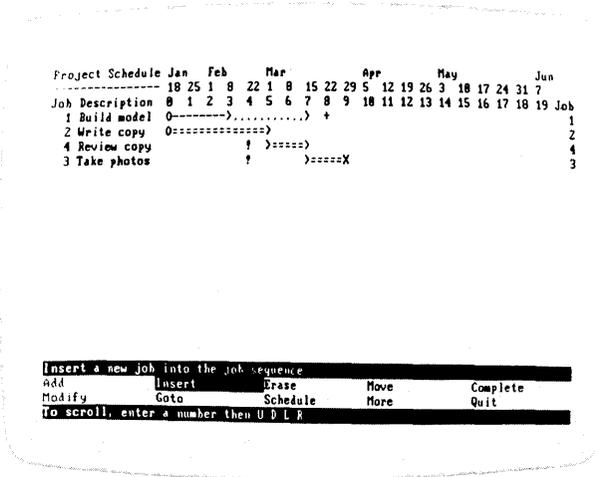
013-013/P

Figure 1-15. Schedule Menu With 4 Jobs Added

MODIFYING JOBS

To change or check a value entered for a job, use the Modify option. For this project, use the Modify option to check that job 3 has the correct prerequisites. Select Modify, and enter 3. Then, select Prereq.

The option displays the current prerequisites. At this point, you could change the prerequisites, but jobs 1 and 4 are listed as prerequisites to job 3, as you wanted.

To exit this option without making a change, press **Esc** and select Cancel.

CLEANING UP THE SCHEDULE

The schedule might look better if the most important job were at the top of the list. Neither job 2 nor job 1 have prerequisites, so they could start at the same time. But because job 2 has no slack time, it *must* begin during week 0.

The Move option lets you place a job anywhere in the list. This option does not change any aspect of the job; it only changes the job's position in the list.

   Select Move, and enter 2. Select Before. Job 2 is moved to the first position in the list, and the job list is now numbered 2, 1, 4, 3. It would look better if the jobs were numbered 1 through 4 from the top to the bottom. The Renum option does this.

   Select More. The More option takes you to an extension of the Schedule menu that contains several more options.

   Select Renum. Because this option is irreversible, the program asks if you are sure you want to renumber. Enter **Y** to continue. **N** cancels the option. The jobs are now numbered 1 through 4 as shown in Figure 1-16.
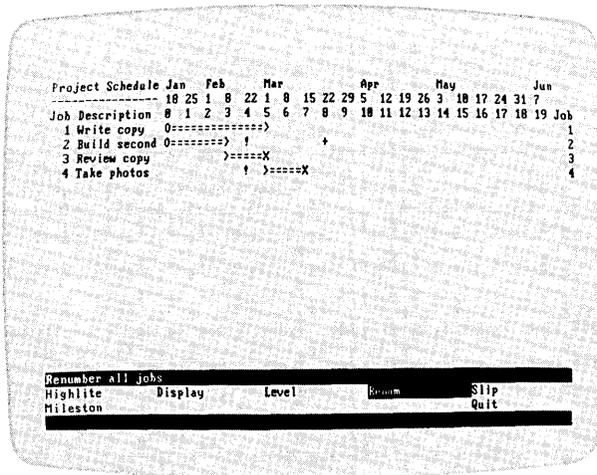
013-014/P

Figure 1-16. Reformatted Schedule

   Many more jobs can be added or inserted to complete this project. Now, you know the basics necessary to develop a complete project. You have not used all of the options (refer to Lesson Four for details on other options), but you can now create your own Schedule Graph.

   Select Quit to return to the main Schedule menu.

PRINTING THE SCHEDULE GRAPH

   You can print the Schedule Graph now if you have an IBM 80 CPS Matrix Printer. The procedure described below allows you to quickly produce a printed graph. Lesson Five describes each of the reports that the VisiSchedule program produces and explains in detail all of the options associated with report printing.

Before printing, it is a good idea to save the displayed project. Lesson Three discusses in detail all options associated with file and memory maintenance, including saving project files.

Beginning at the Schedule menu, return to the Main menu by selecting Quit twice. In the Main menu, select Save. Then, select [New name]. Enter **WIDGIT**, and press ↵. Now the project is safely on disk.

Set up your printer according to the "IBM 80 CPS Matrix Printer Instructions" in Section 3 of the IBM *Guide to Operations*.

In the Main menu, press the **F4** key to select Print. Select Graph. Then, select Print.

The program asks you if you want to look at the report on the screen before you print it. Enter **Y**. Then, press any letter key to display the top of the graph on the screen. Continue pressing any key to see the entire graph. When you are finished, the program asks if you want to print the graph.

If you don't have the standard printer, or if you're having trouble setting up your printer, press ↵ to accept NO. Otherwise, enter **Y**.

If you entered Y, the program prompts you to align the paper. Then, press any letter key. The Schedule Graph should print on your printer. The graph should look like Figure 1-17.

```
┌─────────────────────────────────────────────────────────────┐
│                                                               │
│  Widgit Advertisement. Revision 1   1/ 1/82. File WIDGIT.DATA  │
│                                                               │
│                                                               │
│                               Jan   Feb       Mar             │
│  Job Description              18 25 1  8  22 1  8  15          │
│                               0  1  2  3  4  5  6  7           │
│    1 Write copy               O=============>  .  .           │
│    2 Build model of product   O========> !  .  .  .           │
│    3 Review copy              .  .  .  >=====X  .  .           │
│    4 Take photos of product   .  .  .  .  !  >=====X           │
│                                                               │
│                 Copywriter=1     1     1     0                │
│                              1     1     0     0              │
│               Photographer=0     0     0     1                │
│                              0     0     1     0              │
│                  Designer=0     0     1     1                 │
│                              0     1     1     0              │
│              Model Builder=1     1     0     0                │
│                              1     0     0     0              │
│        Project manpower level=2     2     2     2            │
│                              2     2     2     0              │
│         Project manpower cost=1.9K  1.9K  2.5K  2.5K         │
│                              1.9K  2.5K  2.5K  0            │
│           Project direct cost=10K   0     0     0           │
│                              0     0     0     0            │
│            Project total cost=11K   1.9K  2.5K  2.5K        │
│                              1.9K  2.5K  2.5K  0            │
│                                                               │
│  Sorting order is Current order                               │
│  From the first job to the last job                           │
│  Jobs using all skills                                        │
│                                                               │
│  Symbol-Explanation                                           │
│  >-->    Duration of a normal job                             │
│  >..>    Slack time for a normal job                          │
│  >==>    Duration of a critical path job                      │
│  >::>    Duration of a completed job                          │
│  *       Job with zero duration                               │
│  +       Job deadline                                         │
│  O-->    Job with no prerequisites                            │
│  >--X    Job with no successors                               │
│  !       Time break due to holiday or week-off                │
│                                                               │
└─────────────────────────────────────────────────────────────┘
```

013-002

Figure 1-17. Schedule Graph for Widgit Project

Select Quit to return to the Main menu.

ENTERING YOUR OWN PROJECTS

You have used the most important features of the VisiSchedule pro-
gram. You know enough now to create your own projects.

You must understand a project before you begin entering the jobs. The
VisiSchedule program is an aid in scheduling and determining costs and
manpower requirements. It helps you see and understand the implica-
tions of schedule changes, slips, and prerequisites. But it cannot break
the project into manageable jobs, it cannot determine the time or man-
power requirements for a specific job, and it cannot figure the costs
associated with a job. These are things you must know before you can
enter an intelligent plan.

It is not the purpose of this manual to teach you how to analyze and
define a project. However, if you are a beginner, study the way the pro-
gram breaks down the project and the functions it provides. These give
you insight into the planning you should do before entering a project.
Try to divide your project into manageable pieces by department, by
function, or by a hierarchy of tasks before you begin your project.

LESSON THREE: HANDLING FILES AND MEMORY

Lesson Three explains how to use the computer's memory and maintain project files. A project file is the collection of all information about a project.

The program contains eight options that deal with saving, retrieving, and managing storage files:

- Load reads a project file from disk and loads it into the computer memory.
- Save copies the project data in the computer memory onto disk for future use.
- Clear erases all project data from the computer memory.
- Prefix designates the disk drive used by the Load, Save, and Delete options.
- Delete erases a project file from disk. Remember that you Delete the physical file from a disk and Clear the copy of a file from memory.
- Format erases anything written on a disk and prepares it for project file storage.

- WriteDOS converts a Pascal text file to IBM DOS format. Pascal text files are created when you send a VisiSchedule report to a disk file name rather than to a printer. The WriteDOS option allows you to edit the files, line by line, with IBM DOS. This option is explained in Part II, The Reference.

- Quit lets you exit the program. At the same time, important data, such as printer setup information, is saved on disk for the next time you load the program.

If you are not continuing directly from Lesson Two, bring the Main menu on your screen.

LOADING A PROJECT FILE

Make sure the VisiSchedule Example Diskette is in the drive indicated by the Prefix= line in the Project Status area. If you have not changed the prefix, the line should read Prefix=B:. The Prefix option is explained later in this lesson under "Changing the Data Disk Drive."

Press the **F1** key to select Load. If you are continuing directly from Lesson Two, the message, Do you wish to CLEAR memory? appears on the screen. Enter **Y** to clear the file from memory and continue with the load operation. If you had wanted to save the project in memory, you could have entered **N**.

The program lists the project data files that are stored on the data disk as shown in Figure 1-18. The file names always end with .DATA. The last items on the list are [".BACK" files] and [None].
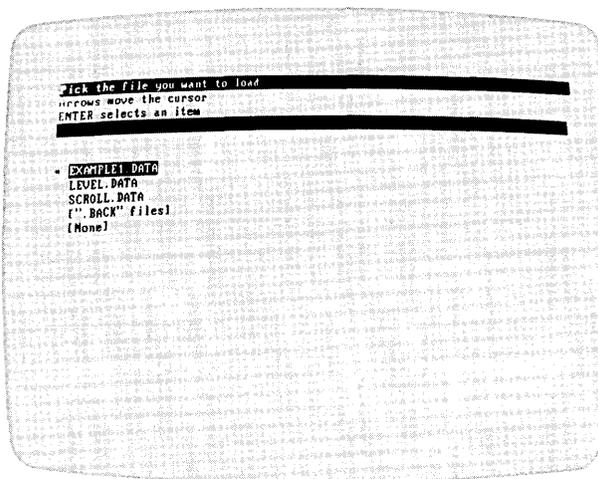
013-015/P

Figure 1-18. Load Selection Screen

To select a file for loading, move the cursor to the file name. You can move the cursor with the ↑ and ↓ keys. The cursor wraps around to the opposite end of the list when you press the ↑ key from the top of the list or the ↓ key from the bottom of the list.

You can also jump the cursor to a file name by typing the first letter of the file name. Pressing the key again jumps the cursor to the second name beginning with that letter, and so on.

You can exit the Load option without loading a file by selecting [None]. The [".BACK" files] option allows you to load the previous version of a file. .BACK files are explained under the next section, "Saving a File."

Move the cursor to the file name EXAMPLE1.DATA, and press ↵. The cursor vanishes, and the drive that is specified by the Prefix option begins running.

In a few moments, the Main menu returns to the screen with some changes. Figure 1-19 shows the Main menu screen after loading the file. The arrows indicate the items that have changed.

```
                              VisiSchedule Main Menu

                Program Status:

              ─Memory=Not cleared
                 Room=39 more jobs
  Changed        Project Status:
  Items          ─Title=First Street Water Main
                   Rev#=4
                   File=EXAMPLE1.DATA
                 Prefix=B:
                Changed=No
                 Size=11 jobs



        Load a project from disk into memory
        Load           Modify       Clear         Delete       Format
        Save           Print        Prefix        WriteDOS     Quit
```
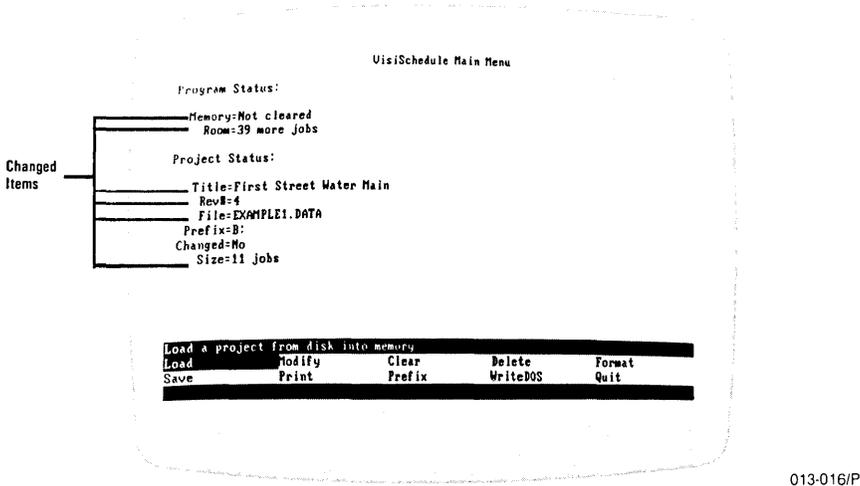
013-016/P

Figure 1-19. The Main Menu With a File Loaded

SAVING A FILE

The Save option stores the project in memory to the data disk. It is a good idea to stop and save a project file at regular intervals as you enter it. This is especially true if the project contains many jobs. By storing the data frequently, you protect yourself against accidental data loss because of a power failure or a malfunction.

Press the **F2** key to select Save. The program informs you that the project data has not been changed and asks if you want to save another copy anyway. It directs you to type **Y** for yes, or **N** for no.

It is important to keep a backup copy of your data. The methods of backing up an entire floppy disk are covered under "Backing Up Your Data" later in this lesson.

To see how the Save option works, type **Y**. The data entry line changes from NO to YES. Now, press ↵.

The program lists the names of all files that are on the data disk, just as it did when you loaded the project file. If you select an existing file name for the Save option, the program takes the already existing file and changes the suffix from .DATA to .BACK. The new file takes the .DATA suffix. You may find the .BACK files invaluable if you ever save over an existing file name by mistake. You can load a .BACK file and retrieve data that otherwise would have been lost.

Two items are on the list that are not file names: [New name] and [None]. If you select the [New name] option, you are asked for a project file name. If you select [None], the Save option is canceled, and the Main menu is displayed.

Select [New name]. The program asks for a new file name. The name may have up to 8 characters. Allowable characters are:

- A through Z. If you enter lowercase letters, they will be changed to uppercase by the program.
- 0 through 9.
- __ (underscore).

If you type any other characters for a file name, you'll get the error message, E19-Illegal character in file name. All error messages are listed in alphanumeric order in Appendix A along with possible causes and suggested responses. When the program displays an error message, you must clear it by pressing any letter key before you can select another option.

The suffix .DATA is added to the file name by the program; do not type it as part of the name. Enter the name **EXAMPLE2**, and press ↵.

To see that the project data was saved under that name, press the **F1** key to select Load. When the program asks if you want to clear memory, enter **Y**. The file named EXAMPLE2.DATA has been added to the list. Select it to load it back into memory.

CLEARING MEMORY

You will need to clear the computer memory when you want to start a new project. Otherwise, when you select Modify to enter the new Project Description, the computer will think you want to modify the project in memory, not start a new one.

Select Clear. Because the EXAMPLE2.DATA file has not been changed since it was loaded, the program removes it and returns to the Main menu. However, if a current copy of the file had not been saved on disk, the program would have informed you that the file was changed and not saved. You would have had the option of continuing with the Clear option by entering **Y** or canceling the option by entering **N**.

CHANGING THE DATA DISK DRIVE

Drive A must always contain the VisiSchedule Program Diskette. The drive currently being used to store project files (drive B) is listed in the Project Status area in the Prefix= line. Up to four additional drives can be specified with the Prefix option, although extra drives were not tested with the program.

Press the **F5** key to select Prefix. The program asks you to enter a letter from B to F. If you want to continue using Drive B for data storage, press the **Esc** key to cancel the option. If you want to use another drive, enter a letter between C and F.

If you specify a drive that you do not have, you will get the error message, E9-No unit — unit is not online the first time you try to use any option that reads data from or writes data to disk.

DELETING A FILE

You can remove files from the data disk with the Delete option.

Press the **Del** key (on the far right side of the keyboard) to select Delete. The option displays a list of the files on disk. You can exit the option without deleting a file by selecting the [None] option at the bottom of the list. The cursor is on [None] with an asterisk next to it.

The lists in the Load and Save options let you select only one item from the list. With the Delete option list, you can select several items that you want to delete.

Move the cursor from [None] to EXAMPLE2.DATA. The asterisk does not move with the cursor. With the cursor on EXAMPLE2.DATA, press the space bar. The asterisk moves from [None] to EXAMPLE2.DATA. Then, move the cursor to the file name above EXAMPLE2.DATA, and press the space bar again. This time the asterisk does not move, but a second one appears next to this second file name.

If you were to press the ↵ key at this time, both of the files marked with asterisks would be selected for deletion. But the only file you want to delete is EXAMPLE2.DATA. Without moving the cursor, press the space bar again to make the asterisk disappear from the second file name. If you were to press the space bar again, the asterisk would return.

Mark several file names for deletion, but do not press ⏎. Now move the cursor back to [None], and press the space bar. An asterisk appears before [None], and the other asterisks are removed.

Mark EXAMPLE2.DATA for deletion again by using the ↑ key to highlight it and pressing the space bar. This time, press the ⏎ key.

The program gives you one last chance to cancel the deletion. Do you really want to delete this file? appears at the bottom of the screen. A **Y** response deletes the file, and **N** cancels the option. Type **Y**, and press ⏎ to delete the file. If you mark more than one file for deletion, the program asks you about each file in turn.

FORMATTING DISKS

The Format option prepares a disk so it can be used to hold VisiSchedule project data. Without this preparation, the program will not write information on a disk. Before using this option, remove your VisiSchedule Example Diskette from Drive B.

Press the **F6** key to select Format. The program asks you to put a blank disk into the drive currently specified by the Prefix option. Insert a blank disk or a used disk that contains data you no longer want to keep. Then, press ⏎ to continue with the function.

If the disk has ever been used, the program warns you that continuing will erase all the data on the disk. Enter **Y** to continue with the operation and destroy the data. If you did want to save the data, you could enter **N** to cancel the formatting. If the disk is brand new, the program immediately formats the disk.

BACKING UP YOUR DATA

It is always important to create backup copies of your computer data. While accidents and malfunctions are infrequent, they do happen. A good rule of thumb to follow when considering making backup copies is: *Back up everything you cannot afford to lose or cannot afford the time to re-enter.* Extra diskettes are cheap. Your time and data are not.

To make a copy of a data diskette, you would load the IBM DOS Diskette, and use the DISKCOPY command. Refer to the IBM *Guide to Operations* for instructions.

EXITING THE PROGRAM

You should use the Quit option every time you are finished using the program. Using Quit, rather than simply removing your floppy disks and turning off the computer, saves several items of information on the VisiSchedule Program Diskette. This information is used the next time you load the program. This information includes:

- The name of the last file you loaded or saved, whichever occurred last.
- The prefix.
- The current date.
- The reporter's name.
- The date format.
- The currency symbol.
- The printer setup information, which is discussed in Lesson Five.

If you do not use the Quit option, the current information is lost. The next time you load the program, you will get the information from the last time the Main menu Quit option was used.

Select Quit. It takes only a few seconds to exit the program in this orderly manner. If you had made any changes to the project file, the program would have reminded you to save them. In that case, you can enter **Y** to continue with the Quit option in which case you will lose any changes to the project, or you can enter **N** to return to save the changed project file.

Using the Quit option is a good habit to get into. The reminder that you have not saved a changed project file can save you from having to re-enter a lot of data.

The screen informs you that pressing **ENTER** restarts the program. Press the ↵ key. When the Startup menu appears, select Continue to reach the Main menu.

LESSON FOUR: REVIEWING AND UPDATING SCHEDULES

This lesson covers all of the Schedule menu options not covered in Lesson Two. In Lesson Two, you used several options from the Schedule menu: Add, Insert, Move, Modify, and Renum. This lesson discusses options that allow you to move around the graph, display the current status of your project, enhance your graph with additional options, and deal with the costs of your project.

If you are not continuing directly from Lesson Three, bring the Main menu onto your screen. If the first line in the Program Status area does not read Memory=Cleared, select Clear.

Make sure the VisiSchedule Example Diskette is in the disk drive specified in the Prefix option. Press the **F1** key to select Load. Load the file named SCROLL.DATA. Proceed to the Schedule menu by selecting Modify and Schedule. Your screen should look like Figure 1-20.

```
Iroject Schedule Jan
.-------------- 4  5  6  7  8  11 12 13 14 15 18 19 20 21 22 25 26 27 28 29
Job Description 0  1  2  3  4  5  6  7  8  9  10 11 12 13 14 15 16 17 18 19 Job
  1 Job A       0==)
  2 Job B          )=======)                                               1
  3 Job C          )-----)..)                                              2
  4 Job D                 )=======X                                        3
  5 Job E              )==)                                                4
  6 Job F                 )==========X                                     5
  7 Job G              )==)                                                6
  8 Job H              *                                                   7
  9 Job I                 )=======)                                        8
 10 Job J                 )-----)..)                                       9
 11 Job K                 )====X                                          10
 12 Job L                          )========)                             11
 13 Job M                                 )=====)                         12
 14 Job N                                       )==)                      13
 15 Job O                                 )=====X                         14
 16 Job P                                       )=============            15
 17 Job Q                                                                 17
Add a new job to the list
Add            Insert        Erase        Move         Complete
Modify         Goto          Schedule     More         Quit
To scroll, enter a number then U D L R
```

013-017/P

Figure 1-20. SCROLL.DATA Schedule Menu

MOVING THE SCHEDULE GRAPH

For many projects, the Schedule is so long that jobs continue off the right side of the screen display. Or, you may have more than 17 jobs in a project. If so, you often want to display a different part of the schedule. To do so, you can scroll the screen in any direction.

The Schedule display is like a window that views a portion of the total schedule. Scrolling moves the entire schedule underneath the window in the direction you specify. In other words, when you scroll left, you move all the jobs to the left to look further ahead in time in the schedule. When you scroll up, all the jobs move up so you can see the jobs nearer the bottom of the job list.

Across the bottom of the Schedule menu are the scrolling instructions: To scroll, enter a number then U D L R (up, down, left, and right).

Type **2**. The bottom line of the menu changes to read U, D, L, & R will scroll 2 units. Now press **L**. The displayed schedule now begins with day 2, as shown in Figure 1-21. Compare the schedule portion in Figure 1-21 with the same portion in Figure 1-20.

```
Project Schedule Jan                                              Feb
           ----------  6  7  8  11 12 13 14 15 18 19 20 21 22 25 26 27 28 29 1  2
Job Description  2  3  4  5  6  7  8  9  10 11 12 13 14 15 16 17 18 19 20 21 Job
  1 Job A                                                                   1
  2 Job B     ======)                                                       2
  3 Job C     --->..)                                                       3
  4 Job D             )========X                                            4
  5 Job E             )==)                                                  5
  6 Job F                )==========X                                       6
  7 Job G                )==)                                               7
  8 Job H                 *                                                 8
  9 Job I                   )=======)                                       9
 10 Job J                   )----->..)                                     10
 11 Job K                   )=====X                                        11
 12 Job L                         )========)                               12
 13 Job M                              )=====)                             13
 14 Job N                                 )==)                             14
 15 Job O                              )=====X                             15
 16 Job P                                    )================)            16
 17 Job Q                                                      )== 17
```
```
Add a new job to the list
Add            Insert       Erase       Move        Complete
Modify         Goto         Schedule    More        Quit
To scroll, enter a number then U D L R
```

013-018/P

Figure 1-21. Schedule After a Scroll

Type **2R**. The beginning of the schedule (day 0) is again visible. Move the schedule up and down in the window to get a feel for it.

You do not have to enter the number to move a single time unit or line. R moves the schedule one time unit to the right, U, up, and so forth.

Scrolling works only in the main Schedule menu; it does not operate in the extension menu that is reached by way of the More option.

Some of the special keys scroll the schedule a complete "page" up, down, left, or right when the Schedule menu is on the screen. Starting with the graph in its original position, press the **F10** key; the schedule moves left to begin with day 20. Press the **F9** key; the first page of the schedule returns, ending with day 19.

Now, press the **PgDn** key. The schedule shows you the next page down the list of jobs. Press the **F10** key to see the right-hand page. Press the **PgUp** key, then the **F9** key to return to the beginning of the schedule.

Practice with the **PgUp**, **PgDn**, **F9**, and **F10** keys to get used to the way they work.

Using the Goto Option

One more way to move the schedule within the window is to move the cursor to the Goto option. The Goto option lets you specify the job with which you want the schedule display to begin.

1-42

Select Goto. The program asks you to enter a job number. Enter **5**. The display changes so that job 5 is the first job on the list and the time line begins with the beginning of job 5, as shown in Figure 1-22.
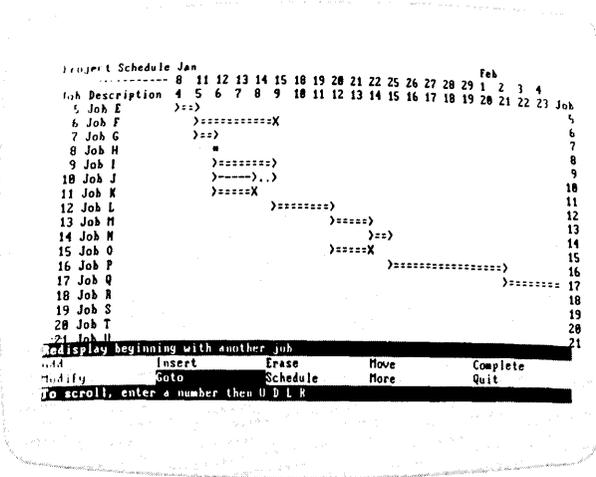
013-019/P

Figure 1-22. Schedule After Goto

Two more special keys work with the VisiSchedule program: **End** and **Home**. Press the **End** key. The schedule moves to begin with the last job. Pressing the **End** key is equivalent to selecting Goto and entering the last job number. The **Home** key begins the schedule with job 1; try it.

CHANGING A SCHEDULE

If you want to change one of the values you specified for a particular job in the Job Specification menu, use the Modify option, as discussed in Lesson Two. To change a schedule after the project has begun, use the Complete, Slip, or Erase options.

Select Quit twice to return to the Main menu. Press the **F1** key to select Load. Enter **Y** in response to the Do you wish to CLEAR memory prompt. Then, select the EXAMPLE1.DATA file for loading.

Press the **F3** key to select Modify. Then, select Schedule.

Completing a Job

For you to monitor your project, a schedule must reflect the current status of a job. The schedule should show the completed work as well as the scheduled work.

The Complete option lets you indicate which jobs are completed. As you saw in Table 1-2, a completed job is shown as a series of colons (:::).

Select Complete. The program asks for a job number. Enter **4**. The program issues an error message indicating that it cannot mark job 4 completed because there are prerequisites to job 4 that have not been completed. You cannot complete a job unless all prerequisites to that job are completed first.

Select Complete again. Remember, you must press a letter key to clear the error message before you can continue. This time enter job number **1**. The display asks for the number of workweeks that are completed. It also tells you that the job duration is three weeks. In this example, you can show up to three weeks as completed. If you enter a value greater than the job duration, the program assumes the job duration.

Type **1**, and press ↵. For job 1, the program changes the first week of dashes to colons. Suppose you discover a problem with job 1, and you find you must start over. You can uncomplete a job by specifying 0 for the number of weeks. Do that for job 1 now by selecting Complete again, and entering **1**, then **0**. If you attempt to complete a job that is already completed, the program asks if you want to uncomplete it.

Slipping a Schedule

It is not a law of nature that schedule slips must happen, but they do occur. The VisiSchedule program provides an option that adjusts the schedule for a project slip.

Identify all completed work before indicating a slip; as you will see, it has an effect on the project completion date. Before beginning, mark job 1 as completed, job 2 as having 2 weeks completed, and job 3 as having 3 weeks completed. Follow these steps:

Select Complete, enter **1**, and enter **3** to mark job 1 as completed.

Select Complete, enter **2**, and enter **2** to mark 2 weeks of job 2 as completed.

Finally, select Complete, enter **3**, and enter **3** to mark 3 weeks of job 3 as completed.
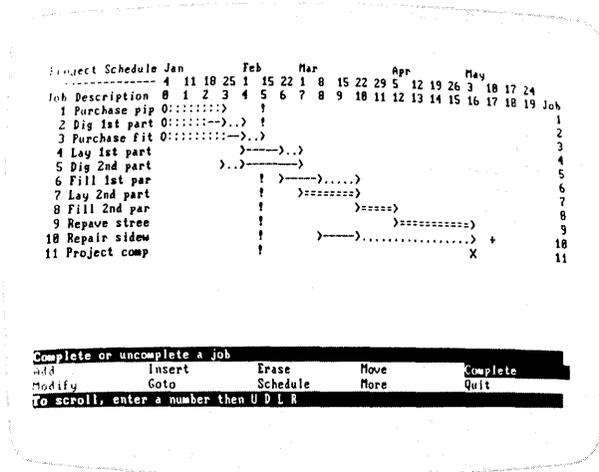
013-020/P

Figure 1-23. Schedule With Completed Jobs

Select More; then, select Slip. The program asks what date you want to slip all jobs to. Enter **4**, for week 4.

As Figure 1-24 shows, the uncompleted portions of jobs 2 and 3 have slipped to week 4. The remainder of job 2 is now on the critical path. All following jobs were adjusted accordingly. The project completion date is now week 17. It had been week 16 before the slip.
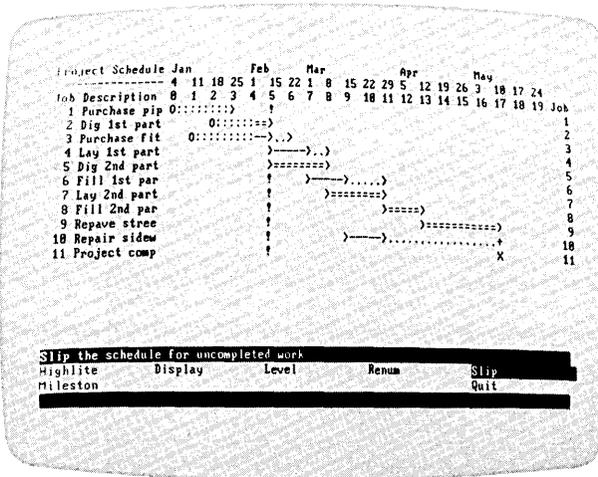
013-021/P

Figure 1-24. Slipped Schedule

To change the schedule back, select Slip and enter **0**.

If you had not indicated what work was completed, the project would have slipped to week 19. Uncomplete jobs 1, 2, and 3. Then, slip the schedule to week 4 to see how important it is that the schedule be up-to-date.

Return the schedule to its original condition by selecting Slip and entering **0**.

Erasing a Job

After entering all the jobs in a project, you may need to remove one or more of them from the list as the project's requirements change. Job 3 is just such a job you may wish to erase.

Recall that the **Del** key selects the Delete option when the Main menu is on the screen. When the Schedule menu is on the screen, the **Del** key selects the Erase option.

Select Quit to return to the main Schedule menu. Then, press the **Del** key to select Erase. Enter **3**. The schedule shifts as shown in Figure 1-25.
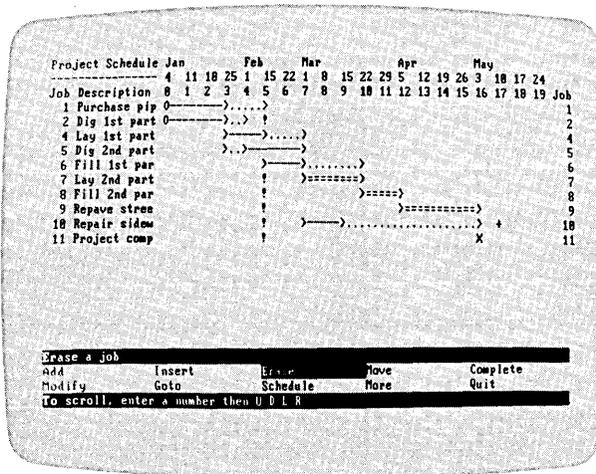
013-022/P

Figure 1-25. EXAMPLE1.DATA Schedule After Erasing Job 3

When you erase a job, the program takes the erased job's prerequisites and assigns them to the job's successors. In the example above, jobs 4 and 5 now have job 2 as a prerequisite. Job 2 had been a prerequisite of job 3, which you erased.

Figure 1-26 explains how the program handles prerequisites after a job is erased. As with prerequisites for the Add and Insert options, the figure illustrates the prerequisites that the program automatically assigns. You can always change prerequisites with the Prereq option if the automatically assigned job numbers are incorrect for your project.

Before Erase

```
1  0-->.>
2  0====>
3       >====>              Job 3 has 1 and 2 as prerequisites
4             >====>        Job 4 has 3 as a prerequisite
5             >-->          Job 5 has 3 as a prerequisite


After Job 3 is Erased

1  0-->.>                   Job 1 has no prerequisites
2  0====>                   Job 2 has no prerequisites
4       >====>              Job 4 has 1 and 2 as prerequisites
5       >-->                Job 5 has 1 and 2 as prerequisites
```

007-012

Figure 1-26. The Effect of Erase on Prerequisites

As with other options, you can cancel the Erase option by pressing the **Esc** key instead of a job number.

DISPLAYING INFORMATION

The Highlite and Display options let you display prerequisites and successors, and costs, respectively. The Mileston option displays significant dates in the Tabular Job Report described in Lesson Five.

Highlighting

It is not always obvious from the VisiSchedule display which jobs are prerequisites or successors to a given job. You can display this information for a single job at a time with the Highlite option.

1-47

Select More to reach the Schedule menu extension. Then, select Highlite. The program asks for a job number. Enter 4. The program highlights the names of jobs 1, 2, 4, 6, and 7, and the number of job 4 as shown in Figure 1-27.
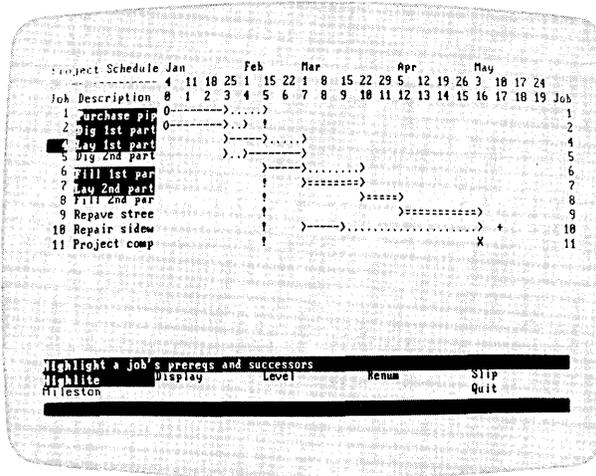
013-023/P

Figure 1-27. Highlighted Schedule

The program highlights both the number and name of the job you selected. It also highlights the names, but not the numbers, of the pre-requisites and successors. While you can see no visual difference between prerequisites and successors, it should be obvious which are which by glancing at the time line. The program does not require it, but jobs are usually listed in time sequence from the top to the bottom of the list.

Select Highlite again, and enter 0 instead of a job number to turn off the highlighting.

Displaying Costs

The Display option lets you display a line of manpower or cost information across the bottom of the schedule display, above the menu.

Select Display. The program replaces the Schedule menu extension with the Display menu as shown in Figure 1-28.
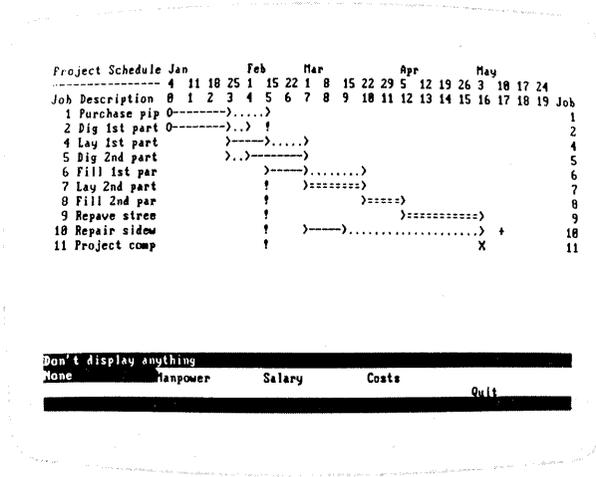
013-024/P

Figure 1-28. The Display Menu

Select Manpower. The program asks you to enter the skill level. Your options are a single skill level or the total of all skill levels. Type 1, for skill category #1 (operating engineers), and press ↵. The program displays the weekly requirements for operating engineers as shown in Figure 1-29. The numbers are staggered to allow room for larger numbers for each time unit.
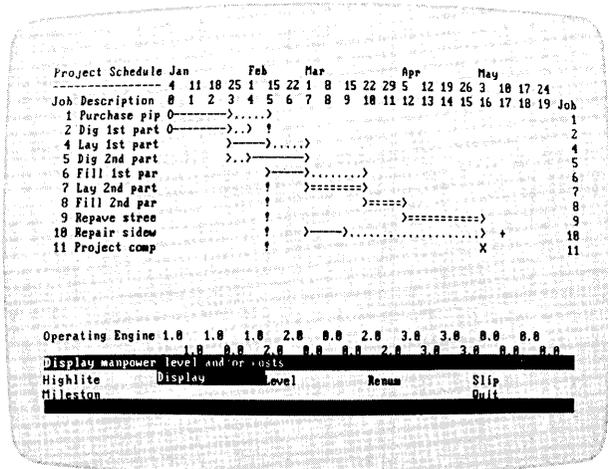
013-025/P

Figure 1-29. Schedule With Manpower Level

You can display a single skill level by entering the skill level number. If you enter **0**, the program displays the total of all skill levels specified for each time unit.

The Salary and Costs options display the manpower costs and the direct costs as shown in Figures 1-30 and 1-31. With the Salary option, you can display the manpower costs for a single skill level or the total for all skill levels.
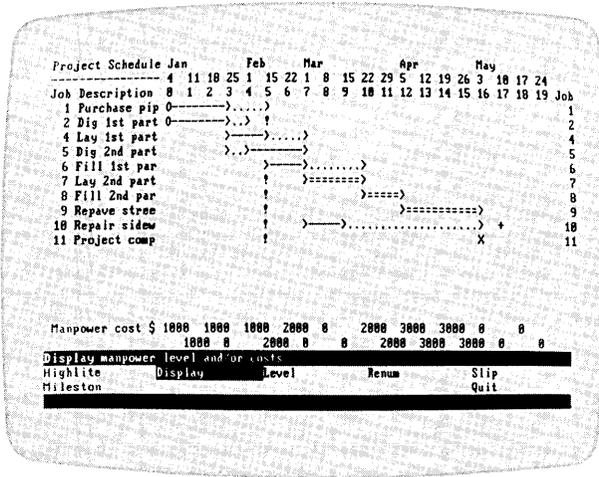
013-026/P

Figure 1-30. Schedule With Manpower Costs

```
Project Schedule Jan        Feb    Mar         Apr       May
                .------------ 4  11 18 25 1  15 22 1  8  15 22 29 5  12 19 26 3  18 17 24
Job Description  8  1  2  3  4  5  6  7  8  9  18 11 12 13 14 15 16 17 18 19 Job
   1 Purchase pip 0-------->.....>                                              1
   2 Dig 1st part 0-------->..> !                                              2
   4 Lay 1st part          >----->.....>                                      4
   5 Dig 2nd part          >..>-------->                                      5
   6 Fill 1st par               >------>........>                             6
   7 Lay 2nd part            !     >========>                                 7
   8 Fill 2nd par            !           >=====>                              8
   9 Repave stree            !               >===========>                    9
  18 Repair sidew            !     >------>................>  +               18
  11 Project comp            !                             X                  11



   Direct cost K$ 55   8    5    8    8   18   38   8    8    8
                    8    13   18    5   8    8    8    8    8    8
Display manpower level and or costs
Highlite       Display       Level        Renum       Slip
Mileston                                               Quit
```

013-027/P

Figure 1-31. Schedule With Direct Costs

To remove the cost lines from the screen, select the Display option, and select None.

Setting Milestones

A milestone is a significant event in your project. You can mark the beginning or end of any job as a milestone. Then, you can choose to sort the jobs by milestone in the Job Description Report, or you can choose milestone dates to be one of the columns in the Tabular Job Report. The reports are described in Lesson Five.

To set a milestone, select the Mileston option. The program first asks for the job number. Type **5**, and press ↵. It then displays the Milestone menu as shown in Figure 1-32.

1-51

```
Project Schedule Jan        Feb        Mar              Apr         May
------------------- 4  11 18 25 1  15 22 1  8  15 22 29 5  12 19 26 3  18 17 24
Job Description  0  1  2  3  4  5  6  7  8  9  18 11 12 13 14 15 16 17 18 19 Job
  1 Purchase pip 0-------->.....>                                            1
  2 Dig 1st part 0-------->..> !                                            2
  4 Lay 1st part          >----->.....>                                     4
  5 Dig 2nd part          >..>------>                                       5
  6 Fill 1st par             >----->.......>                                6
  7 Lay 2nd part            !      >=======>                                7
  8 Fill 2nd par            !            >=====>                            8
  9 Repave stree            !                 >============>                9
  18 Repair sidew           !      >----->...................> +            18
  11 Project comp           !                              X                11
```

```
Mark a milestone at the end
Start              End              None
                                                      Quit
```
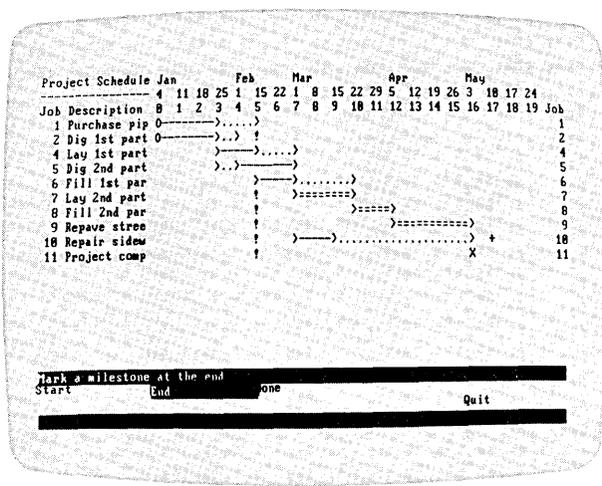
013-028/P

Figure 1-32. The Milestone Menu

The Milestone menu lets you mark a milestone at the Start or the End of a job. You can cancel a previously marked milestone by selecting None. You can exit the menu, leaving the milestones as previously set, by selecting Quit.

For this example, select End. In Lesson Five, you will print the Tabular Job Report and print the project milestones.

EVENLY DISTRIBUTING MANPOWER

The Schedule menu contains two options to help you even out your manpower needs: Level and Schedule.

The Level option moves the starting dates of noncritical jobs within the slack time to even out the job responsibilities in a single skill category. The option levels only one category. When leveling is possible and multiple skills are used, the leveling of one may adversely affect others. The option does not change the scheduling of a critical job.

The Schedule option lets you change the starting date of any job in the project, critical or noncritical. The option warns you that changing critical jobs or changing noncritical jobs beyond certain limits will affect the project completion date.

Using the Level Option

This example is constructed to show the maximum capability of the Level option. The result in this example is dramatic; do not expect results like this every time you use the option. Many projects cannot be leveled.

Return to the Main menu by selecting Quit three times. Select Save, and select [New name]. Enter **EXAMPLE3** for the file name. You'll use this file in Lesson Five. Press the **F1** key to select Load. Respond with **Y** when the program asks if you want to clear memory. Load the file named LEVEL DATA.

Select Modify. Then select Schedule to reach the Schedule menu. Select More to reach the Schedule menu extension.

Select Display, then Manpower, and enter 1.

You should now have the LEVEL DATA file displayed on the screen with manpower levels for skill #1, as shown in Figure 1-33.


```
Project Schedule Oct                        Nov
---------------- 18 19 28 21 22 25 26 27 28 29 1  2  3  4  5  8  9  18 11 12
Job Description  8  1  2  3  4  5  6  7  8  9 18 11 12 13 14 15 16 17 18 19 Job
  1 Nine Clerks  0----------)...................)                          1
  2 Three Clerks 0-----)..................)                                 2
  3 Eight Clerks       )----------)................)                       3
  4 Six Clerks   0=====)                                                    4
  5 Seven Clerks       )=====)                                              5
  6 Four Clerks  0-----).....)                                              6
  7 Two Clerks              )========)                                      7
  8 One Clerk                   )===========)                               8
  9 Done                              X                                     9


        Clerk 22.8  24.8  18.8  2.8   1.8   1.8  8.8  8.8  8.8  8.8
              22.8  24.8  2.8   1.8   1.8  8.8  8.8  8.8  8.8  8.8
Display manpower level and or costs
Highlite      Display        Level           Renum       Slip
Mileston                                                  Quit
```

013-029/P

Figure 1-33. Schedule Menu with LEVEL.DATA

Select Quit to return to the main portion of the Schedule menu. Notice that the number of people needed on any given day varies from 24 to 1. This project would be easier to manage if there were not such fluctuations. Many of the jobs have considerable slack time, which indicates that leveling might be possible.

The Level option has no effect on a project that has no slack time. It affects only those jobs that are not on the critical path.

Select More. Select Level, and enter 1.

The program indicates that it is leveling the project. After a short period some of the noncritical jobs move within their slack periods. Finally, the program revises the manpower levels for skill #1. Figure 1-34 shows the leveled schedule.
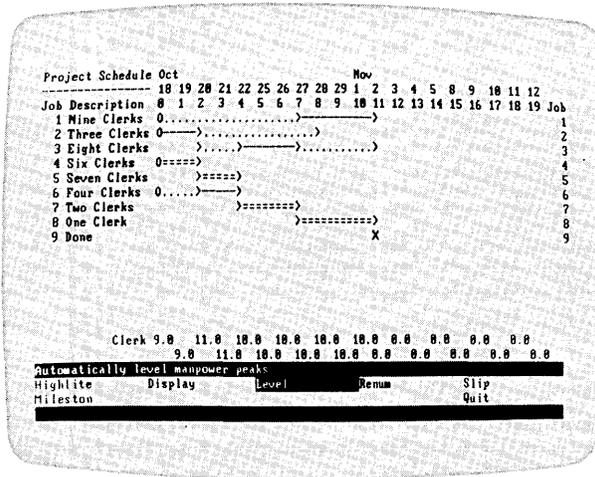
013-030/P

Figure 1-34. LEVEL.DATA After Leveling

The changes to the schedule are not permanent. You can return to the original schedule at any time by selecting Level again and entering **0** when the program asks what skill you want to level. When you cancel the leveling, the program also asks if you want to undo any scheduling. This question refers to schedule changes made with the Schedule option, which is described in the next section.

Select Level again, enter **0**, and answer **N** to the scheduling question.

The schedule is now back as it was when you first loaded it. Leveling and scheduling can be canceled even after you have put the file on disk.

Using the Schedule Option

The Schedule option in the main portion of the Schedule menu lets you change the start date of any job in the project.

Select Quit to return to the main portion of the Schedule menu. Select Schedule, and enter **1**.

The program then asks for a start date in the form of a time period number. The bottom line prompts: Try between 0 and 7. This means that any start date in the range 0 through 7 does not affect the project completion date.

Enter **1**. Notice that job 1 now starts on day 1 instead of day 0. Also the manpower required on day 0 dropped from 22 to 13, and the manpower for day 5 jumped from 10 to 19.

Select Schedule again, and enter **5**.

Job 5 is a critical path job as noted on the bottom line of the prompt. As the prompt indicates, you should enter a 0 to avoid delays in the project. Changing the start date of a critical path job changes the project completion date.

Enter **3**, and watch the schedule change. Jobs 4 and 5, which were previously critical, are now noncritical. The completion date was day 11 and is now day 12.

Select Schedule again, enter **5**, and enter **0**. Job 5 returns to its original state, starting on day 2. Do the same for job 1; that is, enter **0** after entering job 1. The schedule is now back to its original state.

As mentioned earlier, you can cancel all modifications made with the Schedule option by selecting the Level option, entering a skill number of **0**, and entering **Y** when asked if you want to cancel scheduling.
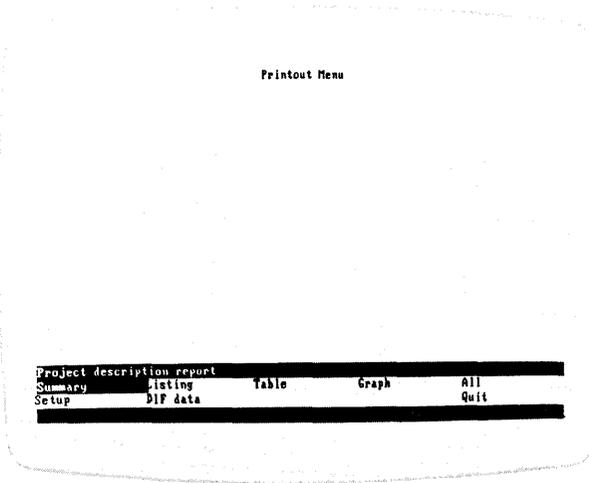
LESSON FIVE: PREPARING AND PRINTING REPORTS

Lesson Five shows you how to set up your printer, and how to create and print the VisiSchedule reports. The program produces four reports:

- The Project Description Report includes a general description of the project, the skills needed, the time allotted and used, and the costs predicted.

- The Job Description Report lists the characteristics of each job, such as the duration, the start and end dates, and the costs.

- The Tabular Job Report can list any set of job characteristics that you want. You can select the content and the order in which jobs appear.

- The Schedule Graph contains the project's time line, the manpower and cost totals, and a legend explaining the schedule.

Before using certain printers, you must use the Hardware Options menu to specify information about your printer. If you have an IBM 80 CPS Matrix Printer, continue with this lesson. If you have another printer, refer to Appendix C, Printers, for instructions. Then, return to this point.

Begin this lesson at the Main menu. Load the file named EXAMPLE3.DATA. Press the **F4** key to select Print. The Printout menu, as shown in Figure 1-35, appears on your screen.

Printout Menu

```
Project description report
Summary        Listing       Table        Graph        All
Setup          DIF data                                Quit
```

013-031/P

Figure 1-35. Printout Menu

This lesson covers all the Printout menu options except DIF data, which is covered in Appendix D.

The options in the top line create the reports. Summary creates the Project Description Report, Listing creates the Job Description Report, Table creates the Tabular Job Report, and Graph generates the Schedule. The last option on the right, All, generates all four reports. As usual, the Quit option returns you to the previous menu, the Main menu.

SETTING UP FOR YOUR PRINTER

Before printing your first report, you must describe your printer to the program.

Select Setup. The program displays the Printer Setup menu as shown in Figure 1-36.
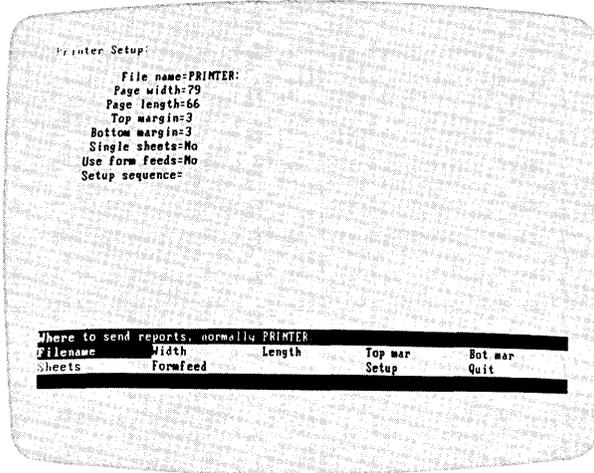
013-032/P

Figure 1-36. Printer Setup Menu

The top of the page lists the current setup. Most of the values that you must set are dependent on your printer. Refer to your printer manual for information. If the manual is not definite about some of the options, print a short sample report to see if you get what you want.

Each of the printer setup options, except Setup sequence, has an initial setting. If you change the settings and exit the program with the Quit option in the Main menu, your new settings are recorded on the VisiSchedule Program Diskette. If you do not exit the program with the Quit option, the program keeps the old settings.

The setup options are listed below:

• Filename specifies where the report data is sent. If you have the IBM 80 CPS Matrix Printer, enter PRINTER. Otherwise, enter either PRINTER or REMOUT, depending on the responses you made in the Hardware Options menu.

  The Filename can also be a disk file name when you are using the DIF data option, or when you want to edit the report with IBM DOS. The DIF data option is explained in Appendix D.

  If you send a report to a disk file name, it is saved with the suffix TEXT instead of .DATA. You can then use the WriteDOS option in the Main menu to convert the file from Pascal to IBM DOS format. Refer to the WriteDOS option in Part II, The Reference for details.

1-58

▸   Top mar and Bot mar specify the number of blank lines to be left at the top and bottom of the printed report page. The program specifies the value of 3 for both options unless you change them.

▸   Width specifies the maximum width of the printer in columns (or characters). You can set this option to a value that is smaller than the printer, but you should not set it to a value that is larger than the printer. The Width can be any value in the range 79 through 218. If you do not enter a value, the program uses the initial value, which is 79.

●   Length specifies the length of the printed page in lines. The value for this option depends on the length of the paper you use and the number of lines-per-inch your printer prints. The Length can be any value in the range 18 through 255. If you do not change the initial value, the program uses 66. A device that prints at 6 lines per inch would use a value of 66 for an 11-inch page.

●   Sheets specifies whether you are using single sheets or continuous form paper. When this option is set to yes, the program stops at the end of each page so you can put in a new sheet, align your paper, or tear off the printed page. To use this option, set it to Y.

●   Formfeed specifies whether your printer accepts form feeds (page feeds) or only a series of line feeds. If your printer does not accept form feeds and if this option is set to YES, there will be no page breaks in your multi-page reports. The program uses NO as the initial value.

●   Setup specifies a setup string to make your printer print in special modes, such as double spaced, compressed, or double strike. Refer to Table C-3 in Appendix C for setup strings for compressed printing for various printers.

Because of the number of different printers available for your computer, it is impossible to tell you what your values in the Printer Setup menu should be. If you are using an IBM 80 CPS Matrix Printer, accept the initial values for the options.

If you want the IBM 80 CPS Matrix Printer to print in compressed mode, which prints more characters per inch, enter **15** for the Setup option. To return to standard printing mode, enter **18** for the Setup option.

When the options are correct, select Quit to return to the Printout
menu. Remember that using the Quit option from the Main menu saves
the printer setup information on the VisiSchedule Program Diskette.

PRINTING THE PROJECT DESCRIPTION REPORT

Select Summary. The program asks if you want to preview the report
on the screen. Enter **Y**. The program displays the directions for preview-
ing at the bottom of the screen. Press any letter key to begin the preview.
From here on, pressing any letter key scrolls the report up one line on the
screen.

You can cancel the previewing and the Summary option by pressing
the **Esc** key.

When you scroll to the bottom of the report, the program asks again if
you want to print it. Enter **Y**. After you align the paper, press any letter
key to begin printing. Figure 1-37 shows the Project Description Report
for the First Street Water Main project.

```
                          PROJECT DESCRIPTION REPORT
                          --------------------------
                             First Street Water Main
                     Revision 5.  1/ 1/82. File EXAMPLE3.DATA


     Description data fields:
           Name of project = First Street Water Main
        Leader of project = J. K. Henderson
                Time scale = Weeks
                Start date =  1/ 4/82
        Direct cost units = K$
     Manpower cost units = $
      Find critical path = Yes

        Skill categories:
                           DESCRIPTION          $/Man-Week     Man-Weeks    TOTAL COST
        1st Skill category = Operating Engineer      1000         24.0       $24000.0
        2nd Skill category = Laborer                  500         46.0       $23000.0
        3rd Skill category = Welder                   750         10.0        $7500.0
        4th Skill category = Civil Engineer          1500            0           $0.0
        5th Skill category = Skill # 5                  0            0           $0.0
        6th Skill category = Skill # 6                  0            0           $0.0
        7th Skill category = Skill # 7                  0            0           $0.0
        8th Skill category = Skill # 8                  0            0           $0.0
        9th Skill category = Skill # 9                  0            0           $0.0

        Working days:
            Days of the week=MTuWThF

        Holidays:  Since the time scale is WEEKS. holidays are ignored
                     1/ 1/82    11/26/81
                     5/31/82    12/25/81
                     7/ 4/82
                     9/ 7/81


        Nonworking weeks:
                     2/ 8/82 -  2/14/82


        Schedule Summary:
            Completion date =  5/ 3/82
            Number of jobs = 10
            Total manpower = 80.0 Man-Weeks
             Manpower cost = $54500.0
               Direct cost = $128000
                Total cost = $182500
```
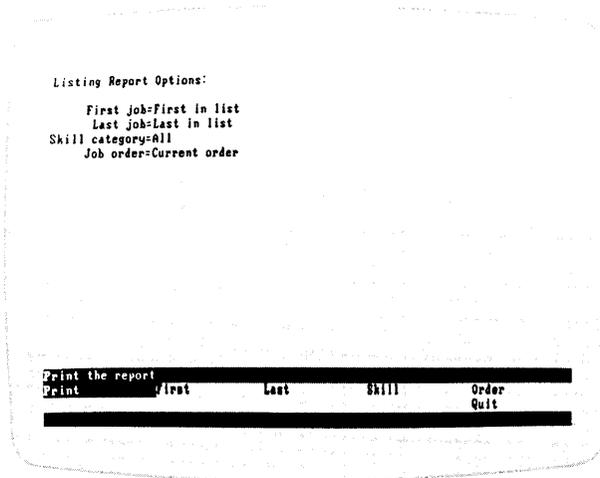   013-003

Figure 1-37. Sample Project Description Report

PRINTING THE JOB DESCRIPTION REPORT

Select Listing. The program displays the Report Options menu as shown in Figure 1-38.

```
Listing Report Options:

      First job=First in list
       Last job=Last in list
   Skill category=All
       Job order=Current order




Print the report
Print         First        Last        Skill        Order
                                                     Quit
```

013-033/P

Figure 1-38. Report Options Menu for Listing Option

The report options menu, besides giving you the option of printing the report, lets you specify which jobs will be included in the report. You can print a subset of the jobs by entering a job number range and/or skill category; you can also specify the order in which they are printed.

The current options in effect are listed at the top of the screen. The First and Last options let you specify, by job number, the range of jobs to be included in the report. You can specify the whole project by entering 0 for both options. If you do not specify anything for either, the first through the last is used. For this report, leave both set to 0, and print the whole list.

The Skill option lets you specify the skill category that will be included in the report. You can specify one skill category or all categories. If you specify a single category, only those jobs using that skill are included in the report. For this report, leave the option set to 0 (all categories).

These three options can be used together to further limit the number of items included in the report. For example, if you specify job 5 as the First job, job 11 as the Last, and skill category 2, the generated report will contain only those jobs between jobs 5 and 11 that use skill 2.

1-61

The Order option lets you specify the sequence in which the jobs will be sorted in the report. Figure 1-39 shows the Order option display. Table 1-6 lists the different sort sequences available through this option.

If you use the Order option along with the First and Last options, be aware that the sorting specified by the Order option is done first. It is possible that the First and Last options will eliminate all jobs from the list. Unless you double check the order, it is advisable not to use Order when using First and Last and vice versa.
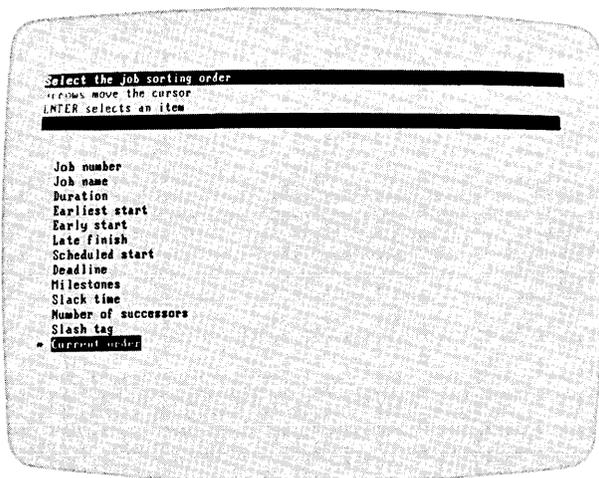
013-034/P

Figure 1-39. Order Option Display

Table 1-6. Order Sort Sequences

Order Item	Description
Current order	If no sorting has been done, the current order is used. Otherwise, the Current order option restores the file to the order it had when you were last in the Printout menu.
Deadline	Sorted by deadline date. Jobs without deadlines are printed before jobs with deadlines.
Duration	Sorted by job length from the shortest to the longest.
Earliest start	Sorted by earliest date on which the job can begin. If an earliest date has not been set, 0 (the start date) is used.
Early start	Sorted by early start date. The early start date differs from the scheduled start date if the slack time precedes the beginning of work.
Job name	Sorted in alphabetic order by job name.
Job number	Sorted in numeric order by job number.
Late finish	Sorted by late finish date. The late finish date is the last date that the job can finish without causing a project delay.
Milestones	Sorted by milestone date. If no milestone date has been set, the scheduled start date is used. If no scheduled start date has been set, the early start date is used.
Number of successors	Sorted by the number of successors a job has, from 0 to the maximum.
Scheduled start	Sorted by the scheduled start date set with the Schedule or Level options. If the scheduled start date was not set, the value is 0.
Slack time	Sorted by the amount of slack time for a job from 0 (critical jobs) to the maximum.
Slash tag	Sorted in ASCII order (numbers, letters, then underscores) by the portion of the name following the slash. Jobs with identical slash tags are ordered according to the first part of the name (before the slash).

1-63

After selecting the jobs and skills that you want to include and the order in which you want them printed, select the Print option. Just as it did when you printed the Project Description Report, the program asks if you want to preview the report on the screen. If you have any trouble with the preview process, review the description earlier in this lesson. When you press the **Esc** key to stop previewing, you may have to wait several seconds for it to take effect. Figure 1-40 shows a portion of a sample Job Description Report.

```
                           JOB DESCRIPTION REPORT
                           -----------------------
                             First Street Water Main
                     Revision 5.  1/ 1/82. File EXAMPLE3.DATA


   Job #1. Purchase pipe
   ----------------------
           Duration = 3 Weeks                Earliest start =  1/ 4/82
      Work Completed = 0 Weeks               Earliest finish =  1/25/82
     On critical path = No                      Latest start =  1/18/82
          Slack time = 2 Weeks                 Latest finish =  2/15/82
       Prerequisites = none
     Manpower skills = none
        Total effort = none
       Manpower cost = $0.0
         Direct cost = $50000

   Job #2. Dig 1st part of trench
   ------------------------------
           Duration = 3 Weeks                Earliest start =  1/ 4/82
      Work Completed = 0 Weeks               Earliest finish =  1/25/82
     On critical path = No                      Latest start =  1/11/82
          Slack time = 1 Week                  Latest finish =  2/ 1/82
       Prerequisites = none
     Manpower skills = Skill #1. Operating Engineer. 1.0 @ 1000$ per Man-Week
                       Skill #2. Laborer. 3.0 @ 500$ per Man-Week
        Total effort = 12.0 Man-Weeks
       Manpower cost = $7500.0
         Direct cost = $5000

   Job #4, Lay 1st part of pipe
   ----------------------------
           Duration = 2 Weeks                Earliest start =  1/25/82
      Work Completed = 0 Weeks               Earliest finish =  2/15/82
     On critical path = No                      Latest start =  2/15/82
          Slack time = 2 Weeks                 Latest finish =  3/ 1/82
       Prerequisites = Job #1. Purchase pipe
                       Job #2. Dig 1st part of trench
     Manpower skills = Skill #2. Laborer. 4.0 @ 500$ per Man-Week
                       Skill #3. Welder. 2.0 @ 750$ per Man-Week
        Total effort = 12.0 Man-Weeks
       Manpower cost = $7000.0
         Direct cost = $13000

   Job #5. Dig 2nd part of trench
   ------------------------------
           Duration = 3 Weeks                Earliest start =  1/25/82
      Work Completed = 0 Weeks               Earliest finish =  2/22/82
     On critical path = No                      Latest start =  2/ 1/82
          Slack time = 1 Week                  Latest finish =  3/ 1/82
       Prerequisites = Job #2. Dig 1st part of trench
     Manpower skills = Skill #1. Operating Engineer. 1.0 @ 1000$ per Man-Week
                       Skill #2. Laborer. 3.0 @ 500$ per Man-Week
        Total effort = 12.0 Man-Weeks
       Manpower cost = $7500.0
         Direct cost = $5000
```
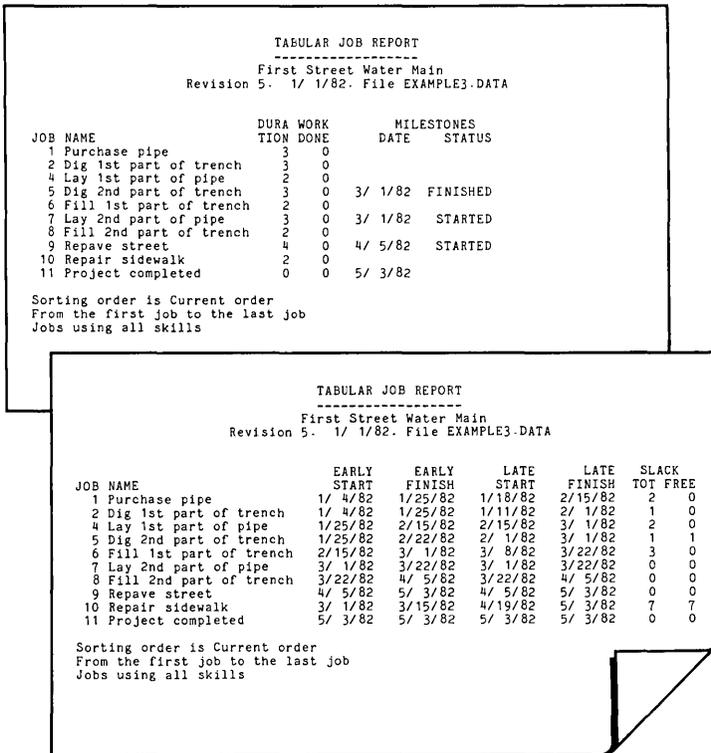
013-004

**Figure 1-40. Sample Job Description Report**

PRINTING THE TABULAR JOB REPORT

The Table option prints the Tabular Job Report. This report differs from the other reports because you can select the content. Figure 1-41 shows two samples of the report.

```
                            TABULAR JOB REPORT
                            -------------------
                          First Street Water Main
                 Revision 5.  1/ 1/82. File EXAMPLE3.DATA

                            DURA WORK        MILESTONES
      JOB NAME              TION DONE       DATE     STATUS
        1 Purchase pipe        3    0
        2 Dig 1st part of trench 3    0
        4 Lay 1st part of pipe  2    0
        5 Dig 2nd part of trench 3    0    3/ 1/82  FINISHED
        6 Fill 1st part of trench 2    0
        7 Lay 2nd part of pipe  3    0    3/ 1/82   STARTED
        8 Fill 2nd part of trench 2    0
        9 Repave street         4    0    4/ 5/82   STARTED
       10 Repair sidewalk       2    0
       11 Project completed     0    0    5/ 3/82

      Sorting order is Current order
      From the first job to the last job
      Jobs using all skills
```

```
                            TABULAR JOB REPORT
                            -------------------
                          First Street Water Main
                 Revision 5.  1/ 1/82. File EXAMPLE3.DATA

                            EARLY     EARLY      LATE      LATE    SLACK
      JOB NAME              START    FINISH     START    FINISH  TOT FREE
        1 Purchase pipe     1/ 4/82  1/25/82  1/18/82  2/15/82   2    0
        2 Dig 1st part of trench 1/ 4/82  1/25/82  1/11/82  2/ 1/82   1    0
        4 Lay 1st part of pipe  1/25/82  2/15/82  2/15/82  3/ 1/82   2    0
        5 Dig 2nd part of trench 1/25/82  2/22/82  2/ 1/82  3/ 1/82   1    1
        6 Fill 1st part of trench 2/15/82  3/ 1/82  3/ 8/82  3/22/82   3    0
        7 Lay 2nd part of pipe  3/ 1/82  3/22/82  3/ 1/82  3/22/82   0    0
        8 Fill 2nd part of trench 3/22/82  4/ 5/82  3/22/82  4/ 5/82   0    0
        9 Repave street        4/ 5/82  5/ 3/82  4/ 5/82  5/ 3/82   0    0
       10 Repair sidewalk      3/ 1/82  3/15/82  4/19/82  5/ 3/82   7    7
       11 Project completed    5/ 3/82  5/ 3/82  5/ 3/82  5/ 3/82   0    0

      Sorting order is Current order
      From the first job to the last job
      Jobs using all skills
```

013-005

Figure 1-41. Sample Tabular Job Reports

Select Table. The program displays the Report Options menu as shown in Figure 1-42. Note that this version of the Report Options menu contains three additional options: Headings, Dates, and Columns.
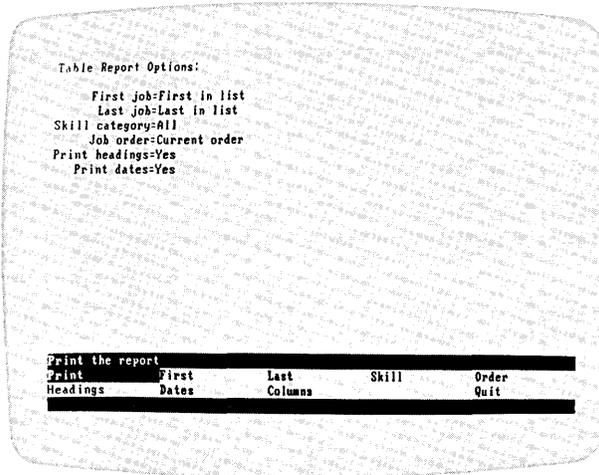
013-035/P

Figure 1-42. Report Options Menu for Table Option

This section does not discuss the options that were described in the previous section; they perform the same functions. If you have questions about Print, First, Last, Skill, or Order, refer to the previous section.
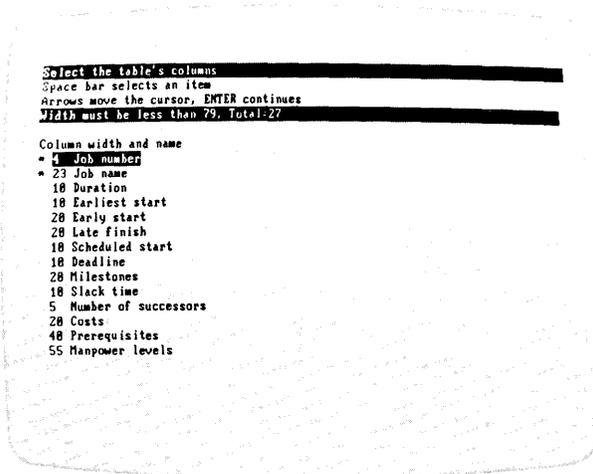
Select Headings. The Headings option lets you specify whether the heading and footing should be printed with the report. The primary purpose of this option is to let you print the report out to a disk file where it can be used by a program that is designed to handle data in this format. When using this option, you must specify the disk file name with the Filename option in the Setup menu. For this example, enter **Y**, indicating that headings are to be printed. Y is the initial setting for this option.

Select Dates. The Dates option specifies whether dates in the report are to be printed in the month/day/year (or day/month/year) format or as the time period number. For this example, enter **Y**, indicating that dates are to be printed in the current date format (either month/day/year or day/month/year). Y is the initial setting for this option.

The Columns option lets you select the contents of the Tabular Job Report. Select Columns.

The program displays a list of the items that you can include in the report. Figure 1-43 shows the item list display. Table 1-7 lists and describes the items. To select an item for the report, move the cursor to the item and press the space bar. The selected item is marked with an asterisk (*). You can move the cursor with the arrow keys or by typing the first digit of the number or the first letter of the name. For example, with the cursor on the top item, you can move to Duration by pressing the 1 key or the **D** key.

Initially, as you can see from Figure 1-43, the first two items, Job number and Job Name, are already selected. If you do not want one of them, move the cursor to the item, and press the space bar. The asterisk is erased, and the item is no longer selected. Usually, you will want one or both of these items. They identify the job associated with the data that follows it.

```
Select the table's columns
Space bar selects an item
Arrows move the cursor, ENTER continues
Width must be less than 79. Total:27

Column width and name
 *  4  Job number
 *  23 Job name
    18 Duration
    18 Earliest start
    20 Early start
    28 Late finish
    18 Scheduled start
    18 Deadline
    28 Milestones
    18 Slack time
    5  Number of successors
    28 Costs
    48 Prerequisites
    55 Manpower levels
```

013-036/P

Figure 1-43. Columns Display

Table 1-7. Columns Options

Name	Size	Description
Costs	20	The total direct costs and manpower costs.
Deadline	10	The dates for all deadlines set. If no deadline is set, the column is left blank.
Duration	10	The number of time units scheduled and the number of time units completed.
Earliest start	10	The earliest possible start date. If no earliest start date is set, the column is left blank.
Early start	20	The start date based on prerequisites unless changed with the Level, Schedule, or Earliest options.
Job name	nn	The name you give to each job. The column width is equal to the number of characters in the largest job name in the project. The minimum is 5 and maximum is 30.
Job number	4	The number assigned by the program.
Late finish	20	The latest possible finish date without delaying the project.
Manpower levels	55	The number of workers needed for each job for each of the nine skill levels.
Milestones	20	The dates for the defined milestones. The milestone's status (STARTED or FINISHED) is displayed for jobs with a duration of one time unit or more. Because jobs of zero duration theoretically have no start or finish, the status of zero-length jobs is not shown. If Job name, Job number, and Milestones are the only items selected, jobs without defined milestones are not included in the report.
Number of successors	5	The number of jobs for which this job is a prerequisite.
Prerequisites	40	The job numbers that are prerequisite to this job.

Table 1-7. Columns Options (Continued)

Name	Size	Description
Scheduled start	10	The scheduled start date if different from the early start date. The column is left blank if no schedule date has been set with the Schedule or Level options.
Slack time	10	The number of total and free slack time units for each job.

The display also contains the column width needed in the report for each item. This is to help you design a report that fits your printer. Look at the bottom line of the status area at the top of the screen. This line tells you what the current printer width setting is and total column width taken up by the currently selected items. Always check these numbers before exiting the option.

For this example, leave Job number and Job Name selected, and select Duration and Milestones. Make sure an asterisk is in front of all four items. Next, look at the status area. You selected a total report width of 57. Since 79 is the minumum printer width, the report will print correctly.

Press the ↵ key to accept the column selections. Select Print. You can preview the report as you did with the last two reports. When you are satisfied, continue and print the report.

The milestone for job 5 that you set in Lesson Four shows on the list. Jobs 7 and 9 had Start milestones set in the example file. Job 11 is listed with the date, but the milestone's position in the job, STARTED or FIN-ISHED, is not shown because it is a zero-length job.

PRINTING THE SCHEDULE GRAPH

Select Graph. The program displays the Report Options menu as shown in Figure 1-44. Note that this version of the Report Options menu differs from the previous two versions you used. The top line is the same, but the second line contains the option Names.
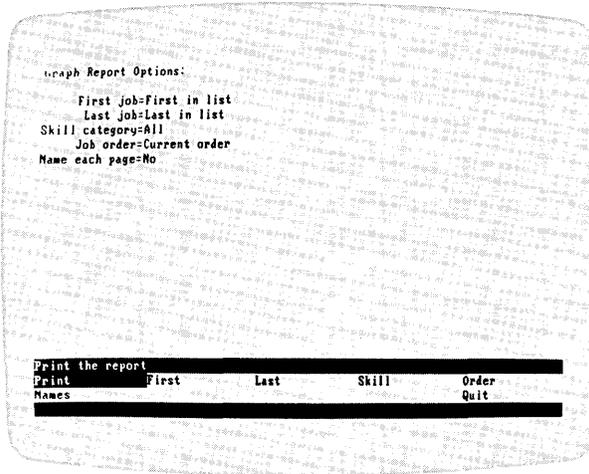
013-037/P

Figure 1-44. Report Options Menu for Graph Option

This section does not discuss the options that were discussed in the section on printing the Job Description Report. If you have questions about Print, First, Last, Skill, or Order, refer to that section.

Select Names. The Names option lets you specify whether the job and skill names are to be printed on each page of the report. You would specify N for this option if you intended to tape multiple page reports together, end to end, to lay out the entire schedule in a line. If you wish to use individual pages, you should specify Y. Subsequent pages without job names are very difficult to use. Enter Y. If you do not specify a value, the program prints job names only on the first page of the report.

Select Print. You can preview the report as you did with the previous reports. When you are satisfied, print the report. Figure 1-45 shows the sample Schedule. Note that the report contains the full job name rather than the abbreviated one used in the Schedule menu. It also contains all the cost and manpower figures. At the bottom is a legend explaining the symbols used in the schedule.

```
First Street Water Main. Revision 5.  1/ 1/82. File EXAMPLE3.DATA


                                  Jan        Feb      Mar           Apr          May
Job Description                   4  11 18 25 1  15 22 1  8  15 22 29 5  12 19 26 3
                                  0  1  2  3  4  5  6  7  8  9  10 11 12 13 14 15 16
   1 Purchase pipe                O-------->.....>  .  .  .   .  .  .  .  .  .  .  .
   2 Dig 1st part of trench       O-------->..>  !  .  .  .   .  .  .  .  .  .  .  .
   4 Lay 1st part of pipe         .  .  .  >----->.....>  .   .  .  .  .  .  .  .  .
   5 Dig 2nd part of trench       .  .  .  >..>--------->  .  .   .  .  .  .  .  .  .
   6 Fill 1st part of trench      .  .  .  .  !  >----->........>  .   .  .  .  .  .

   7 Lay 2nd part of pipe         .  .  .  .  !  .  >=======>  .   .  .  .  .  .
   8 Fill 2nd part of trench      .  .  .  .  !  .  .   .  >=====>  .   .  .  .  .
   9 Repave street                .  .  .  .  !  .  .   .  .  .  .  >===========>
  10 Repair sidewalk              .  .  .  .  !  .  >----->...................>
  11 Project completed            .  .  .  .  !  .  .   .  .  .  .  .  .  .  .  X


          Operating Engineer=1    1     1     2     0     2     3     3     0
                            1     0     2     0     0     2     3     3
                Laborer=3   3     7     5     4     2     0     0     0
                      3     4     5     4     4     2     0     0
              Welder=0      0     2     0     2     0     0     0     0
                      0     2     0     2     2     0     0     0
      Project manpower level=4    4    10     7     6     4     3     3     0
                      4     6     7     6     6     4     3     3
      Project manpower cost=2.5K  2.5K  6K    4.5K  3.5K  3K    3K    3K    0
                      2.5K  3.5K  4.5K  3.5K  3.5K  3K    3K    3K
        Project direct cost=55K   0     5K    0     0     10K   30K   0     0
                      0     13K   10K   5K    0     0     0     0
         Project total cost=57K   2.5K  11K   4.5K  3.5K  13K   33K   3K    0
                      2.5K  16K   14K   8.5K  3.5K  3K    3K    3K

Sorting order is Current order
From the first job to the last job
Jobs using all skills

Symbol-Explanation
>-->    Duration of a normal job
>..>    Slack time for a normal job
>==>    Duration of a critical path job
>::>    Duration of a completed job
*       Job with zero duration
+       Job deadline
O-->    Job with no prerequisites
>--X    Job with no successors
!       Time break due to holiday or week-off
```

013-006

Figure 1-45. Sample Schedule Graph

PRINTING ALL THE REPORTS

The All option prints all four reports. If you want to customize the reports, you must do it with the individual options before selecting All. You cannot select different options for each report. For example, if you select a sequence with the Order option for the Job Description report, it applies to the Tabular Job Report and the Schedule. This option does not let you preview the reports; you have the chance to prepare the printer before the printing begins.

Select Quit in the Printout Menu to return to the Main menu.

PART II: THE REFERENCE

The Reference is a complete and detailed description of every menu, option, and report of the VisiSchedule program. You can use it to quickly find answers to questions you have about the program functions and to understand fully any particular function.

The Reference is organized into three sections: menus, options, and reports. The items within each section are alphabetized.

A menu is a four-line area at the bottom of the screen that contains choices, or options. The Menus section contains the sixteen VisiSchedule menus. Refer to the VisiSchedule Menu Flow fold-out (Figure 2-1) to see how to reach each menu.

An option is a one- or two-word name that you highlight with the cursor and select with the ↵ key. Some options take you to other menus, and others options allow you to enter data. All of the options from all of the menus are alphabetized in the Options section.

A report is a formatted presentation of a given project. You can create four reports with the VisiSchedule program: the Project Description Report, the Job Description Report, the Tabular Job Report, and the Schedule Graph.

MENUS

Figure 2-1 is a flow diagram showing the interconnection of menus within the program. It can be useful in understanding the structure of the program and in finding your way to the option you want.

Quit → Exit Program

Quit

Print

Quit

Setup

Display

Quit

Printout
Summary
All

Listing
Table
Graph
DIF data

Quit
Print

Printer Setup
Filename
Width
Length
Top mar
Bot mar
Sheets
Formfeed
Setup

Report Options
First
Last
Skill
Order
Headings
Dates
Columns
DIF name
Names

Cancel
Accept

ion

ication

Quit
None
Manpower
Costs
Salary

ay

013-007

—

VisiSchedule

Com Port
Baudrate
Protocol
Parity
Stopbits
Databits

COM1
COM2

Quit

Hardware Options
Memory
Printer
Remout

Hardware

Quit

Sta
To
Re
Da
Cu

Conti

Ma
Loa
Sav
Cle
Del
Pre
For
Wri

Quit

Modify

Quit

Work

Modify

Quit

Schedule

Sch
Got
Era
Sch
Con
Hig
Mil
Lev
Ren
Slip

Add
Inse
Mo

Project Description
Title
Leader
Time
Start
Manpower
Cost
Critical
Rev

Descrip

Quit

Job
Job

Occupation
Occupat
Salary
Quit

Manpower

[Done]

Bef
Aft

Workweek
Normal
Days
Weeks

Modify

Job
Nan
Dur
Pre
Earl
Cos
Skil
Dea

Figure 2-1. Vis

COM PORT MENU

```
                    VisiSchedule 1.88, SN 1234567898
                 Copyright (C) 1982 by Organic Software, Inc.

                    * Use arrow keys, space to move cursor
                    * Press ENTER to select a menu item

        Memory=64K bytes
        Printer=Parallel
        Remout=COM1
          COM1=1288 Baud, DTR/DSR protocol, No parity, 7 data bits, 2 stop bits
          COM2=1288 Baud, DTR/DSR protocol, No parity, 8 data bits, 1 stop bits




    Baudrate for COM1
    Baudrate      Protocol      Parity      Databits      Stopbits
                                                          Quit
```

013-039/P

The Com Port menu lets you describe your serial printer to the VisiSchedule program. You reach the menu by selecting COM1 or COM2 from the Hardware Options menu.

Appendix C, Printers, contains a list of printers that have been tested with the program. Values for the Baudrate, Protocol, Parity, Stopbits, and Databits options for various serial printers are provided.

The Quit option returns you to the Hardware Options menu. If you make any changes in the Com Port or Hardware Options menus, you are given the choice of restarting the program to put the changes into effect.

DISPLAY MENU

```
Project Schedule Jan      Feb     Mar           Apr       May
------------------- 4  11 18 25 1  15 22 1  8  15 22 29 5  12 19 26 3  18 17 24
Job Description   8  1  2  3  4  5  6  7  8  9  10 11 12 13 14 15 16 17 18 19 Job
 1 Purchase pip 0--------),....)                                          1
 2 Dig 1st part 0--------)...) !                                          2
 4 Lay 1st part          )------),....)                                   4
 5 Dig 2nd part          )..)------)                                      5
 6 Fill 1st par               )------)........)                           6
 7 Lay 2nd part          !    )========)                                  7
 8 Fill 2nd par          !         )=====)                                8
 9 Repave stree          !              )============)                    9
10 Repair sidew          !    )------)...................) +             10
11 Project comp          !                              X                11
```

```
Don't display anything
None            Manpower      Salary        Costs
                                                 Quit
```

013-024/P

The Display menu lets you select the manpower or cost data that is displayed at the bottom of the screen under the schedule. The Manpower option displays the number of workers needed for each time unit, and the Salary option displays the salary requirements. The Costs option displays the direct costs for each time unit in the project. The None option clears the display area.

The Display menu is reached by way of the Display option in the Schedule menu extension. The Quit option takes you back to the Schedule menu extension.

If a value is computed to be longer than the program can accommodate, > > > > > (greater-than signs) are displayed instead of the value. If you see these symbols, you should change the cost or manpower units from $ to K$ or K$ to M$ and reduce the number of digits for the entries involved.

HARDWARE OPTIONS MENU

```
                    VisiSchedule 1.88, SN 1234567898
                 Copyright (C) 1982 by Organic Software, Inc.

                    * Use arrow keys, space to move cursor
                    * Press ENTER to select a menu item


      Memory=64K bytes
      Printer=Parallel
      Remout=COM1
         COM1=1288 Baud, DTR/DSR protocol, No parity, 7 data bits, 2 stop bits
         COM2=1288 Baud, DTR/DSR protocol, No parity, 8 data bits, 1 stop bits





    Size of RAM memory in K bytes
    Memory          Printer        Remout        COM1        COM2
                                                             Quit
```

013-040/P

The Hardware Options menu describes your computer's memory size
and your printer to the program. You reach the Hardware Options menu
by selecting Hardware from the Startup menu.

Use the Memory option to enter the amount of RAM (random access
memory). Use the Printer and Remout options to assign your printer to
the name that will be used later in the Filename option of the Printer
Setup menu. The COM1 and COM2 options take you to the Com Port
menu. From there, you enter values for your serial printer.

The Quit option returns you to the Startup menu. If you make any
changes in the Com Port or Hardware Options menus, you are given the
choice of restarting the program to put the changes into effect.

JOB LOCATION MENU

```
Project Schedule Jan         Feb    Mar        Apr      May
----------------- 4  11 18 25 1  15 22 1  8  15 22 29 5  12 19 26 3  10 17 24
Job Description 8  1  2  3  4  5  6  7  8  9  10 11 12 13 14 15 16 17 18 19 Job
  1 Purchase pip 0-------->.....>                                           1
  2 Dig 1st part 0-------->..> !                                            2
  4 Lay 1st part          )------>.....>                                    4
  5 Dig 2nd part          >..>------->                                      5
  6 Fill 1st par              )----->........>                              6
  7 Lay 2nd part              !   )=======>                                 7
  8 Fill 2nd par              !        )=====)                              8
  9 Repave stree             !            )===========)                     9
 10 Repair sidew             !      )----->..................) +           10
 11 Project comp             !                           X                 11




Add after job 11
Job          After
Before                                                    Quit
```
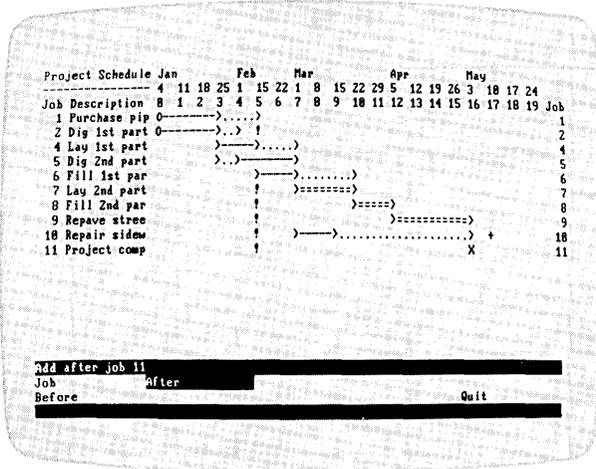
013-041/P

The Job Location menu lets you identify where in the schedule you want to place a job. The menu is reached when you select Add, Insert, or Move from the Schedule menu.

The Before or After options put the new or moved job in a position relative to the job specified by Job.

JOB SPECIFICATION MENU

```
Project Schedule Jan         Feb    Mar        Apr      May
----------------- 4  11 18 25 1  15 22 1  8  15 22 29 5  12 19 26 3  10 17 24
Job Description 8  1  2  3  4  5  6  7  8  9  10 11 12 13 14 15 16 17 18 19 Job
  1 Purchase pip 0-------->.....>                                           1
  2 Dig 1st part 0-------->..> !                                            2
  4 Lay 1st part          )------>.....>                                    4
  5 Dig 2nd part          >..>------->                                      5
  6 Fill 1st par              )----->........>                              6
  7 Lay 2nd part              !   )=======>                                 7
  8 Fill 2nd par              !        )=====>                              8
  9 Repave stree             !            )===========)                     9
 10 Repair sidew             !      )----->..................) +           10
 11 Project comp             !                           X                 11




Name of the job
Accept       Name      Duration      Prereq       Earliest
Cost         Skill     Deadline                   Cancel
```

013-042/P

The Job Specification menu is used to enter each job into the schedule. The menu appears at the bottom of the Schedule screen and uses the Name, Duration, Prereq, Earliest, Cost, Skill, and Deadline options to specify the details of each job. The Accept and Cancel options record or cancel the most recently entered data and take you back to the Schedule menu.

The Job Specification menu is reached by selecting Modify from the Schedule menu. Or, it is reached when you select Add or Insert from the Schedule menu, then Before or After from the Job Location menu.

MAIN MENU


```
                        VisiSchedule Main Menu

    Program Status:

        Memory=Cleared
           Room=50 more jobs

    Project Status:

        Title=
         Rev#=0
          File=SCROLL.DATA
        Prefix=B:
      Changed=No
          Size=0 jobs




Load a project from disk into memory
Load            Modify         Clear        Delete      Format
Save            Print          Prefix       WriteDOS    Quit
```
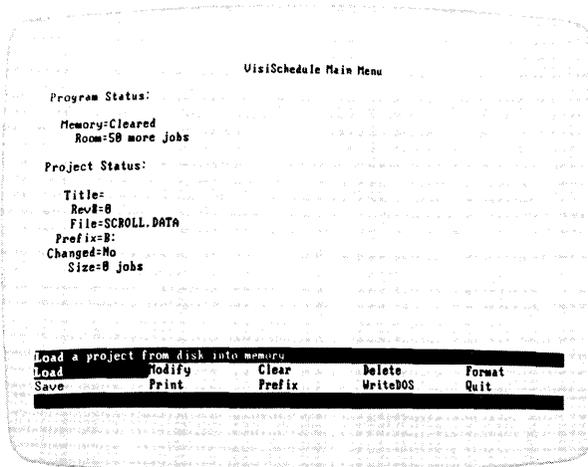
013-002/P

The Main menu contains options that control files and memory. You maintain project files with the Load, Save, Delete, WriteDOS, and Prefix options. The Clear option erases the computer memory, and the Format option prepares disk space for the program to use.

The Modify option takes you to the Modify menu, and the Print option takes you to the Printout menu. The Quit option exits the program.

When you select Continue from the Startup menu, you reach the Main menu. Selecting Quit from either the Modify or Printout menus also takes you to the Main menu.

The Program Status Area

The Program Status area is at the top of the Main menu screen. This status area contains two pieces of information: whether a project is in memory, and how many more jobs can be entered into memory.

If the top line reads, Memory = Cleared, no project is in memory. In this case, Room = displays the maximum number of jobs that can be entered. When Memory = Not cleared, Room = displays the number of jobs that can be added to the project that is currently in memory.

The maximum number of jobs that you can enter for a given project varies according to the amount of memory. You can enter up to 50 jobs with 64K of memory, and up to 150 jobs with 96K or more.

The Project Status Area

The Project Status area is in the middle of the screen between the Program Status area and the menu. The Project Status displays the title of the loaded project, its revision number, its disk file name, the prefix, whether the project has been changed since it was loaded, and its size in number of jobs.

Title = shows the name you gave to the project in the Title option in the Project Description menu.

Rev = displays the revision number of the project. The value is maintained by the program, or you can set the value with the Rev option in the Project Description menu.

File = displays the disk file name of the project most recently in memory.

Prefix = shows the disk drive being used for the data source or destination. The program adds a colon to the end of whatever you enter for the Prefix option.

Changed = Yes indicates that the project in memory has been changed since it was loaded, or that it has not been saved since it was created. When you save the file, this line changes to Changed = No.

Size = displays the number of jobs in the current project.

MILESTONE MENU

```
Project-Schedule Jan         Feb     Mar          Apr       May
---------------- 4  11 18 25 1  15 22 1  8  15 22 29 5  12 19 26 3  10 17 24
Job Description  0  1  2  3  4  5  6  7  8  9  10 11 12 13 14 15 16 17 18 19 Job
  1 Purchase pip 0-------).....)                                           1
  2 Dig 1st part 0-------)..) !                                            2
  4 Lay 1st part         )-----)....)                                      4
  5 Dig 2nd part         )..)--------)                                     5
  6 Fill 1st par           )-----).........)                               6
  7 Lay 2nd part           !  )=======)                                    7
  8 Fill 2nd par           !          )=====)                              8
  9 Repave stree           !               )===========)                   9
 10 Repair sidew           !  )-----).................) +                  10
 11 Project comp           !                       X                      11
```
```
Mark a milestone at the end
Start          End          None
                                        Quit
```
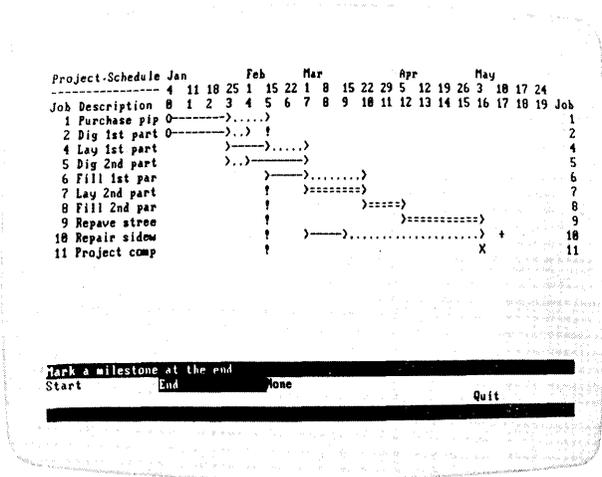
013-028/P

   The Milestone menu lets you set and remove project milestones. You
use the Start or End options to choose the position in the job that you want
to flag. The None option cancels a milestone. The Milestone menu is
reached from the Mileston option of the Schedule menu extension.

   When the Milestone menu is first displayed, the cursor indicates the
current milestone setting for the specified job. Milestones do not show in
the printed or displayed schedule, but are listed in the Tabular Job
Report when the Mileston option is selected from the Columns list.

MODIFY MENU
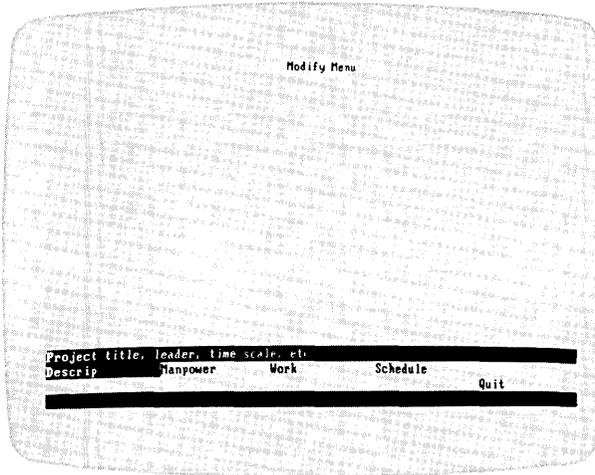
013-043/P

   The Modify menu is reached by selecting the Modify option in the
Main menu. It contains options that channel you to the Project Descrip-
tion menu (Descrip), the Manpower menu (Manpower), the Workweek
menu (Work), and the Schedule menu (Schedule). The options in these
menus allow you to enter or change all aspects of a project file.

OCCUPATION MENU
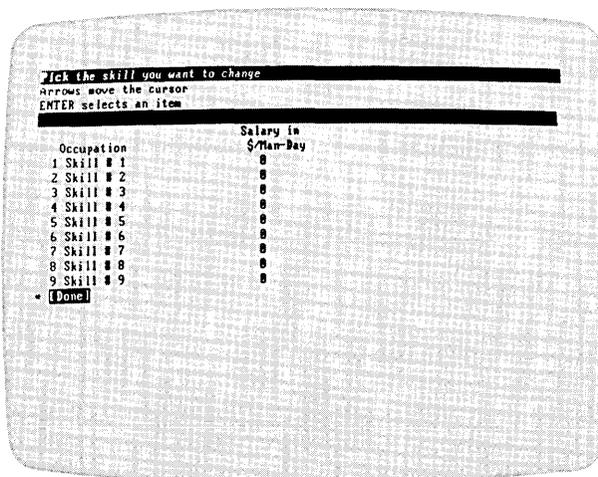
013-044/P

The Occupation menu lets you assign salaries and occupation names to the nine skill levels. The menu is reached by selecting the Manpower option from the Modify menu and selecting a skill category from the list.

You use the Occupat and Salary options for each skill level. The name and value you enter are displayed on the screen. Then, you use the Quit option to return to the Occupation list where you can select the next skill level.

After you have finished entering occupation names and salaries for the skill levels, the [Done] option from the Occupation list takes you back to the Modify menu.

PRINTER SETUP MENU

```
  Printer Setup:

           File name=PRINTER:
           Page width=79
           Page length=66
           Top margin=3
         Bottom margin=3
         Single sheets=No
         Use form feeds=No
         Setup sequence=
```

```
Where to send reports, normally PRINTER:
Filename        Width         Length        Top mar       Bot mar
Sheets          Formfeed                    Setup         Quit
```
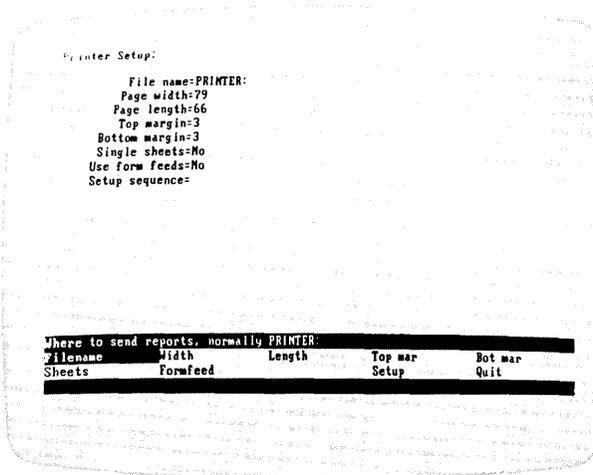
013-032/P

The Printer Setup menu contains options to tailor the program to your particular printer. Select the Setup option in the Printout menu to reach the Printer Setup menu.

The Filename option specifies the destination for reports: a printer or a disk file name. If a setup string is required for your printer, you enter it with the Setup option. The Width, Length, Top mar, and Bot mar options control the size of the printed page. The Sheets and Formfeed options control how the paper is fed into the printer. The Quit option returns you to the Printout menu.

At the top of the screen, the program display the most recent entries for the menu options. These entries are saved on the Program Diskette when you exit the program with the Quit option in the Main menu.

PRINTOUT MENU


```
                          Printout Menu




Project description report
Summary        Listing      Table       Graph       All
Setup          DIF data                             Quit
```
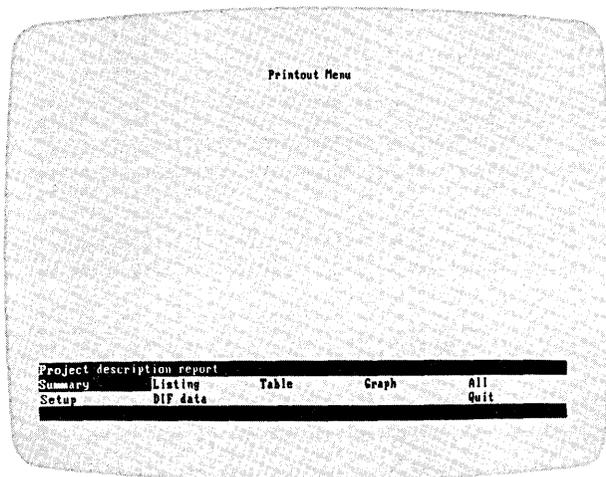
013-031/P

   The Printout menu allows you to preview and print the four VisiSchedule reports. It is reached by way of the Print option in the Main menu. The program creates reports with the Summary, Listing, Table, Graph, and All options. The reports and the schedule are described under "Reports" later in Part II, The Reference.

   The Setup option takes you to the Printer Setup menu, where you can tailor the VisiSchedule program to your specific printer. The DIF data option extracts cost and manpower data from a project file for transfer to another program. Appendix D discusses the DIF format for data transfer. The Quit option takes you back to the Main menu.

PROJECT DESCRIPTION MENU

```
Project Description:

   Title=Widgit Advertisement
   Leader=B. Wilson
   Time=Weeks
   Start= 1/18/82  Mon Jan 18
Manpower=$
   Cost=K$
Critical=Yes
Revision=0




Quit and return to the modify menu
Title         Leader          Time          Start
Manpower      Cost            Critical      Rev        Quit
```
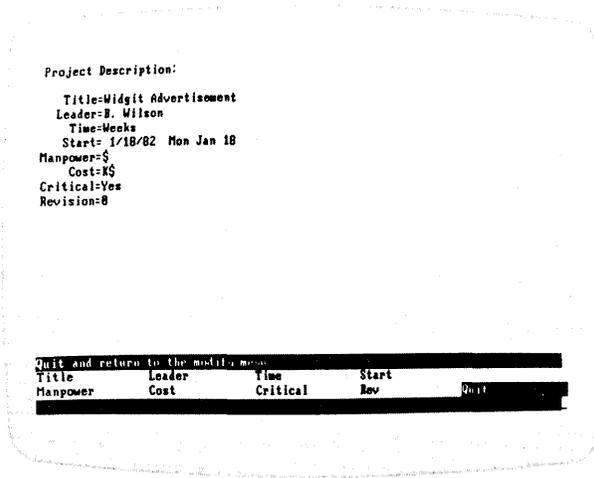
013-004/P

The Project Description menu sets criteria that apply to the entire project. You reach the menu by selecting Descrip in the Modify menu.

You enter names for the Title and Leader options. You measure the project in days or weeks with the Time option. You enter the project's start date with the Start option. The Manpower and Cost options specify the units to be used for monetary values. The Critical option controls whether the critical path is displayed. The most recent value for each of these options is displayed on the screen.

The Rev option controls the revision number of the project. It shows on each report and in the Project Status area of the Main menu. The revision number increases by one each time you save the project unless you set it for another value with the Rev option.

The Quit option returns you to the Modify menu.

REPORT OPTIONS MENU


```
Table Report Options:

    First job=First in list
     Last job=Last in list
Skill category=All
    Job order=Current order
Print headings=Yes
    Print dates=Yes
```

```
Print the report
Print        First        Last        Skill        Order
Headings     Dates        Columns                   Quit
```
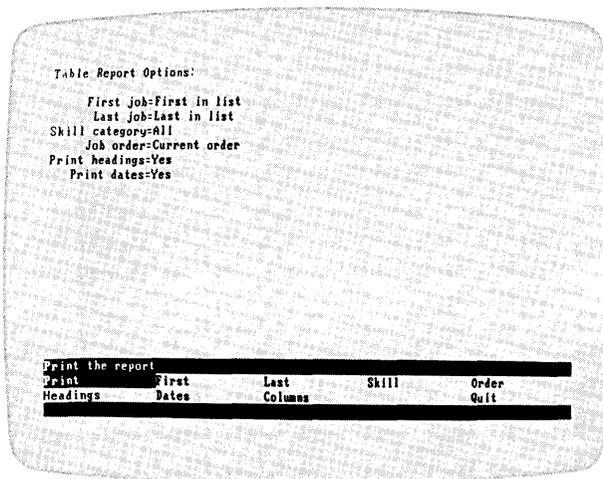
013-035/P

The Report Options menu lets you specify the information to be included in each report. The menu is reached by selecting the Listing, Table, Graph, or DIF data options in the Printout menu. The options in the Report Options menu vary according to which of the reports you are formatting. Table 2-1 shows which options apply to which reports. When an option is set in one report, it is set for all reports that use it.

In all versions of the Report Options menu, the Quit option takes you back to the Printout menu.

Table 2-1. Report Options Use by Report

	DIF data	Graph	Listing	Table
Columns				X
Dates				X
DIF name	X			
First	X	X	X	X
Headings				X
Last	X	X	X	X
Names		X		
Order	X	X	X	X
Print	X	X	X	X
Quit	X	X	X	X
Skill	X	X	X	X

SCHEDULE MENU

```
Project Schedule Jan       Feb     Mar          Apr       May
---------------- 4  11 18 25 1  15 22 1  8  15 22 29 5  12 19 26 3  10 17 24
Job Description  0  1  2  3  4  5  6  7  8  9  10 11 12 13 14 15 16 17 18 19 Job
   1 Purchase pip 0------->.....>                                            1
   2 Dig 1st part 0------->..> !                                             2
   4 Lay 1st part          )----->.....>                                     4
   5 Dig 2nd part          >..>------->                                      5
   6 Fill 1st par           )----->........>                                 6
   7 Lay 2nd part           !    )=========>                                 7
   8 Fill 2nd par           !         )=====>                                8
   9 Repave stree           !                  )============>                9
  10 Repair sidew           !    )----->................> *                 10
  11 Project comp           !                          X                    11


 Add a new job to the list
 Add         Insert        Erase       Move       Complete
 Modify      Goto          Schedule    More       Quit
 To scroll, enter a number then U D L R
```

013-046/P

The Schedule menu contains options for manipulating the jobs in the schedule. You use this menu more often than any other in the program. The menu is reached by selecting Schedule from the Modify menu.

You use the Add, Insert, Move, Erase and Modify options for entering or changing jobs. The Complete option marks the finished portions of jobs. The Schedule, Level, and Slip options change the start dates of jobs. The Display and Highlite options display information on the screen. You use the Renum option to renumber jobs to numerical order. The Mileston option marks either the start or end of a job as a project milestone.

The Schedule menu contains too many options to fit in the normal menu display area. An extension menu is reached by selecting the More option. You return to the main portion through the Quit option in the extension menu.

At the top of the Schedule menu screen is the time line. It assigns a time unit number to each day or week of the schedule. As you enter new jobs or make changes to existing jobs, they are displayed under the time line.

If the project schedule is too long to fit on the screen, you can display the rest of the schedule in several ways. With the Schedule menu on the screen, type a number and **U, D, L,** or **R** to move the schedule in any direction up to 9999 units. The schedule moves within the window of the screen in the direction you specify. If the beginning of the schedule is displayed, for instance, you can scroll the schedule up, not down. Pressing the **F9** key is equivalent to typing **20R** to scroll the schedule 20 units to the right. Pressing **F10** is the same as typing **20L**.

The **PgUp** key displays the previous page of jobs. It is equivalent to typing **17D**. Press the **PgDn** key to see the next page of the project, which is the same as typing **17U**.

The Quit option returns you to the Modify menu.

STARTUP MENU


```
                    VisiSchedule 1.00, SN 1234567890
              Copyright (C) 1982 by Organic Software, Inc.

                * Use arrow keys, space to move cursor
                * Press ENTER to select a menu item

         Today= 1/ 1/82
      Reporter=
         Dates=MM/DD/YY
      Currency=$
```

```
Continue with date and name as shown
Continue        Today           Reporter        Dates           Currency
Hardware                                                        Quit
```
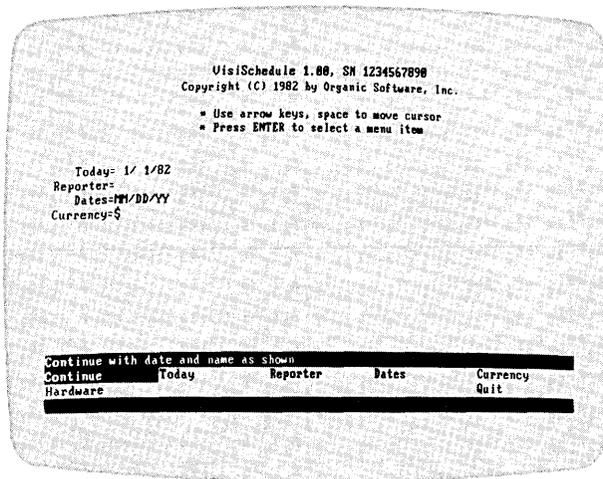
013-001/P

From the Startup menu you set options that pertain to the whole program. You set the current date (Today), the name to be printed on reports (Reporter), the format for dates (Dates), and the currency symbol (Currency). The Hardware option takes you to the Hardware Options menu where you enter values that pertain to your computer's memory size and to your printer.

Each time you load the program, the Startup menu appears on the screen. You use the Continue option to go to the Main menu, or the Quit option to exit the program. After you continue out of the Startup menu, you exit the program by way of the Main menu. The only way back to the Startup menu is by reloading the program.

The program version number and the program diskette serial number are displayed at the top of the screen. The most recent option settings are displayed in the middle of the screen.

WORKWEEK MENU
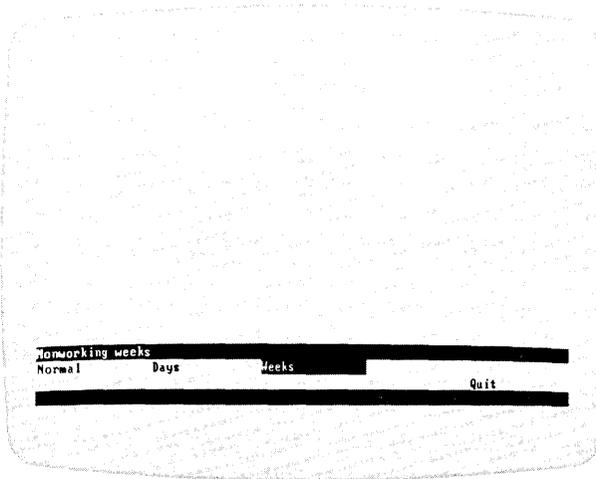
013-047/P

The Workweek menu controls days or weeks off within the project. You reach the menu with the Work option in the Modify menu. The Normal option specifies which days of each week will be working days, and the Days option contains the list of special days off. These options can be used only if you entered Days for the Time option in the Project Description menu. The Weeks option contains the list of weeks off.

The schedule time line reflects the days or weeks off that you establish through the Workweek menu. The Quit option returns you to the Modify menu.

OPTIONS

Accept — Job Specification Menu

The Accept option enters into the Schedule Graph the changes you made with the other options in the Job Specification menu. The project schedule does not change until you select the Accept option. You can cancel the additions or changes by selecting the Cancel option. The Accept and Cancel options return you to the Schedule menu.

Add — Schedule Menu

The Add option lets you add a job to the job list. The option takes you to the Job Location menu, where you specify the new job's location in the schedule.

This option does not affect the scheduling of any other job in the project; it simply adds a job to the list and sets its prerequisites according to whether it is added before or after another job.

Compare Add with the Insert option. The Insert option inserts a job into the job sequence and affects the scheduling of later jobs in the sequence. Be sure you use the correct option when adding (or inserting) a job. Figure 2-2 shows the relationship between the two options.

```
1   0========>
2             >====>

    Original Schedule


1   0========>          1   0========>
3             >====>    3             >====>
2             >====>    2                     >====>

Job 3 Added            Job 3 Inserted
After Job 1            After Job 1
```
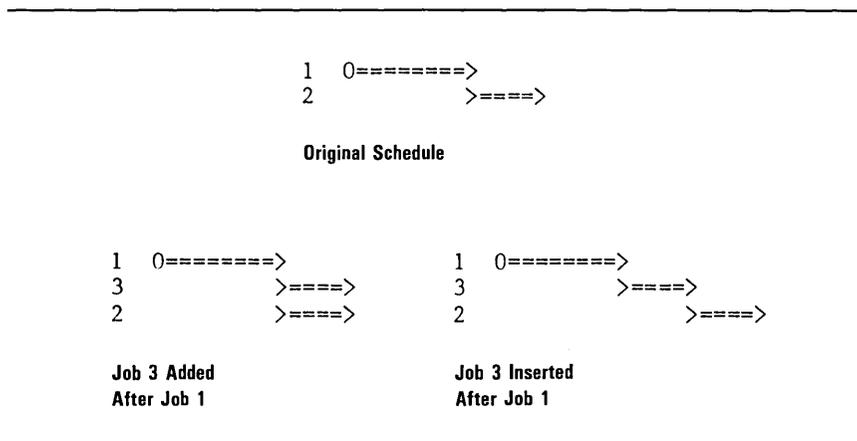
007-003

Figure 2-2. Add vs. Insert Options

The Add option first displays the Job Location menu. With this menu, you select a job number and specify whether the new job is to be located before or after it.

Adding a job establishes the prerequisites in one of two ways:

- If you add job 3 *after* job X, job 3's prerequisite is job X.
- If you add job 3 *before* job X, job 3's prerequisites are the same as job X's prerequisites.

Figure 2-3 shows the difference between the initial prerequisite values when Before or After are used. Remember that you can always manually change prerequisites by selecting Modify and changing the Prereq option.

Initial Job List

```
1  0-->..>
2  0=====>
3        >==X              Job 3 has 1 and 2 as prerequisites
```


Adding Job 4 After Job 2

```
1  0-->..>
2  0=====>
4        >==X              Job 4 has 2 as a prerequisite
3        >==X              Job 3 has 1 and 2 as prerequisites
```


Adding Job 4 Before Job 3

```
1  0-->..>
2  0=====>
4        >==X              Job 4 has 1 and 2 as prerequisites
3        >==X              Job 3 has 1 and 2 as prerequisites
```

007-011

**Figure 2-3. The Effect of Before and After
on Prerequisites During Add**

After the job location is determined, the program displays the Job Specification menu. From this menu, you enter the job name, duration, prerequisites, earliest start date, direct cost, skills used, and deadline.

If you have just erased a job, the values for the options in the Job Specification menu are unchanged when you add or insert the next job. So, instead of moving a job, you can erase it, then add or insert it at the new location to have the prerequisites automatically assigned.

After — Job Location Menu

The After option places the selected job after the target location. The Job option specifies the target location. Refer to the Add and Insert options for information on prerequisites.

All — Printout Menu

The All option prints three reports and the Schedule Graph. With this option you cannot preview the reports. Because the All option bypasses the Report Options menu, you cannot define any new limits for the reports, such as first job and last job. The program uses the limits that were last defined for single reports. To make any changes, select the individual reports and set the limits. The limits that are shared between reports can have only one setting.

Baudrate — Com Port Menu

The Baudrate option requires a value to correspond with the setting on your serial printer. You can enter 110, 150, 300, 600, 1200, 2400, 4800, or 9600. The baud rate is the speed that your printer reads data. Refer to Appendix C, Printers for values that have been successfully tested with various serial printers.

Before — Job Location Menu

The Before option places the selected job before the target location. The Job option specifies the target location. Refer to the Add and Insert options for information on prerequisites.

Bot mar — Printer Setup Menu

The Bot mar option sets the number of blank lines at the bottom of each report page. If you do not specify a number, the program uses 3. The bottom margin must be a number between 0 and the page length minus the top margin, minus 12. For example, if the top margin is 3 and the length is 66, the maximum bottom margin is 51 (66-3-12).

The program places the page number, if any, on the line above the bottom margin.

Cancel — Job Specification Menu

The Cancel option returns you to the Schedule menu without adding, inserting, or modifying a job.

Clear — Main Menu

The Clear option erases the project file from memory. If the project was modified, the program asks if you are sure you want to clear memory. If you enter **Y**, the project, including the changes you made, is erased. Responding **N** cancels the Clear option. You must clear memory before entering a new project.

Columns — Report Options Menu

The Columns option lets you choose the items to be included in the Tabular Job Report. If you make no choice, the program includes the job number and the job name.

This option displays a list of all the items you can include in the report and the number of character spaces they require. Table 2-2 lists the items and their sizes with a description of each one.

The top of the screen shows the maximum report width that is set and totals the amount of space your selections will use. You should not select options that require more space than the current printer width. You can change the width with the Width option in the Printer Setup menu.

Table 2-2. Column Options

Name	Size	Description
Costs	20	The total direct costs and manpower costs.
Deadline	10	The dates for all deadlines set. If no deadline is set, the column is left blank.
Duration	10	The number of time units scheduled and the number of time units completed.
Earliest start	10	The earliest possible start date. If no earliest start date is set, the column is left blank.
Early start	20	The start date based on prerequisites unless changed with the Level, Schedule, or Earliest options.
Job name	nn	The name you give to each job. The column width is equal to the number of characters in the largest job name in the project. The minimum is 5 and maximum is 30.
Job number	4	The number assigned by the program.
Late finish	20	The latest possible finish date without delaying the project.
Manpower levels	55	The number of workers needed for each job for each of the nine skill levels.
Milestones	20	The dates for the defined milestones. The milestone's status (STARTED or FINISHED) is displayed for jobs with a duration of one time unit or more. Because jobs of zero duration theoretically have no start or finish, the status of zero-length jobs is not shown. If Job name, Job number, and Milestones are the only items selected, jobs without defined milestones are not included in the report.
Number of successors	5	The number of jobs for which this job is a prerequisite.
Prerequisites	40	The job numbers that are prerequisite to this job.

Table 2-2. Columns Options (Continued)

Name	Size	Description
Scheduled start	10	The scheduled start date if different from the early start date. The column is left blank if no schedule date has been set with the Schedule or Level options.
Slack time	10	The number of total and free slack time units for each job.

COM1 or COM2 — Hardware Options Menu

The COM1 or COM2 options take you to the Com Port menu. In that menu, you set options to correspond to settings on a serial printer. Refer to Appendix C, Printers for printer settings.

Complete — Schedule Menu

The Complete option marks all or part of a job as completed. A completed job is shown with colons.

You cannot complete a job unless you mark its prerequisites as completed, you use the Modify option to change the prerequisites.

The Complete option first prompts for a job number, then for the number of weeks (or days) of work that are completed. The display also shows the job's duration. You can enter any value less than the duration to mark a job as partially completed. If you enter a value greater than the duration, the program uses the duration value, and the job is marked as completed.

If you select a job that is completed, the Complete option gives you the opportunity to uncomplete it. Enter **Y** to remove the colons that mark the job as completed. You cannot uncomplete a job that is a prerequisite for a job that is also completed; you must uncomplete the successor first.

If you want to change the duration of a completed job, you must first uncomplete the job. The program will not allow you to modify a completed job.

Continue — Startup Menu

The Continue option takes you to the Main menu. You can return to the Startup menu only by reloading the program, so Continue accepts your settings for the following options:

- Today—date to show on reports.
- Reporter—name to show on reports.
- Dates—MM/DD/YY or DD/MM/YY format for data entry and reports.
- Currency—symbol to precede monetary figures throughout the program.
- Hardware—settings for your memory size and printer.

Cost — Job Specification Menu

The Cost option contains the direct cost associated with a job. The prompt specifies whether the cost is to be entered in dollars ($), thousands of dollars (K$), or millions of dollars (M$), as you defined in the Cost option of the Project Description menu.

Cost — Project Description Menu

The Cost option defines the value of one monetary unit for direct costs. Direct costs are defined as any costs other than for manpower. In the rest of the program, you can enter up to four non-negative integers for direct costs. Setting this option correctly enables you to enter the proper values later. You can choose one of three units:

- $ (units) allows a range of 0 to $9,999 in increments of 1 unit.
- K$ (thousands of units) allows a range of 0 to $9,999,000 in increments of 1,000 units.
- M$ (millions of units) allows a range of 0 to $9,999,000,000 in increments of 1,000,000 units.

If you change the direct cost units, the values in the project file are not changed accordingly; you must change them. For example, if the costs are currently entered as K$ and you have a job with an estimate of 1,000K$ ($1,000,000), the estimate becomes 1,000M$ ($1,000,000,000) if you change the Cost option to M$. If you make this change, you should also change the value in the project data to 1M$ ($1,000,000).

Costs — Display Menu

The Costs option displays across the bottom of the schedule the total of all direct job costs for each time period. Direct costs are defined as any costs other than for manpower. The label for these costs reads Direct cost and specifies whether the cost units are dollars ($), thousands of dollars (K$), or millions of dollars (M$).

You can remove the costs by returning to the Display menu and selecting None or another display option.

Critical — Project Description Menu

The Critical option specifies whether the the critical path will be shown for this project. Enter **Y** to show critical path jobs and slack times. Entering **N** causes critical and noncritical jobs to be displayed with the same symbol. This option is initially set to YES.

Currency — Startup Menu

The Currency option sets the symbol that will precede all monetary values. The program was written in the United States and sets the dollar sign ($) as the initial value. If you change the currency symbol, the new symbol replaces $ throughout the program, even in files that were previously entered and saved on disk.

Databits — Com Port Menu

The Databits option requires a value from 5 to 8 to correspond with the setting on your serial printer. The number of data bits is the number of bits per character that your printer reads. Refer to Appendix C, Printers, for values that have been tested successfully with various printers.

Dates — Report Options Menu

The Dates option specifies whether you want dates displayed in the current format (mm/dd/yy or dd/mm/yy) or as a week or day number. Enter **Y** to display full dates, and enter **N** to display the time-unit number.

Dates — Startup Menu

The Dates option specifies whether dates are to be entered and displayed in the month/day/year or the day/month/year format. The initial value is MM/DD/YY. If you change the format, all existing dates are automatically converted to the selected format.

Days — Workweek Menu

The Days option specifies the special nonworking days in the project's schedule. Regular nonworking days such as weekends as specified with the Normal option are not included in the Days option holiday list. You can use the Days option only if you set the Time option to Days in the Project Description menu. The program automatically creates a list of six holidays.

- New Years Day (January 1)
- Memorial Day (last Monday in May)
- Independence Day (July 4)
- Labor Day (first Monday in September)
- Thanksgiving Day (fourth Thursday in November)
- Christmas Day (December 25)

The list begins with the first holiday that occurs in the same month as the date set in the Today option in the Startup menu.

To add a date to this list, enter the date, and press ↵. To remove a date from the list, enter the date as shown in the list, and press ↵. Pressing ↵ alternately adds and removes a given date from the list. Refer to the Today option later in this section for a description of the different ways to enter dates.

To exit the Days option after the holiday list is correct, press the **Esc** key.

Deadline — Job Specification Menu

The Deadline option sets a deadline for a job. A deadline is displayed on the screen or in a report as a plus sign (+). The deadline has no effect on scheduling. It is shown on the schedule graph as information only.

The option prompts for a day or week number for the deadline. The initial value is 0. To remove a deadline, set the day or week number to 0.

Deadlines that occur after the end of a project are not shown on printed reports. They are shown on the screen in the schedule display.

Delete — Main Menu

The Delete option erases project files from a data disk. With the Main menu on the screen, select the Delete option with only one keystroke by pressing the **Del** key.

You can select as many files as you want to delete. To mark a file for deletion, move the cursor to the name, and press the space bar to mark the name with an asterisk (*). When you press ↵, you are given the opportunity to delete all marked files. Before each file is actually erased from the disk, you are given one last chance to keep each selected file. Enter **Y** to erase the file. N cancels the Delete option for that file.

If you have more than 16 files on the disk, the [More] option takes you to the next screen, which shows you the next 16 files. File names ending with .BACK are the second-to-last revised versions of DATA files. If your disk is full, you may want to delete some of the backup copies of your files to make room for other files.

Descrip — Modify Menu

The Descrip option takes you to the Project Description menu where you enter options that apply to the whole project. The program displays the entries for these options at the top of the screen:

- The 1- to 30-character project title (Title).
- The 1- to 24-character project leader's name (Leader).
- The time in days or weeks (Time).
- The project's start date (Start).
- The units of money for manpower costs: units, thousands of units, or millions of units (Manpower).
- The units of money for direct costs: units, thousands of of units, or millions of units (Cost).
- Whether or not the critical path will be displayed (Critical).
- The revision number of the current project file (Rev).

Refer to each option for details on its use.

DIF Data — Printout Menu

The DIF data option displays the Report Options menu and the current options defined for the DIF Data Report. The DIF Data Report takes the project's manpower and cost information that you specify and writes it to a separate file on disk. A file written in the DIF format can be read by some other programs. Instructions for loading the DIF Data Report into the VisiCalc program are provided in Appendix D, Transferring VisiSchedule Data to the VisiCalc Program.

The Report Options menu lets you record the report on disk (Print), return to the Printout menu (Quit), or specify the following:

- The first job to be included in the report (First).
- The last job to be included in the report (Last).
- The skill categories to be included in the report (Skill).
- The order in which the jobs are to be listed (Order).
- The disk file name under which the report will be stored (DIF name).

Refer to each option for details on its use.

DIF Name — Report Options Menu

The DIF name option sets the disk file name for the DIF Data Report. The program assumes the project's disk file name with .DATA changed to .DIF.

You can enter another name for the DIF name. The file name must be no more than eight characters long. Then, the program adds .DIF. Allowable characters are different from those allowed for other disk file names: A-Z (lowercase letters are automatically changed to uppercase), 0-9, $ (dollar sign), & (ampersand), # (number sign), @ (at, or each sign), ! (exclamation point), % (percent sign), ' (left single quote sign), ' (right single quote sign), ((left parenthesis),) (right parenthesis), – (hyphen), __ (underscore), < (less-than sign), > (greater-than sign), { (left bracket), } (right bracket), \ (backslash), ∧ (caret), ˜ (tilde), | (vertical bar).

Display — Schedule Menu Extension

The Display option displays cost and manpower information at the bottom of the schedule graph, just above the menu.

The option takes you to the Display menu where you can choose to display:

- The number of workers needed for each day or week in the schedule (Manpower). You can display figures for one skill category or for the totals of all skill categories.
- The salary costs for each day or week (Salary). You can display costs for one skill category or for the totals of all skill categories.
- The direct costs for each day or week (Costs).

You can select one of the items above or none of them. You cannot display more than one item on the screen. However, all selections do appear on the printed Schedule Graph except salary costs relating to only one skill. The values are staggered under each time unit to make them easier to read.

To turn off the current manpower, salary, or cost display, select None from the Display menu. The Quit option returns you to the Schedule menu extension without changing the display area.

Duration — Job Specification Menu

The Duration option specifies the amount of time the job takes. The duration is recorded as a number of time units, either days or weeks.

Fractional durations are not allowed. If you find that you want to enter durations as portions of weeks, you should change the time unit to days.

A job of 0 duration is allowed. Jobs with a duration are shown as arrows, and jobs of 0 duration are shown as a single character (* or X). The maximum duration of a job is 999 time units.

Earliest — Job Specification Menu

The Earliest option specifies the earliest possible start date for a job. The initial date for this option is the start date of the project. You usually use the Earliest option when a job has no prerequisites, but cannot begin until a certain day or week.

The option asks for the time unit number of the earliest start date. To remove an earliest start date, enter **0**.

End — Milestone Menu

The End option marks a milestone at the end of a job. Milestones do not show on the schedule graph. Milestone dates can be printed in the Tabular Job Report, or jobs can be sorted by milestone date. The End option removes the Start milestone if one is set. After you select End, the program returns you to the Schedule menu extension.

Erase — Schedule Menu

The Erase option removes a job from the schedule. With the Schedule menu on the screen, select the Erase option with only one keystroke by pressing the **Del** key. The option asks you to enter a job number. You can cancel the option by pressing the **Esc** key instead of a job number.

The erased job's prerequisites become the prerequisites of the erased job's successors, as shown in Figure 2-4.

```
Before Erase

1  0-->.>
2  0====>
3       >====>          Job 3 has 1 and 2 as prerequisites
4               >====>   Job 4 has 3 as a prerequisite
5               >-->     Job 5 has 3 as a prerequisite


After Job 3 is Erased

1  0-->.>
2  0====>
4       >====>          Job 4 has 1 and 2 as prerequisites
5       >-->            Job 5 has 1 and 2 as prerequisites
```

007-012

Figure 2-4. The Effect of Erase on Prerequisites

If you have just erased a job, the values for the options in the Job Specification menu are unchanged when you add or insert the next job. So, instead of moving a job, you can erase it, then add or insert it at the new location to have the prerequisites automatically assigned.

Filename — Printer Setup Menu

The Filename option specifies a printer or a disk file name as the destination for reports. Valid entries include **PRINTER, REMOUT,** or a disk file name. If you want to use the standard printer (IBM 80 CPS Matrix Printer), use PRINTER, the initial value for the Filename option. To use another printer, you must first assign specifics about that printer to REMOUT or PRINTER by way of the Hardware Options menu. Refer to Appendix C, Printers, for instructions.

You can send the report to a disk file by entering a file name. You will find this feature useful if you want to edit a VisiSchedule report more extensively than the VisiSchedule program allows. You can save the report under a disk file name and edit it with EDLIN command in IBM DOS. But because the VisiSchedule program writes data in the Pascal format, you must use the WriteDOS option to convert the file from Pascal to IBM DOS format. Refer to the WriteDOS option for details.

The file name must be no more than eight characters long. Then, the program adds TEXT. Allowable characters are the same as for other disk file names: letters (A-Z), numbers (0-9), and underscores (__). Lower-case letters are automatically converted to uppercase.

The words PRINTER and REMOUT cannot be used as disk file names. If you enter one of them, the program puts a colon after the name and sends the output to the printer, not to the disk.

If you plan to edit Tabular Job Report data with IBM DOS, you should suppress heading information by entering **N** for the Headings option of the Report Options menu.

First — Report Options Menu

The First option sets the job number of the first job to be included in the report. The initial value of 0 begins the report with the first job in the list. If you enter a job number for the First option, job numbers smaller than the number you enter are not included in the reports. If the job number you enter does not exist in the project file, you will receive an error message.

If you request that the list be sorted, the sort is done before the First and Last jobs are selected.

Format — Main Menu

The Format option prepares a data disk for use with the VisiSchedule program. With the Main menu on the screen, select Format by pressing the **F6** key.

The screen prompts you to put a blank disk in the drive currently specified by the Prefix option, usually Drive B. If the data disk is brand new, the disk is immediately formatted, and you return to the Main menu. If the data disk has been used, the program asks if you want to erase the data. Enter **Y** to continue the formatting process, or press ↵ to cancel it. The Format option erases all data on the disk.

If you select Format when a project file is in the computer memory, Do you wish to CLEAR memory? appears on the screen. Enter **N** to cancel formatting and return to the Main menu where you can save the current project in memory. Enter **Y** to clear the file from memory and continue with the format operation.

Formfeed — Printer Setup Menu

The Formfeed option lets you specify whether your printer uses form feeds. Enter **Y** if your printer uses form feeds. A response of **N** means it does not.

If you are not getting the correct spacing between the page number of one page and the heading of the next page, you have the Formfeed option set incorrectly. For printers that do not use form feeds, the program issues a series of line feeds before beginning the next page.

If your printer uses form feeds and you set this option to YES, set the report length to a value less than the physical page length with the Length option. If you do not, you may get an occasional blank page in a report.

Goto — Schedule Menu

The Goto option displays the schedule beginning with a specific job. The job you select is displayed at the top of the schedule display, and the time line begins with the start of that job.

Instead of selecting Goto and entering the number of the first job, you can accomplish the equivalent by pressing the **Home** key. Pressing the **End** key is equivalent to selecting Goto and entering the number of the last job in the schedule.

The **F9**, **F10**, **PgUp**, and **PgDn** keys are scrolling keys, which move the schedule under the time line. Refer to the Schedule option for more information.

Graph — Printout Menu

The Graph option displays the Report Options menu and the current options defined for the Schedule Graph. The Report Options menu lets you print the schedule graph (Print), return to the Printout menu (Quit), or specify one of the following:

- The first job to be included in the printed schedule (First).
- The last job to be included in the printed schedule (Last).
- The skill categories to be included in the printed schedule (Skill).
- The order in which the jobs are to be listed (Order).
- Whether job and skill names are to be printed on each graph page (Names).

Refer to the individual options for details on their uses.

Hardware — Startup Menu

The Hardware option takes you to the Hardware Options menu. From there, you specify the amount of memory in your computer, and you assign hardware settings to the printer ports. Refer to Appendix C, Printers for instructions. If you make any changes to any of the hardware options, you are given the choice of restarting the program to put the changes into effect.

Headings — Report Options Menu

The Headings option specifies whether the page headings, column headings, and page number are to be included with the Tabular Job Report. Enter **Y** to include headings, and **N** to exclude them. The Headings option allows you to strip extra data from a report. Removing headings makes it easier for other programs to read the report data. You should always set this option to N when collecting data for use by other programs.

Highlite — Schedule Menu Extension

The Highlite option displays the job you select, its prerequisites, and its successors in inverse video (dark characters on a light background). The job number and the job name of the selected job are highlighted. Only the job names of the prerequisites and successors are highlighted.

The option asks for the number of the job you want to highlight. You cancel highlighting by selecting Highlite and entering **0**.

Insert — Schedule Menu

The Insert option lets you insert a job into the job sequence. With the Schedule menu on the screen, select the Insert option by pressing the **Ins** key. This option affects the scheduling of the following jobs in the project.

Compare the Insert with the Add option, which adds a job into the job list without affecting the schedules of the jobs that follow. Be sure you use the correct option when inserting (or adding) a job. Figure 2-5 shows the relationship between the two options.

```
1   0========>
2                >====>
```

Original Schedule

```
1   0========>          1   0========>
3            >====>      3            >====>
2            >====>      2                  >====>
```

Job 3 Added   **Job 3 Inserted**
After Job 1   **After Job 1**

009-003

Figure 2-5. Add vs. Insert Options

The Add option first displays the Job Location menu. With this menu, you select a job number and specify whether the new job is to be located before or after it.

Inserting a job establishes the prerequisites in one of two ways:

• If you insert job 3 *after* job X, one of job 3's prerequisites is job X. Job 3 replaces job X in every prerequisite list in the project.

• If you insert job 3 *before* job X, job 3 assumes all of job X's prerequisites. Job X has only job 3 as its prerequisite.

Figure 2-6 shows the difference between the initial prerequisite values when Before or After are used. Remember that you can always change prerequisites by selecting Modify and changing the Prereq option.

Initial Job List

```
1  0-->..>
2  0=====>
3        >==X                Job 3 has 1 and 2 as prerequisites
```

Inserting Job 4 After Job 2

```
1  0-->.....>
2  0=====>
4        >==>               Job 4 has 2 as a prerequisite
3            >==X           Job 3 has 1 and 4 as prerequisites
```

Inserting Job 4 Before Job 3

```
1  0-->..>
2  0=====>
4        >==>               Job 4 has 1 and 2 as prerequisites
3            >==X           Job 3 has 4 as a prerequisite
```

007-013

Figure 2-6. The Effect of Before and After on Prerequisites During Insert

After the job location is determined, the program displays the Job Specification menu. This menu lets you enter the job name, duration, prerequisites, early start date, direct cost, skills used, and deadline.

If you have just erased a job, the values for the options in the Job Specification menu are unchanged when you add or insert the next job. So, instead of moving a job, you can erase it, then add or insert it at the new location to have the prerequisites automatically assigned.

Job – Job Location Menu

The Job option specifies the target location for a job. The added, inserted, or moved job will be located before or after this location in the list. This option prompts for a job number.

Last — Report Options Menu

The Last option sets the job number of the last job to be included in the report. The initial value is 0, which specifies the last job in the list. If you enter a number for the Last option, job numbers greater than the number you enter are not included in the reports. If the job number you enter does not exist in the project file, you receive an error message.

If you request that the list be sorted, the sort is done before the First and Last jobs are selected.

Leader — Project Description Menu

The Leader option specifies the name of the project leader. You cannot enter more than 24 characters. The name appears on the Project Description Report.

Length — Printer Setup Menu

The Length option sets the printer page length. The initial value is 66, which is the setting for an 11-inch page printed at 6 lines-per-inch. The length must be between 12 (plus top and bottom margins) and 255. For example, if each margin is 3, the minimum length is 18 ($12 + 3 + 3$).

If your printer uses form feeds and you set the Formfeed option to YES, set the Length to a value less than the physical page length. If you do not, youe length. If you do not, you may get an occasional blank page in a report.

Level — Schedule Menu Extension

The Level option adjusts jobs within their slack times to distribute workers evenly. This option can operate only with a project that has slack time. You can also use the Schedule option to adjust the manpower levels on critical and noncritical jobs.

Leveling operates on a single skill level. To level more than one skill level, you must use the option individually for each skill level. Be aware that leveling for a second skill level can undo the leveling for the first skill level. Leveling may change any start dates you have entered with the Schedule option.

Each of the three jobs in Figure 2-7 requires two laborers. Before leveling, jobs 2 and 3 are scheduled to begin on the same date. As a result, six laborers are needed for the first two weeks, then only two for the next two weeks. Leveling moved job 3 within its slack time to begin after job 2. The manpower peaks were leveled so four laborers could be hired for four weeks each without delaying the completion of the project.

```
                   Before Leveling            After Leveling

                   0   1   2   3   4          0   1   2   3   4
               1   >===========>              >===========>
               2   >----->.....>              >----->.....>
               3   >----->.....>              >.....>----->

   MANPOWER LEVEL  6.0    2.0    0.0           4.0    4.0    0.0
          LABORER     6.0    2.0                  4.0    4.0
```

007-014

Figure 2-7. Leveling

You can cancel leveling by selecting the Level option and entering **0** for the skill level. Then, you can cancel any scheduling you have done with the Schedule option of the Schedule menu.

Listing — Printout Menu

The Listing option displays the Report Options menu and the current options defined for the report. The Report Options menu lets you print the Job Description Report (Print), return to the Printout menu (Quit), or specify one of the following:

* The first job to be included in the printed report (First).
* The last job to be included in the printed report (Last).
* The skill categories to be included in the printed report (Skill).
* The order in which the jobs are to be listed (Order).

Refer to each option for details on its use.

Load — Main Menu

The Load option copies a project file from a data disk into the computer memory. The file is never lost from the disk until you specifically delete it with the Delete option. Then, you can display the project, modify it, and print reports from it. With the Main menu on the screen, select Load with only one keystroke by pressing the **F1** key.

This option lists the project files on the data disk that you specified with the Prefix option. To select a project file, move the cursor to the file name and press ↵. The program returns to the Main menu. The file name, project title, size, and changed status are listed in the Project Status area.

If you decide not to load a file from the list that is displayed, you can select [None] to return to the Main menu. If you have more than 16 files on the disk, select the [More] option to reach the next screen of files.

After all of the files whose names end with DATA have been displayed, select the [" BACK" files] option to reach the backup copies of those files. File names ending with BACK are the second-to-last revised versions of corresponding DATA files. You will need to load BACK files only on rare occasions. If, by mistake, you save a changed file under the same name as the old version, but realize you *do not* want to erase it, you can retrieve the old version by loading the BACK version of the file.

If you select Load when another project file is already in the computer memory, Do you wish to CLEAR memory? appears on the screen. Enter **N** to cancel loading and return to the Main menu where you can save the current project in memory. Enter **Y** to clear the file from memory and continue with the load operation.

Manpower — Display Menu

The Manpower option displays the number of workers required for each time period. You can display figures for one skill level or the totals of all skill levels. The label for these levels is the name of the skill category or Manpower total.

The option asks for a skill category (1 to 9). To display the total of all skill categories, enter **0**.

You can remove the manpower display by returning to the Display menu and selecting None or another display option.

Manpower — Modify Menu

The Manpower option displays the occupation list. From there, you can select each of nine skill categories. Each skill category takes you to the Occupation menu, where you enter the skill level name (Occupat), and salary level (Salary). The Quit option takes you back to the occupation list, where you can choose to select another skill level, or return to the Modify menu ([Done]).

Manpower — Project Description Menu

The Manpower option defines the value of one monetary unit for manpower costs. Later, you enter from one to four non-negative integers for manpower costs. Setting this option to suit your needs enables you to enter values later that accurately account for your manpower costs. You have three units to choose from:

- $ (units) allows a range of 0 to $9,999 in increments of 1 unit.

- K$ (thousands of units) allows a range of 0 to $9,999,000 in increments of 1,000 units.

- M$ (millions of units) allows a range of 0 to $9,999,000,000 in increments of 1,000,000 units.

If you change the manpower cost units, the values in the project file are not changed accordingly; you must change them. For example, if the salary is currently entered in $ (dollars) and you have a skill with a salary of 1000$ ($1000), changing the Manpower option to K$ changes the salary to $1,000,000. If you make the change, you should change the value to 1K$ ($1000).

Memory — Hardware Options Menu

The Memory option is set to the amount of that you have in your computer. Enter a value from 64 to 960.

The program rounds the number down to the nearest multiple of 32, as long as you actually have that amount of memory. For example, if you have 64K of memory, and you enter 130 for the Memory option, the value will be rounded down to 64. If you have 128K of RAM and enter 130, the value will be rounded down to 128. If you enter a value less than 64, the program rounds the value up to 64.

The VisiSchedule program can use only 64K or 128K of memory. If your computer has more than 128K of memory, the VisiSchedule program will still work properly, but the extra memory will not be used.

The number of jobs that you can enter for a given project varies according to the amount of memory. You can enter up to 50 jobs with 64K of memory, and up to 150 jobs with 96K or more.

If you try to use your VisiSchedule Program Diskette with an IBM Personal Computer that has less memory than the current value of the Memory option, the program will not load. Be sure to change the Memory option to accommodate the computer you will be moving to if you will be changing Computers.

Mileston — Schedule Menu Extension

The Mileston option marks the beginning or ending of jobs as signifi-
cant dates, or milestones. Milestones are not marked on the schedule,
but they are recorded by the program. You can print a list of the project's
milestones in the Tabular Job Report by selecting Milestones from the
Columns list. You can also sort jobs by milestone date with the Order
option.

The option prompts for a job number. Then, it displays the Milestone
menu. The Start and End options mark a milestone at the beginning or
end of the job. The None option removes any existing milestones.

Only one milestone can be set for a job. If you set a milestone at the
start or end of a job, you cancel the milestone when you choose the
opposite milestone option. The Quit option returns you to the Schedule
menu extension without adding or changing any milestones.

Modify — Main Menu

The Modify option displays the Modify menu. The Modify menu con-
tains options that take you to the following menus: Project Description,
Manpower, Workweek, and Schedule. Use the Modify option to reach all
parts of the program except those related to printing reports. With the
Main menu on the screen, select Modify with only one keystroke by
pressing the **F3** key.

Modify — Schedule Menu

The Modify option lets you change all aspects of a job. The option first
asks for the job number of the job you want to modify. You can enter a job
number and press ↵ to continue, or you can press **Esc** to cancel the
option. If you continue, the program displays the Job Specification
menu. From there, you can change the job name, duration, prereq-
uisites, early start date, direct cost, manpower levels, and deadline date.

You leave the Job Specification menu by selecting Accept or Cancel.
Selecting the Accept option records the changes you make on the
schedule graph. Selecting the Cancel option cancels the changes.

More — Schedule Menu

The More option takes you to the Schedule menu extension. From
there, you can use the Highlite, Display, Level, Renum, Slip, or Mileston
options. To return to the main portion of the Schedule menu, select the
Quit option in the extension.

Move — Schedule Menu

The Move option lets you move a job to a different position in the list. The option prompts for the job number. Then, the Job Location menu is displayed. You enter a target job number and specify whether the job being moved is to be placed before or after the target job.

Moving a job in the list does not change its number, prerequisites, or successors. It only changes its location in the list.

Name — Job Specification Menu

The Name option lets you specify a job name of up to 30 characters. When the name is displayed on the screen, you see only the first 12 characters. All 30 characters are printed on the reports.

Names — Report Options Menu

The Names option specifies whether job and skill names are to be printed on all pages of a printed schedule or only on the first page. Enter **Y** to print the names on every page. Enter **N** when the pages must be taped together to show the whole schedule; this will reduce the amount of paper needed.

None — Display Menu

The None option erases the manpower, salary, or cost information that is currently displayed. When you select None, the program returns you to the Schedule menu extension.

None — Milestone Menu

The None option removes a milestone marked for a job. When you select None, the program returns you to the Schedule menu extension.

Normal — Workweek Menu

The Normal option sets the normal working week. You can use this option only if you set the Time option to Days in the Project Description menu.

This option displays a list of the days of the week, Sunday through Saturday. You select each working day by highlighting it and pressing the space bar. You accept the list of working days by pressing ↵. The initial setting is for a five-day week, Monday through Friday.

Occupat — Occupation Menu

The Occupat option specifies the name for the skill level you selected. You can enter up to 24 characters. The name you enter is used in all reports and displays that list manpower categories and costs. If you do not enter a name, the program uses Skill # n, where n is a digit from 1 through 9.

Order — Report Options Menu

The Order option sets the sequence in which the jobs are sorted for a report. Table 2-3 lists and describes the available sequences.

Table 2-3. Order Sort Sequences

Order Item	Description
Current order	If no sorting has been done, the current order is used. Otherwise, the Current order option restores the file to the order it had when you were last in the Printout menu.
Deadline	Sorted by deadline date. Jobs without deadlines are printed before jobs with deadlines.
Duration	Sorted by job length from the shortest to the longest.
Earliest start	Sorted by earliest date on which the job can begin. If an earliest date has not been set, 0 (the start date) is used.
Early start	Sorted by early start date. The early start date differs from the scheduled start date if the slack time precedes the beginning of work.
Job name	Sorted in alphabetic order by job name.
Job number	Sorted in numeric order by job number.
Late finish	Sorted by late finish date. The late finish date is the last date that the job can finish without causing a project delay.
Milestones	Sorted by milestone date. If no milestone date has been set, the scheduled start date is used. If no scheduled start date has been set, the early start date is used.
Number of successors	Sorted by the number of successors a job has, from 0 to the maximum.

2-44

Table 2-3. Order Sort Sequences (Continued)

Order Item	Description
Scheduled start	Sorted by the scheduled start date set with the Schedule or Level options. If the scheduled start date was not set, the value is 0.
Slack time	Sorted by the amount of slack time for a job from 0 (critical jobs) to the maximum.
Slash tag	Sorted in ASCII order (numbers, letters, then underscores) by the portion of the name following the slash. Jobs with identical slash tags are ordered according to the first part of the name (before the slash).

Parity—Com Port Menu

The Parity option requires a setting to correspond with the setting on your serial printer. You can enter No, Even, or Odd. The parity bit is an item your printer checks to test the data that it receives. Refer to Appendix C, Printers for settings that have been tested successfully with various printers.

Prefix—Main Menu

The Prefix option specifies in which drive the project data will be saved, or from which drive it will be loaded or deleted. With the Main menu on the screen, select the Prefix option with only one keystroke by pressing the **F5** key. The program asks you to supply a drive name from B to F. Drive A must always hold the VisiSchedule Program Diskette, so you cannot enter **A** for the Prefix option.

The initial value for the Prefix is B:. If you select Prefix and enter another letter, do not type the colon; the program adds the colon automatically. The current value for the Prefix option is always displayed in the Project Status Area.

The VisiSchedule program has not been tested with more than two disk drives. If you do add disk drives to your system, the Prefix option allows you to access them.

Prereq — Job Specification Menu

The Prereq option lists the jobs that must be completed before the job you are entering can be started. Refer to the Add and Insert options to see how these options assume prerequisites. The Prereq option lets you replace the prerequisites the program automatically sets.

The option prompts you to enter a list of the jobs, by number, that must be completed before the subject job can be started. The program displays the current list of prerequisites, if any. The job numbers in the prerequisite list must be separated by commas. To remove all prerequisites, enter a **0**. If you enter a 0 as part of a string of prerequisites, the string is revised to contain only a zero.

A job can have no more than nine prerequisites. If a job depends on more than nine others, you can create two other fictitious jobs of zero duration and split the prerequisites between them. Then, the real job will have the two zero-duration jobs as prerequisites.

Print — Main Menu

The Print option displays the Printout menu. From there, you can print reports and extract manpower and cost information for transfer to another program. With the Main menu on the screen, select Print with only one keystroke by pressing the **F4** key.

Print — Report Options Menu

The Print option prints the current report according to the other options you select in the Report Options menu. Before printing any one of the reports, the program gives you the option of previewing the report on the screen. Enter **Y** to preview the report, and enter **N** to print the report immediately.

When you preview the report, you can press any letter key to scroll the report forward, line by line. If you are set up for a printed report width of more than 80 characters, the lines wrap on the screen, but print correctly on the printer. After you have scrolled through the entire report, the program prompts you to print the report. A response of **Y** prints the report, and **N** cancels it.

You can stop the previewing at any time by pressing the **Esc** key. Then, you have the choice of printing the report or returning to the Printout menu.

Printer — Hardware Options Menu

The Printer option assigns a parallel or serial printer to the PRINTER port. If you want to use a parallel printer, enter Parallel for the Printer option. To use a serial printer, enter either COM1 or COM2 for the Printer option. You must have already entered the appropriate values for your printer in the Com Port menu (refer to Appendix C, Printers). Then, when you enter **PRINTER** for the Filename option in the Printer Setup menu, the VisiSchedule program can print to your printer.

Protocol — Com Port Menu

The Protocol option requires a setting that corresponds to the setting on your serial printer. You can enter DTR/DSR, or XON/XOFF. The DTR/DSR protocol requires a special print cable. The protocol is the format in which your printer expects to receive data. Refer to Appendix C, Printers for settings that have been tested successfully with various printers.

Quit — Com Port Menu

The Quit option returns you to the Hardware Options menu.

Quit — Display Menu

The Quit option returns you to the Schedule menu extension without changing the current display.

Quit — Hardware Options Menu

The Quit option returns you to the Startup menu. If you changed any options in the Com Port or Hardware Option menus, you are given the opportunity to restart the program to put the changes into effect.

Quit — Job Location Menu

The Quit option cancels the Add, Insert, or Move option and returns you to the Schedule menu.

Quit — Main Menu

It is best to be safe and always use the Quit option to exit the program. If you have a changed project file in memory, the program gives you the chance to save it before exiting. The program saves the following information on the VisiSchedule Program Diskette when you select the Quit option:

• The current date and format.

• The reporter name.

- The current file name.
- The current prefix.
- The currency symbol.
- The printer setup information.

If you exit the program simply by turning off the power switch, this housekeeping information is not saved. More importantly, if you do not use the Quit option, you are not reminded to save your current file with its changes.

Quit — Milestone Menu

The Quit option returns you to the Schedule menu extension.

Quit — Modify Menu

The Quit option returns you to the Main menu.

Quit — Occupation Menu

The Quit option returns you to the occupation list. The [Done] option in the occupation list returns you to the Modify menu.

Quit — Printer Setup Menu

The Quit option returns you to the Printout menu.

Quit — Printout Menu

The Quit option returns you to the Main menu.

Quit — Project Description Menu

The Quit option returns you to the Modify menu.

Quit — Report Options Menu

The Quit option returns you to the Printout menu.

Quit — Schedule Menu

The Quit option returns you to the Modify menu if you are in the main portion of the Schedule menu. If you are in the Schedule menu extension, Quit returns you to the main Schedule menu.

Quit — Startup Menu

The Quit option exits the VisiSchedule program. You can restart the program by pressing the ↵ key.

Quit — Workweek Menu

The Quit option returns you to the Modify menu.

Remout — Hardware Options Menu

The Remout option assigns a serial printer to the REMOUT printer port. After entering the appropriate option settings for COM1 or COM2 in the Com Port menu (refer to Appendix C, Printers), you can enter either COM1 or COM2 for the Remout option. Then, when you enter **REMOUT** for the Filename option in the Printer Setup menu, the VisiSchedule program can print on your printer.

If you have two serial printers, record the settings for each one under the COM1 or COM2 options. Then, when you return to the Hardware Options menu, select Remout, and enter either COM1 or COM2. Select Printer, and enter the other **COM** option to assign the other printer to the PRINTER port. You can easily switch from one printer to another by entering REMOUT or PRINTER for the Filename option in the Printer Setup menu.

Renum — Schedule Menu Extension

The Renum option renumbers the project's jobs starting with the job at the top of the list as Job 1, the job second in the list as Job 2, and so on to the last job.

Your job list will probably be out of numeric sequence after a session of adding, inserting, moving, and erasing jobs. Renumbering changes only two aspects of the jobs. It changes the job numbers, and it changes the prerequisite lists to reflect the job number changes. This way, the project's prerequisites are preserved.

Renumbering is an irreversible process. For this reason, the program prompts you to confirm your intention to renumber after you select the option. Enter **Y** to confirm the option, or enter **N** to cancel it.

Reporter — Startup Menu

The Reporter option sets the name that is listed as the preparer of each report. You may enter up to 24 characters.

Rev — Project Description Menu

The Rev option contains the revision number for the project. When you create a project, the revision number is automatically set to 0. Each time you make a change to the project and save it on disk, the program increases the revision number by one. With this option, you can set the revision number to any value you wish, up to three digits long. The revision number is displayed on the Main menu screen as Rev# = .

Salary — Display Menu

The Salary option displays the salary costs for each time period. You can display the costs for one skill category or for the total of all skill categories. The label for this option is Manpower cost and specifies whether the cost units are dollars ($), thousands of dollars (K$), or millions of dollars (M$).

The option prompts for a skill category (1 to 9) to display the costs for a single skill level. To display the total of all skill levels, enter 0.

You can remove the manpower costs by returning to the Display menu and selecting None or another display option.

Salary — Occupation Menu

The Salary option specifies the salary for the skill level you selected. You can enter up to four non-negative integers. The salary is entered according to the Manpower and Time options in the Project Description menu. For example, if the manpower cost monetary unit is dollars ($) and the time unit is weeks, the salary is expressed in dollars per week.

Save — Main Menu

The Save option copies the file in memory to the data drive you specified with the Prefix option. With the Main menu on the screen, select the Save option with only one keystroke by pressing the **F2** key.

This option lists the name of the files on the data disk and [New name] and [None]. You can choose to replace the old version of the file with the changed version, or you may want to save the changed version under a new name. You can exit the option without saving anything by selecting [None], which returns you to the Main menu.

If you choose to replace the old version with the new, the old version is renamed. The .DATA suffix is changed to BACK, and the new version of the file takes the .DATA suffix.

If you choose [New name], you are prompted for an eight-character name. A file name can contain only letters, numbers, and underscores (__). Lowercase letters are converted to uppercase. The program adds .DATA to the end of the name you supply.

If more than 16 files are on the disk, the [More] option is displayed. Selecting [More] displays the continuation of the list.

If you select Save when the current project is unchanged, the program asks if you are sure you want to save it. Enter **Y** to continue the save operation. **N** cancels it.

When you save a file, the Project Status area is updated to reflect the current file name. The changed status becomes No. The revision number associated with the file you saved is increased by one.

It is a good practice to save frequently when entering a large schedule or when modifying extensively.

For further data protection, you should make backup copies of entire data disks. To do so, exit the VisiSchedule program, and use the IBM DOS DISKCOPY command.

Schedule — Modify Menu

The Schedule option displays the Schedule menu. From there, you can enter the specifics of each job in the project.

The schedule is displayed on the screen above the menu. The schedule graphically shows your project's progress over time. The Schedule menu is at the bottom of the screen.

If the project schedule is too long to fit on the screen, you can display the rest of the schedule in several ways. With the Schedule menu on the screen, type a number and **U**, **D**, **L**, or **R** to move the schedule in any direction up to 9999 units. The schedule moves within the window of the screen in the direction you specify. If the beginning of the schedule is displayed, for instance, you can scroll the schedule up, not down. Pressing the **F9** key is equivalent to typing **20R** to scroll the schedule 20 units to the right. Pressing **F10** is the same as typing **20L**.

The **PgUp** key displays the previous page of jobs. It is equivalent to typing **17D**. Press the **PgDn** key to see the next page of the project, which is the same as typing **17U**.

Schedule — Schedule Menu

The Schedule option lets you schedule a job to begin on a certain date. If the job is not on the critical path, the program prompts you to begin the job between the early and late start date times. If you enter a time unit outside of these limits, the entire schedule may be affected.

The option prompts for a job number. After you enter a job number, you are prompted for the start date of the job. Entering **0** schedules the job to begin on the early start date. For noncritical jobs, the program lists the starting date range that will not affect the overall schedule. For critical path jobs, enter **0** to avoid project delays. If you schedule a starting date before the early start date or the earliest start date, the remainder of the schedule is not affected.

You can unschedule all jobs, that is, return all scheduled jobs to the early or earliest start date, with the Level option. Select Level, enter **0** for a skill level number, and type **Y** when the program prompts you to undo scheduling.

Setup — Printer Setup Menu

The Setup option lets you enter a printer setup string. Refer to your printer manual for the setup strings your printer requires for special printing modes. Or, refer to Table C-3 in Appendix C, Printers for compressed mode setup strings (more characters per inch) that have been tested successfully with the listed printers.

A setup string must be entered as a series of decimal values separated by commas. The numbers are the decimal equivalent of the string in the ASCII character set. You can enter a maximum of eight numbers. For example, to enter the setup string of Ctrl-I K Ctrl-I 132 N, type the following string of decimal numbers:

9,75,9,49,51,50,78

NOTE: The Ctrl-P character (decimal 16) has a special meaning to the Pascal system; do not enter it in a setup string. If you need Ctrl-P, enter 144 (which is 16 plus 128).

Appendix G in the *IBM Personal Computer BASIC* manual contains a list of the decimal numbers used to produce the ASCII character set.

To remove the setup string, enter **0** for the Setup option.

Setup — Printout Menu

The Setup option displays the Printer Setup menu and a listing of the most recently entered printer setup values. With the Printer Setup menu you can specify:

▸ The name of the printer or file to which the report will be sent. If you want to use other than the standard printer (IBM 80 CPS Matrix Printer), you must have assigned that printer to the name PRINTER: or REMOUT: by way of the Hardware Options menu. Refer to that menu for more information.

▸ The page width in characters. The width must be in the range 79 through 255.

▸ The page length in lines. The length must be in the range 12 (plus top and bottom margins) through 255. For example, if the margins are both 3, the minimum length is 18 (12 + 3 + 3).

▸ The top and bottom margins in lines. The individual margins must be in the range 0 through page length minus the other margin minus 12. For example, if the top margin is 3 and the length is 66, the maximum bottom margin is 51 (66-3-12).

• Whether the printer uses continuous form paper or individual sheets.

• Whether the printer uses form feeds.

• Whether the printer uses automatic line feeds.

• A setup sequence if your printer requires one.

Sheets — Printer Setup Menu

The Sheets option tells the program if you are using single sheets or continuous form paper. If single sheets are used, the program stops at the end of each page to allow you to insert a new sheet of paper. Enter **Y** if you are using single sheets of paper. A response of **N** means you are not.

Some people use the single sheet option to stop at the bottom of each page to make sure the paper is correctly aligned. After inserting and aligning the paper, press any letter key to continue printing. You can stop the printing at this point by pressing the **Esc** key.

When using the single sheet option, remember that the spacing for the top margin (Top mar) is done after printing is resumed. If you want to have a one-inch margin at the top of the page, use either of the following (assuming your printer prints at six lines-per-inch):

• Set Top mar to 6, and adjust the print head to the top of the paper.

• Set Top mar to 0, and adjust the print head to a point one inch from the top of the paper.

Skill — Job Specification Menu

The Skill option lets you select the manpower required to do a job. The job can draw manpower from any combination of the nine different skills.

The option displays a menu of the skill level numbers with the number of people assigned from each level. The long prompt for each skill level number is the occupation name that you entered in the Occupation menu.

To change the number of people required for a skill level, move the cursor to the skill number and press ↵. Then, the program prompts for the number of people. The program accepts values in tenths of persons from 0.1 person up to 999.9 persons.

When you have set the number of people required for the necessary skills, select Continue. You return to the Job Specification menu.

Skill — Report Options Menu

The Skill option specifies the skill categories that will be included in the report. You can select a single skill by entering its skill level number, or you can select all skills by entering 0.

Slip — Schedule Menu Extension

The Slip option reschedules a partially-completed project. You may find that you are three weeks into a project, but the jobs scheduled to be completed by the third week are not finished. You could move each uncompleted job to the right under the time line, but the Slip option moves them all at once for you.

Before using the Slip option, make sure that all jobs or portions of jobs that are actually completed are marked completed with colons. Use the Complete option to do this. Then, select Slip. You are prompted for the time period to which all jobs are to be slipped. After you enter the time period, the program modifies the schedule, maintaining all relationships for the uncompleted work.

Figure 2-8 shows how the option can affect the schedule. The upper portion of the figure shows the project as of time period 2. Job 2 should have been finished, but only one week is completed. Slipping the schedule as of time period 2 results in the schedule shown in the lower portion of the figure. Job 2 is shifted one time period because the remaining work cannot begin until the current date (time period 2).

Note that the Slip option does not preserve the history of a partially-completed job. The first week of Job 2 was completed in the first week of the project. After the slip, the schedule shows the job as being completed in the second week. Job 2 is now on the critical path because it has no more slack time. Job 1 is not affected because it is completed. Job 3 is not affected because it is up-to-date.

Status at Time Period 2

```
    0   1   2   3   4

1   0::>
2   0::--->..>
3   0:::::===>
```

Schedule After Slip as of Time Period 2

```
    0   1   2   3   4

1   0::>
2      0::===>
3   0:::::===>
```

007-015

Figure 2-8. Slip Option

Start — Milestone Menu

The Start option marks a milestone at the beginning of a job. Milestones do not show on the schedule display. Milestone dates can be printed in the Tabular Job Report, or jobs can be sorted by milestone date. The Start option removes the End milestone if one is set. After you select Start, the program returns you to the Schedule menu extension.

Start — Project Description Menu

The Start option specifies the beginning date for the project. The initial value is the date you entered for the Today option in the Startup menu. You can enter another date according to the format described under the Today option later in this section.

The Start date becomes the 0th time unit in the project. If this date is a nonworking day or is in a nonworking week, the program uses the first working day that follows this date.

Stopbits — Com Port Menu

The Stopbits option requires a value of 1 or 2 that corresponds with the setting on your serial printer. Your printer expects to read either one or two stop bits before each character or block of data. Refer to Appendix C, Printers, for values that have been tested successfully with various printers.

Summary — Printout Menu

The Summary option prints the Project Description Report for the project in memory. The report is described in detail in the "Reports" section later in the Reference.

Before printing any one of the reports, the program gives you the option of previewing the report on the screen. Enter **Y** to preview the report, and enter **N** to print the report immediately.

When you preview the report, you can press any key to scroll the report forward, line by line. If you are set up for a printed report width of more than 80 characters, the lines wrap on the screen, but print correctly on the printer. After you have scrolled through the entire report, the program prompts you to print the report. A response of **Y** prints the report, and **N** cancels it.

You can stop the previewing at any time by pressing the **Esc** key. Then, you have the choice of printing the report or returning to the Printout menu.

Table — Printout Menu

The Table option displays the Report Options menu and the current option entries defined for the report. The Report Options menu lets you print the report (Print), return to the Printout menu (Quit), or specify the following:

- The first job to be included in the printed report (First).
- The last job to be included in the printed report (Last).
- The skill categories to be included in the printed report (Skill).
- The order in which the jobs are to be listed (Order).
- Whether page and column headings and page numbers are to be printed on each report page (Headings).

- Whether dates or time unit numbers are to be included in the report (Dates).
- Which column items are to be included in the report (Columns).

Refer to each option for details on its use.

Time — Project Description Menu

The Time option specifies the time units for the project. You can choose Days or Weeks. You should pick the scale that corresponds to the majority of the jobs in the project. If most of the jobs are many weeks long and a few are days long, you should probably choose Weeks. Then, enter the short-term jobs as zero or one week in length.

The time scale is crucial. If you pick the wrong scale and find you have to change it, the job durations stored in the project file are not converted. You will have to use the Modify option to change the duration of each job. For example, if you first specify weeks and find that you must change to days, a job with a duration of 2 weeks is changed to 2 days, not to 10 working days.

Title — Project Description Menu

The Title option specifies a project title of up to 30 characters. The title appears on all the reports that the program creates.

Today — Startup Menu

The Today option sets the date that will show on reports as the current date. The Today option also determines the holiday list for the Days option in the Workweek Menu.

Dates can be entered in either of two forms, as determined by the Dates option in the Startup Menu:

11/29/81 (mm/dd/yy)

29/11/81 (dd/mm/yy)

The program handles and maintains dates in the range from 1/1/1977 through 12/31/2065. For dates outside this range, the year is rounded. The years 66 through 69 are rounded down to 65, and 70 through 76 are rounded up to 77.

You can enter dates in a relative form as a number of days, weeks, months, or years from the currently recorded date:

+3M (3 months from the current date)

The program accepts only valid date characters and slashes if you are entering an absolute date. It accepts +, -, D, W, M, Y, and the digits 0 through 9 if you are entering a relative date. If you attempt to enter an invalid character, the computer beeps and rejects the character. The program also rejects impossible dates. For example, it does not allow you to enter a month of 13 or a day of 45. You cannot enter 2/29 unless the year is previously set to a leap year. You must use slashes to separate month, day, and year.

You need not change the entire date. If you change only the month and day and press ↵, the current year is kept. Pressing the slash key skips over a field. For example, to change 9/23/81 to 9/24/81, enter /24 ↵.

You can change the current date by entering a relative period of time preceded by a plus sign (+) or a minus sign (−). You must specify whether the relative period is in days, weeks, months, or years by entering D, W, M, or Y after the number. For example:

• + 60D adds sixty days to the current date.

• − 3W subtracts three weeks from the current date.

• + 6M adds six months.

• − 1Y subtracts one year.

Top mar — Printer Setup Menu

The Top mar sets the number of blank lines to be left at the top of each report page. If you do not specify a number, the program uses 3. The margin must be in the range 0 through page length minus the bottom margin minus 12. For example, if the bottom margin is 3 and the length is 66, the maximum top margin is 51 (66-3-12).

Weeks — Workweek Menu

The Weeks option sets the project's nonworking weeks. A nonworking week can begin on any day of the week; it does not have to begin on the same weekday that the project starts on.

To add a week to the list, enter the date of the first day of the week, and press ↵. To remove a week from the list, enter the date of the first day as shown in the list and press ↵. Pressing ↵ alternately adds and removes a given week from the list. Refer to the Today option in this section for different ways to enter dates.

To exit the Weeks option after the list is correct, press the **Esc** key.

Width — Printer Setup Menu

The Width option sets the page width in number of characters. Allowable values are between 79 and 218. Most printers output a ten character-per-inch line of either 80 or 132 characters. Some printers can print up to 218 characters per line. Most reports use only 80 characters, although the Tabular Job Report and the Schedule Graph can use up to 218 characters. If you do not specify a value, the program uses 79.

If you are printing an 80-character line and your reports are double-spaced, you should change the width to 79 columns. Some printers issue an automatic line feed when printing an 80-character line. This causes double spacing because the VisiSchedule program issues a carriage return and a line feed.

Work — Modify Menu

The Work option displays the Workweek menu. From there, you can specify the project's normal working days (Normal), the days off (Days), and the weeks off (Weeks).

WriteDOS — Main Menu

The WriteDOS option converts files from Pascal format to IBM DOS format. To accomplish the conversion, you need to have on hand a disk formatted with IBM DOS 1.0 or 1.1. With the Main menu on the screen, select the WriteDOS option with only one keystroke by pressing the **F7** key.

If you select WriteDOS when another project file is already in the computer memory, Do you wish to CLEAR memory? appears on the screen. Enter **N** to cancel loading and return to the Main menu where you can save the current project in memory. Enter **Y** to clear the file from memory and continue with the WriteDOS operation.

The program displays the list of report files, which end with the suffix .TEXT. These files were created by printing a report to a disk file name rather than to a printer port. The report destination was controlled by the Filename option in the Printer Setup menu. The files are written in Pascal text format. To edit one of these files, you must convert it to IBM DOS format with the WriteDOS option.

Select a .TEXT file to convert. Then, follow the instructions on the screen to switch back and forth from your data disk to your IBM DOS disk. If the DOS disk has a write-protect tab in place, be sure to remove it. The VisiSchedule program creates a file on the IBM DOS disk based on the name of the .TEXT file. The .TEXT file name extension is changed to .TXT. If you write a file to a name that already exists on the IBM DOS disk, the old version is renamed with an extension of .BAK, and the new version takes the .TXT extension.

After the operation is completed, select Quit to exit the VisiSchedule program. Then, remove the VisiSchedule Program Diskette, and insert your IBM DOS Diskette. Press **Ctrl-Alt-Del**. Now, you can read and edit the file with the IBM DOS EDLIN command. Refer to the IBM *Disk Operating System* manual for instructions.

REPORTS

The VisiSchedule program creates four different reports:

* The Project Description Report is created by selecting the Summary option from the Printout menu.

* The Job Description Report is created by selecting the Listing option from the Printout menu.

* The Tabular Job Report is created by selecting the Table option from the Printout menu.

* The Schedule Graph is created by selecting the Graph option from the the Printout menu.

Three of the reports (all but the Project Description Report) can be modified by way of the Report Options menu. You can limit the jobs included in these reports with the First and Last options, which let you specify, by job number, the first and last jobs to be included. You can further limit the reports by specifying that the report be generated for a single skill category. When a single skill category is selected, only those jobs that use the skill are included in the report.

You can preview any one of the reports on the screen before you print it. After you select Print from the Report Options menu, the program prompts you for previewing. After you enter **Y**, pressing any letter key begins the preview. You can scroll the report forward, line by line, by pressing any letter key. You can cancel previewing by pressing the **Esc** key.

If you see > > > > > (greater-than signs) in a report, the program has computed a value that has more digits than the report can accommodate. Change the cost or manpower units from $ to K$ or K$ to M$ and reduce the number of digits for the entries involved.

THE PROJECT DESCRIPTION REPORT

The Project Description Report, shown in Figure 2-9, is created from the Summary option in the Printout menu. The report lists the project details entered with the Descrip, Manpower, and Work options from the Modify menu. Additionally, this report calculates values from an analysis of the whole project. These values are:

- The man-weeks required for each skill category.
- The cost for each skill category.
- The project's completion date.
- The number of jobs.
- The total manpower requirement.
- The total manpower cost.
- The total direct cost.
- The total project cost.

```
                        PROJECT DESCRIPTION REPORT
                        --------------------------
                          First Street Water Main
                   Revision 5.  1/ 1/82. File EXAMPLE3.DATA


  Description data fields:
       Name of project = First Street Water Main
    Leader of project = J. K. Henderson
           Time scale = Weeks
           Start date =  1/ 4/82
    Direct cost units = K$
  Manpower cost units = $
   Find critical path = Yes

  Skill categories:
                         DESCRIPTION          $/Man-Week    Man-Weeks    TOTAL COST
  1st Skill category = Operating Engineer        1000         24.0      $24000.0
  2nd Skill category = Laborer                    500         46.0      $23000.0
  3rd Skill category = Welder                     750         10.0       $7500.0
  4th Skill category = Civil Engineer            1500            0          $0.0
  5th Skill category = Skill # 5                    0            0          $0.0
  6th Skill category = Skill # 6                    0            0          $0.0
  7th Skill category = Skill # 7                    0            0          $0.0
  8th Skill category = Skill # 8                    0            0          $0.0
  9th Skill category = Skill # 9                    0            0          $0.0

  Working days:
       Days of the week=MTuWThF

  Holidays:  Since the time scale is WEEKS. holidays are ignored
             1/ 1/82   11/26/81
             5/31/82   12/25/81
             7/ 4/82
             9/ 7/81


  Nonworking weeks:
             2/ 8/82 -  2/14/82


  Schedule Summary:
       Completion date =  5/ 3/82
        Number of jobs = 10
        Total manpower = 80.0 Man-Weeks
         Manpower cost = $54500.0
           Direct cost = $128000
            Total cost = $182500
```

013-003

Figure 2-9. Sample Project Description Report

THE JOB DESCRIPTION REPORT

The Job Description Report, shown in Figure 2-10, is created from the Listing option in the Printout menu. The report lists details about each job in the range of jobs or skills that you select. The jobs are in the sequence you selected with the Order option in the Report Options menu. The report lists all aspects of the job.

The report includes the following information about each job:

- The duration.
- The number of time units completed.
- Whether the job is on the critical path.
- The amount of slack time.
- The prerequisites.
- The manpower skills and salaries.
- The total effort.
- The manpower cost.
- The direct cost.
- The earliest and latest start dates.
- The earliest and latest finish dates.

```
                           JOB DESCRIPTION REPORT
                           ----------------------
                            First Street Water Main
                    Revision 5.  1/ 1/82. File EXAMPLE3.DATA


Job #1. Purchase pipe
---------------------
          Duration = 3 Weeks                Earliest start =  1/ 4/82
   Work Completed = 0 Weeks                Earliest finish =  1/25/82
  On critical path = No                       Latest start =  1/18/82
        Slack time = 2 Weeks                  Latest finish =  2/15/82
     Prerequisites = none
   Manpower skills = none
      Total effort = none
     Manpower cost = $0.0
       Direct cost = $50000

Job #2. Dig 1st part of trench
------------------------------
          Duration = 3 Weeks                Earliest start =  1/ 4/82
   Work Completed = 0 Weeks                Earliest finish =  1/25/82
  On critical path = No                       Latest start =  1/11/82
        Slack time = 1 Week                   Latest finish =  2/ 1/82
     Prerequisites = none
   Manpower skills = Skill #1. Operating Engineer. 1.0 @ 1000$ per Man-Week
                     Skill #2. Laborer. 3.0 @ 500$ per Man-Week
      Total effort = 12.0 Man-Weeks
     Manpower cost = $7500.0
       Direct cost = $5000

Job #4. Lay 1st part of pipe
----------------------------
          Duration = 2 Weeks                Earliest start =  1/25/82
   Work Completed = 0 Weeks                Earliest finish =  2/15/82
  On critical path = No                       Latest start =  2/15/82
        Slack time = 2 Weeks                  Latest finish =  3/ 1/82
     Prerequisites = Job #1. Purchase pipe
                     Job #2. Dig 1st part of trench
   Manpower skills = Skill #2. Laborer. 4.0 @ 500$ per Man-Week
                     Skill #3. Welder. 2.0 @ 750$ per Man-Week
      Total effort = 12.0 Man-Weeks
     Manpower cost = $7000.0
       Direct cost = $13000

Job #5. Dig 2nd part of trench
------------------------------
          Duration = 3 Weeks                Earliest start =  1/25/82
   Work Completed = 0 Weeks                Earliest finish =  2/22/82
  On critical path = No                       Latest start =  2/ 1/82
        Slack time = 1 Week                   Latest finish =  3/ 1/82
     Prerequisites = Job #2. Dig 1st part of trench
   Manpower skills = Skill #1. Operating Engineer. 1.0 @ 1000$ per Man-Week
                     Skill #2. Laborer. 3.0 @ 500$ per Man-Week
      Total effort = 12.0 Man-Weeks
     Manpower cost = $7500.0
       Direct cost = $5000
```

013-004

Figure 2-10. Sample Job Description Report

THE TABULAR JOB REPORT

The Tabular Job Report is created from the Table option of the Printout menu. A sample Tabular Job Report is shown in Figure 2-11. It lists details of the project that depend on the selections you make with the Columns option in the Report Options menu.

The contents of this report vary. There are no entries that must always be included. However, if you do not make a selection with the Columns option, the program prints a report that contains the job number and name.

The Columns option gives you the space, in characters, required for each report. You should avoid selecting more fields than fit across your report page. If you need more than you can get onto a report page, run two or more reports with different selections.

```
                          TABULAR JOB REPORT
                          ------------------
                        First Street Water Main
              Revision 5.  1/ 1/82. File EXAMPLE3.DATA


                              EARLY      EARLY       LATE        LATE    SLACK
  JOB NAME                    START     FINISH      START      FINISH  TOT FREE
     1 Purchase pipe          1/ 4/82   1/25/82    1/18/82    2/15/82   `2     0
     2 Dig 1st part of trench 1/ 4/82   1/25/82    1/11/82    2/ 1/82    1     0
     4 Lay 1st part of pipe   1/25/82   2/15/82    2/15/82    3/ 1/82    2     0
     5 Dig 2nd part of trench 1/25/82   2/22/82    2/ 1/82    3/ 1/82    1     1
     6 Fill 1st part of trench 2/15/82  3/ 1/82    3/ 8/82    3/22/82    3     0
     7 Lay 2nd part of pipe   3/ 1/82   3/22/82    3/ 1/82    3/22/82    0     0
     8 Fill 2nd part of trench 3/22/82  4/ 5/62    3/22/82    4/ 5/82    0     0
     9 Repave street          4/ 5/82   5/ 3/82    4/ 5/82    5/ 3/82    0     0
    10 Repair sidewalk        3/ 1/82   3/15/82    4/19/82    5/ 3/82    7     7
    11 Project completed      5/ 3/82   5/ 3/82    5/ 3/82    5/ 3/82    0     0

  Sorting order is Current order
  From the first job to the last job
  Jobs using all skills
```

013-005

Figure 2-11. Sample Tabular Job Report

THE SCHEDULE GRAPH

The Schedule Graph, shown in Figure 2-12, is created from the Graph option in the Printout menu.


```
First Street Water Main, Revision 5.  1/ 1/82. File EXAMPLE3.DATA

                            Jan        Feb      Mar              Apr          May
Job Description             4  11 18 25 1  15 22 1  8  15 22 29 5  12 19 26 3
                           0   1  2  3  4  5  6  7  8  9  10 11 12 13 14 15 16
   1 Purchase pipe         0-------->.....>  .  .  .  .  .  .  .  .  .  .  .
   2 Dig 1st part of trench 0-------->..>  .  !  .  .  .  .  .  .  .  .  .  .
   4 Lay 1st part of pipe   .  .  .  >----->.....>  .  .  .  .  .  .  .  .  .
   5 Dig 2nd part of trench .  .  .  >..>-------->  .  .  .  .  .  .  .  .  .
   6 Fill 1st part of trench .  .  .  .  >----->........>  .  .  .  .  .  .  .

   7 Lay 2nd part of pipe   .  .  .  .  !  .  >========>  .  .  .  .  .  .
   8 Fill 2nd part of trench .  .  .  .  !  .  .  .  >=====>  .  .  .  .  .
   9 Repave street          .  .  .  .  !  .  .  .  .  .  >=========>
  10 Repair sidewalk        .  .  .  .  !  .  >----->....................>
  11 Project completed      .  .  .  .  !  .  .  .  .  .  .  .  .  .  X


           Operating Engineer=1   1     1     2     0     2     3     3    0
                               1     0     2     0     0     2     3     3
                   Laborer=3    3     7     5     4     2     0     0    0
                             3     4     5     4     4     2     0     0
                   Welder=0    0     2     0     2     0     0     0    0
                             0     2     0     2     2     0     0     0
         Project manpower level=4   4    10     7     6     4     3     3    0
                             4     6     7     6     6     4     3     3
         Project manpower cost=2.5K  2.5K  6K    4.5K  3.5K  3K    3K    3K    0
                             2.5K  3.5K  4.5K  3.5K  3.5K  3K     3K    3K
         Project direct cost=55K    0     5K    0     0    10K   30K    0    0
                             0    13K   10K   5K     0     0     0     0
         Project total cost=57K    2.5K  11K   4.5K  3.5K 13K   33K   3K    0
                             2.5K  16K   14K   8.5K  3.5K  3K     3K    3K

Sorting order is Current order
From the first job to the last job
Jobs using all skills

Symbol-Explanation
>-->    Duration of a normal job
>..>    Slack time for a normal job
>==>    Duration of a critical path job
>::>    Duration of a completed job
*       Job with zero duration
+       Job deadline
0-->    Job with no prerequisites
>--X    Job with no successors
!       Time break due to holiday or week-off
```

013-006

Figure 2-12. Sample Schedule Graph

Across the top of the Schedule Graph is the time scale. It is measured in days or weeks depending on what you entered for the Time option in the Project Description menu. The second line across the top gives the time period number for each day or week. Reports do not show the whole schedule on a single page if the printer width is smaller than the schedule.

The number of time units on the printed schedule depends on the length of the project and on the limitations that you select with the First, Last, and Skill options in the Report Options menu. With the Names option, you can choose to print the job and skill names on each page of a multiple-page report or only on the first page. By printing them only on the first page, you can tape the schedule pages together to make a complete linear schedule.

In the middle of the page is a list of each skill included in the report, and the project's manpower level, manpower cost, direct cost, and total cost. The cost information can also be displayed in the Schedule menu with the Display option. Do not be alarmed if the last digit of a calculated figure is different from screen display to report. The report totals are calculated out to an extra digit and are more accurate.

At the bottom of the page, the report lists the sorting order, the range of jobs included, and the skills that are covered. Below that, the legend explains the schedule symbols.

Table 2-4 is a detailed list of the symbols used in both the Schedule Graph and the Schedule screen display.

Table 2-4. Schedule Symbols

Symbol	Description
>========>	A critical job. A critical job cannot be delayed without delaying the entire project.
>-------->	A noncritical job. Slack time is associated with a noncritical job. This symbol is used for all jobs when you choose not to show the critical path.
>.........>	Slack time for a noncritical job. A job can be delayed up to its total slack time without delaying the project.
>::::::::>	A completed job.
>::::====>	A partially-completed job. The uncompleted portion could be critical or noncritical.
0========> 0--------> 0::::::::>	Jobs with no prerequisites. These jobs are scheduled to begin on a specific date, and do not depend on the completion of another job.
>========X >::::::::X	Jobs with no successors. No other jobs name these jobs as prerequisites. The last job in a project normally ends with an X. A project can have multiple finishes.
*	A zero-length job with successors. A job with zero duration marks an important event or shows a job that does not require an entire time unit.
X	A zero-length job with no successors, usually the end of a project.

Table 2-4. Schedule Symbols (Continued)

Symbol	Description
+	A deadline. This marks the date when the job must be completed.
!	A break in the schedule. If the time unit is days, this marks holidays and nonworking weeks. If the time unit is weeks, this marks nonworking weeks only.

The Time Line

The time line has many parts, as shown in Figure 2-13.

```
0   1   2   3   4   5   6   7   8   9   10  11  12  13  14  15  16  17  18
        >.....>---------->.....>            +
I           I   I                   I       I
I           I   I                   I       Deadline
I           I   I                   Late Finish
I           I   Scheduled Start
I           Early Start
I
Earliest Start
```

Figure 2-13. The Schedule Time Line

The definitions of these time line parts are:

- The earliest start is the earliest date possible to start the job. You specify this with the Earliest option in the Job Specification menu. A job cannot begin before this date. The initial value is time period 0.

- The early start is either the earliest start date or the date on which all prerequisites are completed, whichever is later. The job starts on this date unless changed with the Schedule or Level options.

- The scheduled start is a start date established with the Schedule or Level options.

- The late finish is the latest date at which the job can end without delaying the project completion date. The late finish and actual finish are the same for critical jobs and can differ for noncritical jobs.

- The deadline is the date on which the job must be finished. The deadline is created with the Deadline option. The deadline has no effect on the scheduling of the job; it is shown for informational purposes only.

Schedule Breaks

Breaks occur in schedules because of holidays, or days or weeks off that you specify in the Workweek menu. The effect of days and weeks off depends on whether the project's time unit is days or weeks. The examples in this section use the calendar shown in Figure 2-14. It is a portion of the December, 1981 and January, 1982 calendar.

	S	M	T	W	T	F	S
Dec.	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	28	30	31	1	2
Jan.	3	4	5	6	7	8	9
	10	11	12	13	14	15	16

007-019

Figure 2-14. Calendar Used in Examples

For these examples, the normal workweek will be Monday through Friday. December 25th and January 1st (Fridays) are defined as holidays. A nonworking week is defined beginning on December 24 (Thursday) and ending on December 30th. Note that it is not necessary for nonworking weeks to begin on the same day of the week as the project.

NORMAL WORKING WEEK

You can enter a project start date as any day, even a nonworking day, but the program moves the start to the first working day following the start date. For example, if you entered 12/20/81 (a Sunday and nonworking day) as the start date, the program develops the schedule beginning on 12/21/81.

SCHEDULING DAYS WITH NONWORKING PERIODS

Breaks in the normal flow, such as holidays and nonworking weeks are shown with an exclamation point (!) at the first time period following the break, as shown in Figure 2-15. Note that the exclamation point at day 3 (Dec 31) indicates the week break from Dec. 24 through Dec. 30. The second exclamation point at day 4 indicates the holiday on Jan 1, the previous workday. Weekend breaks are not indicated on the schedule with exclamation points. The schedule does not indicate the holiday on 12/25/81 because it occurs within a nonworking week.

```
Time:            Days
Start Date:      12/20/81
Holidays:        12/25/81
                 1/1/82
Nonworking Week: 12/24/81-12/30/81

PROJECT SCHEDULE DEC           JAN
---------------- 21 22 23 31 4  5  6  7
JOB DESCRIPTION  0  1  2  3  4  5  6  7
   1 START DIGGIN 0===================>
   2 PURCHASE FIT          !  !        >=
   3 BUILD SUPERS          !  !
     •   •
     •   •
     •   •
```

007-021

Figure 2-15. Project With Breaks (Days)

SCHEDULING WEEKS WITH NONWORKING PERIODS

Single nonworking days such as holidays and days off are not shown when the time unit is weeks. A workweek is considered to be five working days beginning on the same day of the week the project started. The five days do not have to be in the same calendar week, as shown in Figure 2-16. In this figure, the first workweek begins on Dec. 21 and includes the days Dec. 21, 22, 23, and 31. The second week begins on Jan 4 and includes the four days following. The first week has only four working days because the program ignores holidays and days off when the time unit is weeks.

```
Time:              Weeks
Start Date:        12/20/81
Holidays:          12/25/81
                   1/1/82
Nonworking Week:   12/24/81-12/30/81


PROJECT SCHEDULE DECJAN              FEB
---------------- 21 4   11 18 25 1   8   15
JOB DESCRIPTION  0   1   2   3   4   5   6   7
   1 START DIGGIN 0===================>
   2 PURCHASE FIT    !                    >=
   3 BUILD SUPERS    !
     •     •
     •     •
     •     •
```

007-022

Figure 2-16. Project With Breaks (Weeks)

APPENDIX A

ERROR MESSAGES

This chapter contains a list of the error messages the VisiSchedule pro-
gram issues. The more common error messages start with an E followed
by a one- or two-digit number. Each message is accompanied by a brief
description of the error condition and, when possible, the action you
should take to correct the error condition.

The Exec error and System error messages are produced by Pascal or
by IBM DOS. These messages rarely occur.

The other kind of error checking mechanism is the beep from the com-
puter when you enter an invalid character or value. If you press an
invalid key, you hear a beep.

E1-Hardware error when reading
   An error occurred while reading a file from disk. It is very likely that
   the disk has a bad block. You should use your backup disk to load this
   file. If the problem is a bad disk, make a new backup.

E2-Bad unit number
   An incorrect disk drive name was issued when loading or saving a
   file. Try the operation again. If the error persists, contact your dealer
   or VisiCorp Customer Support.

E3-Illegal operation
   Try the operation again. Consult the appropriate section of the
   manual; if the error persists, contact your dealer or VisiCorp
   Customer Support.

E4-Undefined hardware error
   Try the operation again. If the error persists, contact your computer
   dealer or computer maintenance person.

E5-Lost unit — no longer on line
   This error occurs when a disk drive is disabled after a read or write
   operation is started. It will occur if you open the drive door before the
   operation is completed.

E6-Lost file — no longer in directory
   This error occurs when you change a disk before a read or write
   operation is completed. Replace the original disk and proceed.

E7-Illegal filename
An invalid character is probably imbedded in a file name. Repeat the command and make sure the file name is correct. File names can include letters (A-Z), numbers (0-9), and underscores (__).

E8-No room — insufficient space on disk
You have too much data in your file to fit on the disk. Use a different disk with more free space or delete some files from this disk. If you were saving a modified file under the same name, the old file's suffix has been changed from .DATA to .BACK. Use another VisiSchedule-formatted disk to save the file.

E9-No unit — unit is not on line
Either the disk drive you specified with the Prefix option does not exist, no disk is in the drive, or the drive door is open. Correct whichever condition exists, and proceed.

E10-No such file in specified directory
You changed disks after listing the contents of the disk. Replace the original disk. Or, you tried to write a VisiSchedule data file to an IBM DOS-formatted disk. Insert a VisiSchedule-formatted disk.

E11-Duplicate directory entry
The specified file name already exists on the disk. Either specify a different name, change disks, or delete the existing file.

E12-Attempt to open an already open file
Repeat the option. Consult the appropriate section of the manual; if the error persists, contact your dealer or VisiCorp Customer Support.

E13-Attempt to access a closed file
Repeat the option. Consult the appropriate section of this manual; if the error persists, contact your dealer or VisiCorp Customer Support.

E14-Bad input format
You are most likely trying to read a file that was not created by the VisiSchedule program. If it is a file created with the VisiSchedule program, contact your dealer or VisiCorp Customer Support.

E15-Ring buffer overflow
Repeat the option. Consult the appropriate section of this manual; if the error persists, contact your dealer or VisiCorp Customer Support.

E16-Write-protect error
This disk has a write-protect tab installed. Make sure you really want to write on this disk before you remove the tab.

E17-Illegal block number
Try the operation again. Consult the appropriate section of the manual; if the error persists, contact your dealer or VisiCorp Customer Support.

E18-Illegal buffer
Try the operation again. Consult the appropriate section of the manual; if the error persists, contact your dealer or VisiCorp Customer Support.

E19-Illegal character in file name
A file name can contain only letters (A-Z), numbers (0-9), and underscores (__). Repeat the option, and enter a valid file name.

E20-Name can't be blank
You must enter a file name.

E21-Invalid data file
The disk you tried to use is not a VisiSchedule data disk, or the disk is damaged.

E22-No more room in memory
You are trying to load a project file with too many jobs. The file was probably created on a computer with more memory, or you have taken some memory out of your computer. If you continue, memory will be filled with as many jobs as memory can hold. You can add more memory to your computer (see your computer dealer), or you can combine jobs to reduce the number.

E23-Insert disk, close door and try again
Either there is not a disk in the drive, or the drive door was not closed. Correct the condition, and try again.

E24-Can't use drive X for formatting
You tried to format a disk with the Prefix option set for drive E or F. Change the prefix to drive B, C, or D, and format the disk in that drive.

E25-Disk is write protected
You tried to format a disk that has a write protect tab installed. Be sure you really want to destroy the data on this disk before you remove the write protect tab and continue formatting.

E26-Bad diskette
You tried to format a bad disk, or the disk drive door is open. If the door is closed, try a different disk.

E27-Not a DOS disk
While printing a DIF file or while using the WriteDOS option, you inserted the wrong disk when the program asked for an IBM DOS disk. Insert the appropriate disk, and continue.

E28-Illegal character in DOS file name
You entered an illegal character for the DIF name option. Refer to the DIF name option in Part II, The Reference, for the list of acceptable file name characters. Enter a valid name, and continue.

E30-Can't format program disk
You tried to format the VisiSchedule Program Diskette. Take the disk out of the drive, and insert a blank disk or a disk that contains data you no longer want to keep.

E32-Can't find filename
You inserted the wrong disk when the program asked for the VisiSchedule data disk during a WriteDOS operation. Insert the correct disk and continue.

E51-No more room, the list is full
The number of holidays and the number of nonworking weeks is limited to 24. You attempted to enter more. If your project does not run an entire year, try entering the first 24 holidays or nonworking weeks in order following the project start date.

E52-Not used if time scale is weeks
The program keeps track of holidays and nonworking days only if the time scale is Days. Currently, your time scale is Weeks.

E53-Illegal char in file prefix
You entered a character other than B, C, D, E, or F for the Prefix option. Enter a correct character.

E55-Project data must be loaded first
You must load a project file before you can execute the desired option. Load a file, and continue.

E57-Illegal character in prerequisite list
A prerequisite list can contain from 1 to 9 numbers separated by commas. Only the comma and the digits 0 through 9 are allowed. The numbers can be from 1 to 3 digits long. Correct the list, and continue.

E58-Job x does not exist
You entered the number of job that does not exist. Enter a valid job number.

E59-Job x can't be its own prerequisite
You entered the current job number as its own prerequisite. Re-enter the list, and exclude the current job number.

E60-Job x would create a loop
A job you entered as a prerequisite is a successor of the current job. A job cannot be a prerequisite to itself, nor can it be both a prerequisite and a successor of an individual job. Re-enter the list without this job number or correct the prerequisites of the subject job.

E61-Job x isn't completed
You attempted to complete a job for which the prerequisites are not all completed. If a job is completed before its prerequisites, you should change the prerequisite list.

E62-Illegal character in decimal number
You entered a decimal number that included a character other than the decimal point (.) and the digits 0 through 9. Re-enter the number correctly.

E63-Too many decimal points
A decimal number can contain only one decimal point (.). Re-enter the number correctly.

E64-Too many digits
You entered a number with more digits than the program accepts for this value. Re-enter the number correctly.

E65-Can't insert between completed jobs
You attempted to insert a job before a completed job. A completed job's prerequisites must be completed. Either uncomplete the completed job, or insert the new job in a different location.

E66-Can't add or insert before job 0
You attempted to add or insert a job before job 0. To add or insert a job at the top of the job list, place it after job 0 or before job 1.

E67-Erasing x gives y too many prerequisites
If you erase job x, job y will have more than 9 prerequisites. Before you can erase job x, you must modify the prerequisites for job x or y so the subsequent erasing of x will not give y too many prerequisites.

E68-Can't, a prereq isn't completed
You cannot complete a job until all of its prerequisites are completed. Either complete all prerequisites, or change the prerequisite list.

E69-Field name must be between xxx and yyy
You entered a numeric value that is not within the acceptable range.
Re-enter a value that is within the range specified in the message text.

E70-Illegal device name
You entered something other than **PRINTER, REMOUT,** or a disk file
name for the Filename option. Re-enter a correct filename.

E71-Columns are wider than the printer
You selected too many columns for the Tabular Job Report. The total
number of characters in the columns cannot exceed the printer
width. Either increase the printer width, if possible, or change field
selections in the Columns option.

E72-Illegal character in sequence
You entered a setup sequence string that contained an illegal
character. The setup string is limited to a maximum of eight values,
separated by commas. The values must be entered as decimal
numbers in the range 0 through 255. The numbers must be separated
with commas.

E73-Can't, a successor is completed
You attempted to uncomplete a job that has a successor that is com-
pleted. You must uncomplete all of a job's successors before you can
uncomplete the job.

E74-Can't move a job before/after itself
You tried to move a job relative to itself. Repeat the option and specify
the job you want this job moved before or after.

E75-Not a data disk
You probably inserted a disk from another program into the data disk
drive. Remove the current disk and replace it with a VisiSchedule-
formatted disk.

E77-Too many prerequisites
You tried to enter more than nine prerequisites for a job. Specify
fewer prerequisites for the job, or create two other fictitious jobs of 0
duration, and split the prerequisites between them. Then the real job
will have the two 0 duration jobs as prerequisites.

E78-Can't modify a completed job
You tried to modify a job that you already marked as completed.
Uncomplete the job, then modify it.

Exec err # n
S# x, P# y, I# z
Type <space> to continue
  This error message is issued by the Pascal system. The n refers to one
  of the conditions listed in Table A-1. The x, y, and z are the program
  segment, procedure, and instruction numbers, respectively. If this
  error occurs, press the space bar. The program is automatically
  reloaded. Try the function you were doing again. Then consult the
  appropriate section of this manual. If the problem persists, contact
  your dealer or VisiCorp Customer Support.

Table A-1. Execution Error Conditions

nn	Condition
1	Value range error
2	No procedure in segment table
3	Exit from uncalled procedure
4	Stack overflow
5	Integer overflow
6	Divide by zero
7	NIL pointer reference
8	Program interrupted by user
9	System I/O error
10	User I/O error
11	Unimplemented instruction
12	Floating point error
13	String overflow
14	Programmed HALT
15	Programmed break-point

System Error #
  The System Error messages are produced by the Pascal operating
  system. If a message such as the one above occurs, you will probably
  have to restart the program. If the error recurs, see your computer
  dealer.

.

APPENDIX B

THE IBM KEYBOARD

Figure B-1 shows the computer keyboard. The shaded keys are impor-
tant. They are explained in Table B-1.

| Function keys | Typewriter keyboard | Numeric keypad |
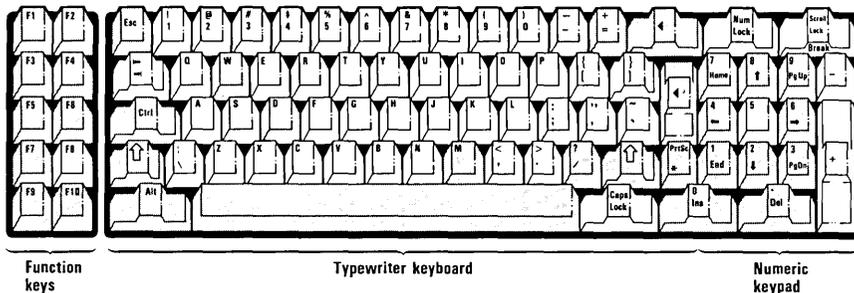
Figure B-1. The IBM Keyboard   005-001

Table B-1 lists the special keys and their uses in the VisiSchedule pro-
gram. For the special keys on the numeric key pad to function, the **Num
Lock** key must be in the position that disables the numerals. The **Num
Lock** key works like a toggle switch; each time you press the key you
alternately activate the numerals and the special keys on the numeric
key pad.

Table B-1. Special Key Usage

Key	Usage
← →	Moves the cursor from one menu option or list entry to another in a horizontal direction.
↑ ↓	Moves the cursor from one menu option or list entry to another in a vertical direction.
↵	Selects the option or list item to which the cursor is pointing.
BKSP	During data entry, the **BKSP** key erases characters for correction.
Ctrl-Alt-Del	WARNING: DO NOT PRESS THE **Ctrl-Alt-Del** COMBINATION until you have exited the VisiSchedule program. Pressing these keys causes the program to restart without saving your data.

Table B-1. Special Key Usage (Continued)

Key	Usage
Del	Selects the Delete option if the Main menu is on the screen. Selects the Erase option if the Schedule menu is on the screen. Pressing the **Del** key is equivalent to moving the cursor to the option and pressing ↵. The **Num Lock** key must be set to activate the special keys for the **Del** key to function.
End	Shifts the schedule within the screen to begin the display with the last job in the schedule. Functions as if you selected Goto and entered the number of the last job in the schedule. The **End** key can be used only if the Schedule menu is on the screen and if the **Num Lock** key is set to deactivate the numeric key pad.
Esc	Cancels some executing functions such as report printing, and cancels all data entry without making a change to the current value.
F1	Selects the Load option. Pressing **F1** is equivalent to moving the cursor to Load and pressing ↵. The **F1** key can be used only if the Main menu is on the screen.
F2	Selects the Save option. Pressing **F2** is equivalent to moving the cursor to Save and pressing ↵. The **F2** key can be used only if the Main menu is on the screen.
F3	Selects the Modify option. Pressing **F3** is equivalent to moving the cursor to Modify and pressing ↵. The **F3** key can be used only if the Main menu is on the screen.
F4	Selects the Print option. Pressing **F4** is equivalent to moving the cursor to Print and pressing ↵. The **F4** key can be used only if the Main menu is on the screen.
F5	Selects the Prefix option. Pressing **F5** is equivalent to moving the cursor to Prefix and pressing ↵. The **F5** key can be used only if the Main menu is on the screen.

Table B-1. Special Key Usage (Continued)

Key	Usage
F6	Selects the Format option. Pressing **F6** is equivalent to moving the cursor to Format and pressing ↵. The **F6** key can be used only if the Main menu is on the screen.
F7	Selects the WriteDOS option. Pressing **F7** is equivalent to moving the cursor to WriteDOS and pressing ↵. The **F7** key can be used only if the Main menu is on the screen.
F9	Scrolls the schedule 20 time units to the right within the window of the Schedule display. Pressing **F9** is equivalent to typing **20R**. The **F9** key can be used only if the Schedule menu is on the screen.
F10	Scrolls the schedule 20 time units to the left within the window of the Schedule display. Pressing **F10** is equivalent to typing **20L**. The **F10** key can be used only if the Schedule menu is on the screen.
Home	Shifts the schedule within the screen to begin the display with the first job in the schedule. Functions as if you selected Goto and entered the number of the first job in the schedule. The **Home** key can be used only if the Schedule menu is on the screen and if the **Num Lock** key is set to activate the special keys.
Ins	Selects the Insert option if the Schedule menu is on the screen. Pressing the **Ins** key is equivalent to moving the cursor to Insert and pressing the ↵ key. The **Num Lock** key must be set to activate the special keys for the **Ins** key to function.
PgDn	Shifts the schedule so that the next page of the project is displayed. Pressing **PgDn** is equivalent to typing **17U**. The **PgDn** key can be used only if the Schedule menu is on the screen and if the **Num Lock** key is set to activate the special keys.
PgUp	Shifts the schedule so that the previous page of the project is displayed. Pressing **PgUp** is equivalent to typing **17D**. The **PgUp** key can be used only if the Schedule menu is on the screen and if the **Num Lock** key is set to activate the special keys.

Table B-1. Special Key Usage (Continued)

Key	Usage
Shift + PrtSc	Prints the current contents of the screen to the printer you connected to the parallel port.
Space bar	Marks an item for selection in lists that allow multiple selection. Switches the cursor between menu lines.
D,W,M,Y	Specifies day, week, month, or year for relative dates.
+ or −	Indicates a relative date. + is future and − is past. Is followed by a number and D, W, M, or Y.
/	Jumps to the next field in a date entry. In job names, separates the slash tag from the main part of the name.

APPENDIX C

PRINTERS

The VisiSchedule program can operate with a variety of printers. The program is initially set up to work with the IBM® 80 CPS Matrix Printer. Other printers have been tested successfully with the program.

This appendix lists the printer and printer adapter combinations that have been tested successfully. Then, it gives you instructions for entering values for options in the Hardware Options menu. Finally, setup strings are listed for compressed mode printing for various printers.

SUPPORTED PRINTERS

The printers listed below have been tested with the program and performed satisfactorily:

* Centronics® 739
* Diablo® 630
* IBM 80 CPS Matrix Printer
* IDS Paper Tiger™ 460 and 560
* IDS Prism Printer™ 132
* Epson MX-80 and MX-100
* Microline 82A, 83A, and 84
* NEC Spinwriter™ 3510, 3530, 5520, 5530, 7710, 7715, 7730, and 8023
* Qume® Sprint 9/45 and 9/55

These printers were tested with the printer adapters shown in Table C-1. An X in the table means the combination was tested satisfactorily, an F means it failed the test, and a blank means it was not tested.

Table C-1. Printer and Printer Adapter Tests

Printer	IBM Par. Printer Adapter	Asynch. Comm. Adapter	AST 256K Mem. Card Parallel Port	Serial Port
Centronics 739	X		X	
Diablo 630		X		X
IBM 80 CPS Matrix	X		X	
IDS Paper Tiger 460	X	X		X
IDS Paper Tiger 560	X	X		X
IDS Prism 132	X	X		X
Epson MX-80	X		X	
Epson MX-100	X		X	
Microline 82A	X		X	
Microline 83A	X		X	
Microline 84	X		X	
NEC Spinwriter 3510		X		X
NEC Spinwriter 3530	X		X	
NEC Spinwriter 5520		F		X
NEC Spinwriter 5530	X		X	
NEC Spinwriter 7710		X		X
NEC Spinwriter 7715		F		X
NEC Spinwriter 7730	X		X	
NEC Spinwriter 8023	X		X	
Qume Sprint 9		X		X

X = Tested with satisfactory results.
F = Tested and failed
   = Not tested

HARDWARE OPTIONS

If you will only be using an IBM 80 CPS Matrix Printer, you can skip to "Setup Strings" later in this appendix. To set up the VisiSchedule program to work with a serial printer, you must set options in the Com Port menu (which is reached from the Hardware Options menu) to correspond with your printer's settings.

If you have never used your serial printer before, we suggest that you use the settings listed for your printer in Table C-2. The values you enter in the Com Port menu must correspond to the switches on your printer. Refer to your printer manual for instructions on how to set the appropriate switches.

The settings in Table C-2 have been tested and work satisfactorily. They are not the only settings that might work. If you have used your printer with another program, you may want to leave the switches set as they are and enter the corresponding values in the Com Port menu.

Table C-2. Com Port Menu Settings

Printer	Baudrate	Protocol	Parity	Databits	Stopbits
Diablo 630	1200	XON/XOFF	None	7	2
IDS Paper Tiger 460	1200	XON/XOFF	None	7	2
IDS Paper Tiger 560	1200	XON/XOFF	None	7	2
IDS Prism 132	1200	XON/XOFF	None	7	2
NEC Spinwriter 3510	1200	XON/XOFF	None	7	2
NEC Spinwriter 5520	1200	DTR/DSR	None	7	2
NEC Spinwriter 7710	1200	XON/XOFF	None	7	2
NEC Spinwriter 7715	1200	DTR/DSR	None	7	2
Qume Sprint 9	1200	XON/XOFF	None	7	2

Setting Hardware Options

To reach the Hardware Options menu, load the program as explained in Lesson One, or restart it by pressing the **Ctrl-Alt-Del** key sequence.

From the Startup menu, select the Hardware option. If your printer can be connected to the parallel port, select Printer. Then, select Parallel. If you also have a serial printer, go on to the next paragraph. Otherwise, select Quit, accept the YES response to the prompt, Restart system with changes?, and press the **Ctrl-Alt-Del** key sequence to restart the program.

If you want to use a serial printer, select COM1 to reach the Com Port menu. Then, enter the correct values for the options according to Table C-2. Select Quit to return to the Hardware Options menu. Then, assign COM1 to the serial port by selecting Remout and entering COM1.

As explained above, select Quit, enter YES, and restart the program.

SETUP STRINGS

To enable your printer to print in special modes, such as double spaced, compressed, or double strike, you need to enter a setup string for the Setup option in the Printer Setup menu. Table C-3 contains compressed mode setup strings (to print more characters per inch) that have been tested successfully with the listed printers.

When you use a setup string to change the lines per inch on some printers, you must include numbers that set the top of form in addition to numbers that set the lines per inch. Refer to your printer manual for the necessary decimal numbers to set lines per inch and top of form.

Table C-3. Setup Strings

Printer	To Turn On Compressed Mode	To Turn Off Compressed Mode
Centronics 739	27,20	27,19
IBM 80 CPS Dot Matrix	15	18
IDS Paper Tiger 460	31	29
IDS Paper Tiger 560	31	29
IDS Prism 132	31	29
Epson MX-80	15	18
Epson MX-100	15	18
Microline 82A	29	30
Microline 83A	29	30
Microline 84	29	30

APPENDIX D

TRANSFERRING VISISCHEDULE DATA TO THE VISICALC PROGRAM

The DIF data option in the Print menu provides a way to transfer manpower and cost data from a VisiSchedule project file to a DIF™ format file. Data in the DIF format is usable by all other VisiCorp™ programs that accept data in the DIF format.

This special data format lets you develop your project manpower and cost requirements with the VisiSchedule program and transfer them to other VisiCorp programs available on the IBM Personal Computer, such as the VisiCalc® program. Figure D-1 shows the data that is transferred to a DIF file.

```
Automatic Leveling Test. Revision 3.  1/ 1/82  File LEVEL.DATA

                                 Oct                        Nov
Job Description                  18 19 20 21 22 25 26 27 28 29 1  2
                                 0  1  2  3  4  5  6  7  8  9  10 11
    1 Nine Clerks                0----------->....................>
    2 Three Clerks               0----->.................> .  .  .
    3 Eight Clerks               .  .  >--------->.................>
    4 Six Clerks                 0=====> .  .  .  .  .  .  .  .  .
    5 Seven Clerks               .  .  >=====> .  .  .  .  .  .  .      Transferred
                                                                       Data
    6 Four Clerks                0----->.....> .  .  .  .  .  .  .
    7 Two Clerks                 .  .  .  .  >========> .  .  .  .
    8 One Clerk                  .  .  .  .  .  .  >===========>
    9 Done                       .  .  .  .  .  .  .  .  .  .  X

                     Clerk=22    24     10     2      1      1
                            22      24     2      1      1      0
          Project manpower level=22    24     10     2      1      1
                            22      24     2      1      1      0
             Project manpower cost=0    0      0      0      0      0
                            0      0      0      0      0      0
                Project total cost=0    0      0      0      0      0
                            0      0      0      0      0      0

Sorting order is Current order
From the first job to the last job
Jobs using all skills

Symbol-Explanation
>-->    Duration of a normal job
>..>    Slack time for a normal job
>==>    Duration of a critical path job
>::>    Duration of a completed job
*       Job with zero duration
+       Job deadline
0-->    Job with no prerequisites
>--X    Job with no successors
!       Time break due to holiday or week-off
```

013-012

Figure D-1. Data Transferred in the DIF Format

The example in this lesson transfers cost and manpower data from a file to a DIF file. Then, it gives directions for reading the data into the VisiCalc program. If you do not have the VisiCalc program, you should follow along to see the results of the transfer. If you do have the VisiCalc product and want to do the example, you should have your VisiCalc program diskette ready along with a data disk formatted for the VisiCalc program.

Before the conversion can begin, you must load the project file with the desired data into memory.

From the Main menu, select Clear.

Select Load, and select the LEVEL.DATA project file.

Select Print. Then, select DIF data.

The program displays the Report Options menu. Select Skill, and enter 1. This says that you are going to transfer the data only for skill category #1. Select DIF name to specify the DIF file name. The data entry line reads LEVEL. The initial setting for the DIF name option is always the disk file name with .DATA changed to .DIF. Press ↵ to accept the current name.

Select Print to write the data to the file named LEVEL.DIF. The data is limited to those jobs that use skill category 1.

Follow the instructions to switch disks as they appear on the screen. You are instructed to insert an IBM DOS disk. You can use a disk formatted with either IBM DOS 1.0 or 1.1. If the DOS disk has a write-protect tab in place, be sure to remove it.

When the option is done, select Quit twice to exit the program.

Remove the VisiSchedule Program Diskette from Drive A, and insert the VisiCalc Program Diskette. If you have never used the VisiCalc Program Diskette, follow the instructions in the *VisiCalc User's Guide* under "Preparing the VisiCalc Program Diskette" in the Introduction. Then, press the **Ctrl-Alt-Del** key combination. The VisiCalc worksheet appears on your screen.

Type **/S#L**. The prompt line reads Data load: File to Load.

Type B:LEVEL.DIF. If you make a typing error, press the **Esc** key to erase the error. Then, retype the remainder of the name correctly. Press ↵. Data load: R C or RETURN appears in the prompt line.

Type **R** to load the VisiSchedule manpower and cost data by rows across your screen. Or, you can display the same data by columns by typing **C**. Now, you can manipulate the data and use it to make calculations with your VisiCalc program.

CONSIDERATIONS WHEN USING
THE VISICALC PROGRAM

The VisiCalc program uses a matrix of 63 columns by 252 rows. A VisiSchedule DIF file that exceeds 63 time units must be loaded into the VisiCalc program by columns. A file that contains more than 252 time units exceeds the VisiCalc program capability.

EXCHANGING FILES

The information in the remainder of this appendix describes the DIF file format and lists three sample programs in BASIC that read and write DIF files. You need to read this information only if you want to write your own programs to using DIF.

Further information is available through the DIF Clearinghouse, which has been set up to coordinate and distribute information about the DIF format. The Clearinghouse maintains and distributes the DIF Technical Specification, which is a detailed technical description of the DIF format, and information about the commercially available programs that support the format. To obtain this information, please send your name, address, and a note requesting this information to: DIF Clearinghouse, P.O. Box 527, Cambridge, MA 02139.

The DIF™ Format

The DIF format stores data in a form accessible to programs other than the VisiSchedule program. To accommodate a wide range of languages in which such a program might be written, several simplifying techniques have been used:

- Information about the size of the file is provided at the beginning.
- Records are kept as short as possible.
- The data type (string or number) of each value is explicitly defined.
- Strings are stored one per line.
- Strings that contain special characters are enclosed in quotation marks.
- The file ends with an explicit End-Of-Data record.

Figure D-2 shows a sample workload file used to describe the format and the programs that work with the DIF format.

Welder	2	1	3
Mechanic	1	2	4
Finisher	1	1	1
Total manpower	4	4	8
Manpower cost	1200	1200	2400
Direct cost	0	1300	0
Total cost	1200	2500	2400
Week	0	1	2

Figure D-2. Sample File for Use With DIF

The format stores the data in a series of slices; it can be sliced either horizontally (by rows) or vertically (by columns). Each of these slices is called a tuple; each slice along the other axis is called a vector.

A DIF file consists of a series of header records that describe the file, followed by one set of data records for each tuple, and ends with a pair of End-Of-Data records.

Header

The header consists of four sets of three records that give information about the entire file.

TABLE
0,1
"   "
VECTORS
0,V
"   "
TUPLES
0,T
"   "
DATA
0,0
"   "

V is the number of vectors in the file.

T is the number of tuples in the file.

Data Records

The data records consist of a pair of header records that identify the beginning of a tuple, and a pair of records for each value in the tuple.

-1,0
BOT
T1,N1
string1
T2,N2
string2
T3,N3
string3
.
.
.
Tn,Nn
stringn

Beginning Of Tuple records.

First value of tuple.

Second value of tuple.

Third value of tuple.

Last (nth) value of tuple.

End-O-Data Records

The End-Of-Data records mark the end of the file.

-1,0
EOD

PROGRAMS THAT WORK WITH THE DIF™ FORMAT

The following three programs demonstrate the use of the DIF format. They perform the following functions:

- Dump a DIF file just as it is stored, record by record.
- Print a worksheet from a DIF file.
- Create a DIF file by prompting for the worksheet entries.

Dumping a DIF™ File

This program prints the DIF file just as it is stored, record by record. It asks for the name of the file, and whether to print it. If not instructed to print the file, the program displays the file on the screen.

```
100 ' ************************
110 ' *    INITIALIZATION    *
120 ' ************************
130 NUL$ = CHR$(34) + CHR$(34)
140 FALSE = 0
150 TRUE = -1
440 '
450 '
460 ' ************************
470 ' *     MAIN ROUTINE     *
480 ' ************************
490 '
500 GOSUB 1000'                    * PROMPT FOR ORDERS
510 GOSUB 1200                     * PRINT HEADER
520 GOSUB 1400'                    * PRINT DATA RECORDS
530 GOSUB 1600'                    * END-OF-PROGRAM CLEANUP
540 END
940 '
950 '
960 ' ************************
970 ' * PROMPT FOR ORDERS  *
980 ' ************************
990 '
1000 CLS
1010 INPUT "File name: ",FILENAME$
1020 IF RIGHT$(FILENAME$,4) <> ".DIF" THEN FILENAME$ = FILENAME$ + ".DIF"
1030 INPUT "Print the file (Y or N): ",REPLY$
1040 IF REPLY$ = "Y" OR REPLY$ = "y" THEN HARDCOPY = TRUE
1050 OPEN FILENAME$ FOR INPUT AS #1
1060 IF NOT HARDCOPY THEN CLS
1070 IF HARDCOPY THEN LPRINT FILENAME$: LPRINT " ";LPRINT ELSE PRINT FILENAME$:P
RINT:PRINT
1080 RETURN
1140 '
1150 '
1160 ' ************************
1170 ' *     PRINT HEADER     *
1180 ' ************************
1190 '
1200 INPUT #1, TITLE$
1210 INPUT #1, TYPE, NUMBER
1220 INPUT #1, STRNG$
1230 IF HARDCOPY THEN LPRINT TITLE$:LPRINT TYPE; ","; NUMBER ELSE PRINT TITLE$:P
RINT TYPE; ","; NUMBER
1240 IF STRNG$ = "" THEN IF HARDCOPY THEN LPRINT NUL$ ELSE PRINT NUL$ ELSE IF HA
RDCOPY THEN LPRINT STRNG$ ELSE PRINT STRNG$
1250 IF TITLE$ <> "DATA" THEN 1200
1260 IF NOT HARDCOPY THEN GOSUB 2000
1270 RETURN
1340 '
1350 '
1360 ' ************************
1370 ' * PRINT DATA RECORDS *
1380 ' ************************
1390 '
1400 INPUT #1, TYPE, NUMBER
1410 INPUT #1, STRNG$
1420 IF CSRLIN > 20 AND NOT HARDCOPY THEN GOSUB 2000
1430 IF HARDCOPY THEN LPRINT TYPE; ","; NUMBER: LPRINT STRNG$ ELSE PRINT TYPE; "
,"; NUMBER: PRINT STRNG$
1440 IF STRNG$ <> "EOD" THEN 1400
1450 RETURN
1530 '
1540 '
1550 ' ************************
1560 ' *     END-OF-PROGRAM   *
1570 ' *     CLEANUP          *
1580 ' ************************
```

```
1590 '
1600 CLOSE 1
1610 RETURN
1920 '
1930 '
1940 ' ***********************
1950 ' *         PRINT        *
1960 ' * "RETURN FOR MORE"    *
1970 ' * MESSAGE AT BOTTOM    *
1980 ' ***********************
1990 '
2000 LOCATE 24,1
2010 PRINT "RETURN for more";
2020 REPLY$ = INPUT$(1)'                 * WAIT UNTIL ANY KEY IS PRESSED
2030 CLS
2040 RETURN
```

Printing a Data File from a DIF™ File

The following program prints the workload file as it would appear on the screen. It asks for the name of the file in which the worksheet was saved in the DIF format, the width of columns to be printed, and whether the worksheet was saved by rows or by columns.

```
60 ' ***********************
70 ' *   INITIALIZATION     *
80 ' ***********************
90 '
100 DIM WORKSHEET$(50,50)
110 FALSE = 0
120 TRUE = -1
130 BYROWS = FALSE
440 '
450 '
460 ' ***********************
470 ' *     MAIN ROUTINE     *
480 ' ***********************
490 '
500 GOSUB 1000'                          * PROMPT FOR ORDERS
510 GOSUB 1200'                          * READ HEADER
520 GOSUB 1400'                          * READ DATA RECORDS
530 IF NOT FILEBAD THEN GOSUB 1600'      * PRINT THE WORKSHEET
540 GOSUB 1800'                          * END-OF-PROGRAM CLEANUP
550 END
940 '
950 '
960 ' ***********************
970 ' * PROMPT FOR ORDERS   *
980 ' ***********************
990 '
1000 CLS
1010 INPUT "File name: ", FILENAME$
1020 IF RIGHT$(FILENAME$,4) <> ".DIF" THEN FILENAME$ = FILENAME$ + ".DIF"
1030 INPUT "Column width: ",COLUMNWIDTH
1040 INPUT "Saved by row or column (R or C): ",REPLY$
1050 IF REPLY$ = "R" OR REPLY$ = "r" THEN BYROWS = TRUE
1060 INPUT "Print the worksheet (Y or N): ",REPLY$
1070 IF REPLY$ = "Y" OR REPLY$ = "y" THEN HARDCOPY = TRUE
1080 OPEN FILENAME$ FOR INPUT AS #1
1090 RETURN
1140 '
1150 '
1160 ' ***********************
1170 ' *     READ HEADER      *
1180 ' ***********************
1190 '
1200 INPUT #1, TITLE$
1210 INPUT #1, TYPE, NUMBER
1220 INPUT #1, STRNG$
1230 IF TITLE$ = "VECTORS" THEN VECTORS = NUMBER
1240 IF TITLE$ = "TUPLES" THEN TUPLES = NUMBER
1250 IF TITLE$ = "DATA" THEN RETURN
```

```
1260 GOTO 1200
1340 '
1350 '
1360 ' *************************
1370 ' * READ DATA RECORDS  *
1380 ' *************************
1390 '
1400 FOR ROW = 1 TO TUPLES
1410     INPUT #1, TYPE, NUMBER
1420     INPUT #1, STRNG$
1430     IF TYPE <> -1 OR STRNG$ <> "BOT" THEN
             GOSUB 2000:
             RETURN
1440     FOR COL = 1 TO VECTORS
1450         INPUT #1, TYPE, NUMBER
1460         INPUT #1, STRNG$
1470         IF TYPE <> 0 AND TYPE <> 1 THEN
                 GOSUB 2000: RETURN
1475         GOSUB 2200
1480         IF BYROWS AND TYPE = 0 THEN WORKSHEET$(COL,ROW) = NUMBER$:
             GOTO 1500
1490         IF BYROWS THEN WORKSHEET$(COL,ROW) = STRNG$
1500         IF NOT BYROWS AND TYPE = 0 THEN WORKSHEET$(ROW,COL) = NUMBER$:
             GOTO 1520
1510         IF NOT BYROWS THEN WORKSHEET$(ROW,COL) = STRNG$
1520         NEXT COL
1530     NEXT ROW
1540 RETURN
1550 '
1560 ' *************************
1570 ' * PRINT THE WORKSHEET*
1580 ' *************************
1590 '
1600 IF BYROWS THEN WDTH = TUPLES: DEPTH = VECTORS ELSE WDTH = VECTORS: DEPTH =
TUPLES
1610 FOR ROW = 1 TO DEPTH
1620     FOR COL = 1 TO WDTH
1630         IF HARDCOPY THEN LPRINT WORKSHEET$(ROW,COL); ELSE PRINT WORKSHEET$(
ROW,COL);
1640         NEXT COL
1650     IF HARDCOPY THEN LPRINT " " ELSE PRINT
1660     NEXT ROW
1670 RETURN
1730 '
1740 '
1750 ' *************************
1760 ' *    END-OF-PROGRAM    *
1770 ' *     CLEANUP          *
1780 ' *************************
1790 '
1800 CLOSE 1
1810 RETURN
1940 '
1950 '
1960 ' *************************
1970 ' *    ERROR IN FILE    *
1980 ' *************************
1990 '
2000 PRINT
2010 BEEP: PRINT "ERROR IN FILE . . . "
2020 PRINT TAB(5); "TYPE ="; TYPE
2030 PRINT TAB(5); "NUMBER ="; NUMBER
2040 PRINT TAB(5); "STRING = "; STRNG$
2050 FILEBAD = TRUE
2060 RETURN
2140 '
2150 ' *************************
2160 ' *         OFFSET        *
2170 ' * LABELS & NUMBERS    *
2180 ' *************************
2190 '
2200 IF TYPE <> 0 THEN 2300
2210 NUMBER$ = STR$(NUMBER)
2220 IF LEN(NUMBER$) > COLUMNWIDTH - 1 THEN NUMBER$ = " " + LEFT$(NUMBER$,COLUMN
WIDTH - 1):RETURN
2230 BLANK$ = "                    "
2240 BN = COLUMNWIDTH - LEN(NUMBER$)
```

```
2250 NUMBER$ = LEFT$(BLANK$,BN) + NUMBER$
2260 RETURN
2300 IF LEN(STRNG$) > COLUMNWIDTH THEN STRNG$ = LEFT$(STRNG$,COLUMNWIDTH):
        RETURN
2310 BLANK$ = "                            "
2320 BN = COLUMNWIDTH - LEN(STRNG$)
2330 STRNG$ = STRNG$ + LEFT$(BLANK$,BN)
2340 RETURN
```

Creating a DIF™ File

The following program prompts for worksheet entries (by row-column coordinate), then writes the entries on a diskette in a DIF file. Either a string or number (integer or real) can be entered. To enter a label that starts with a number, type a quotation mark (") as the first character of the label. To end a row, type ESCAPE ↵; to end the worksheet, type ESCAPE ESCAPE ↵.

The program assumes the coordinate of the lower-right corner of the worksheet is the row-column coordinate of the location immediately to the left of the coordinate where ESCAPE ESCAPE is typed, so the last row should be at least as wide as all preceding rows. The worksheet is saved by rows.

```
60 ' ***********************
70 ' *    INITIALIZATION   *
80 ' ***********************
90 '
100 ESC$ = CHR$(27)
110 LASTINROW$ = ESC$
120 LASTONSHEET$ = ESC$ + ESC$
130 QUOTE$ = CHR$(34)
140 NUL$ = QUOTE$ + QUOTE$
150 DIM WORKSHEET$(50,50)
160 ROW = 1
170 COL = 1
180 FALSE = 0
190 TRUE = -1
440 '
450 '
460 ' ***********************
470 ' *    MAIN ROUTINE     *
480 ' ***********************
490 '
500 GOSUB 1000'                          * PROMPT FOR ORDERS
510 GOSUB 1200'                          * PROMPT FOR ENTRIES
520 GOSUB 1400'                          * WRITE FILE
530 GOSUB 2000'                          * END-OF-PROGRAM CLEANUP
540 END
940 '
950 '
960 ' ***********************
970 ' * PROMPT FOR ORDERS   *
980 ' ***********************
990 '
1000 CLS
1010 INPUT "Write the file (Y or N): ",REPLY$
1020 IF REPLY$ = "Y" OR REPLY$ = "y" THEN DISKCOPY = TRUE
1030 IF DISKCOPY
        THEN INPUT "File name: ",FILENAME$:
             IF RIGHT$(FILENAME$,4) <> ".DIF" THEN FILENAME$ = FILENAME$ + ".DIF
"
1040 RETURN
1140 '
1150 '
```

```
1160 ' **********************
1170 ' * PROMPT FOR ENTRIES *
1180 ' **********************
1190 '
1200 CLS
1210 WORKSHEET$(ROW,COL) = ""
1220 PRINT "Row"; ROW; ", Column ";CHR$(64+COL); ": ";
1230 REPLY$ = INPUT$(1)
1240 IF REPLY$ = CHR$(8) AND LEN(WORKSHEET$(ROW,COL)) - 1 = 0 THEN PRINT " ":
        GOTO 1210
1250 IF REPLY$ = CHR$(8) THEN WORKSHEET$(ROW,COL) = LEFT$(WORKSHEET$(ROW,COL),LE
N(WORKSHEET$(ROW,COL)) - 1): PRINT " "; WORKSHEET$(ROW,COL);:GOTO 1230
1260 IF REPLY$ <> CHR$(13)
        THEN PRINT REPLY$;: WORKSHEET$(ROW,COL) = WORKSHEET$(ROW,COL) + REPLY$:
GOTO 1230
1270 PRINT
1280 IF WORKSHEET$(ROW,COL) = LASTONSHEET$
        THEN WDTH = COL - 1: DEPTH = ROW: RETURN
1290 IF WORKSHEET$(ROW,COL) = LASTINROW$
        THEN ROW = ROW + 1: COL = 1: PRINT:GOTO 1210
1300 COL = COL + 1
1310 GOTO 1210
1320 '
1330 ' **********************
1340 ' *     WRITE FILE      *
1350 ' **********************
1360 '
1370 ' ---------------------
1380 '         HEADER
1390 ' ---------------------
1400 IF NOT DISKCOPY THEN RETURN
1404 OPEN FILENAME$ FOR OUTPUT AS #1
1410 PRINT #1, "TABLE"
1420 PRINT #1, 0; ","; 1
1430 PRINT #1, NUL$
1440 PRINT #1, "VECTORS"
1450 PRINT #1, 0; ","; DEPTH
1460 PRINT #1, NUL$
1470 PRINT #1, "TUPLES"
1480 PRINT #1, 0; ","; WDTH
1490 PRINT #1, NUL$
1500 PRINT #1, "DATA"
1510 PRINT #1, 0; ","; 0
1520 PRINT #1, NUL$
1540 '
1550 ' ---------------------
1560 '     DATA RECORDS
1570 ' ---------------------
1580 FOR COL = 1 TO WDTH
1590     PRINT #1, -1; ","; 0
1600     PRINT #1, "BOT"
1610     FOR ROW = 1 TO DEPTH
1620         IF VAL(WORKSHEET$(ROW,COL)) <> 0 OR WORKSHEET$(ROW,COL) = "0" THEN
                PRINT #1, 0;","; VAL(WORKSHEET$(ROW,COL)):PRINT #1, "V":GOTO 1660
1630         IF LEFT$(WORKSHEET$(ROW,COL),1) = QUOTE$ THEN
                WORKSHEET$(ROW,COL) = MID$(WORKSHEET$(ROW,COL),2)
1640         PRINT #1, 1; ","; 0
1650         PRINT #1, QUOTE$; WORKSHEET$(ROW,COL); QUOTE$
1660         NEXT ROW
1670     NEXT COL
1680 '
1690 ' ---------------------
1700 '        END-OF-DATA
1710 ' ---------------------
1720 PRINT #1, -1; ","; 0
1730 PRINT #1, "EOD"
1740 RETURN
1930 '
1940 '
1950 ' **********************
1960 ' *    END-OF-PROGRAM   *
1970 ' *    - CLEANUP        *
1980 ' **********************
1990 '
2000 CLOSE 1
2010 RETURN
```

APPENDIX E

USEFUL FACTS ABOUT THE VISISCHEDULE PROGRAM

Capacity	The number of jobs per project depends on the amount of memory available. 64K—50 jobs 96K or more—150 jobs
Cost units	Money in units, thousands of units, or millions of units, separately definable for skill category, salary and direct costs.
Dates	The program handles dates in the range 1/1/1977 through 12/31/2065. It handles dates in the format MM/DD/YY or DD/MM/YY.
Disk drives	Requires two disk drives.
Diskette capacity	Table E-1 lists the approximate number of files of specified job sizes you can store on a single diskette.
Duration	Up to 9999 time units for a project. Up to 999 time units for a job.
File names	Eight characters consisting of letters (A-Z), numbers (0-9), and underscores (__). The words PRINTER, and REMOUT are reserved and cannot be used as disk file names.
Holidays	Up to 24 days.
Names (people)	Up to 24 alphanumeric characters.
Numbers	All numbers are limited to 4 digits.
Output devices	Printers (PRINTER:, or REMOUT:), or disk file (by name).
Prerequisites	Each job can have up to nine.
Report length	12 (plus margins) to 255.

Report margins   0 to 243 minus the other margin.

Report widths   79 to 218 characters.

Setup strings   Up to eight characters expressed as decimal values.

Skills   Nine skill categories, each with a salary per time unit.

Time units   Days or weeks.

Title   Up to 30 alphanumeric characters.

Weeks off   Up to 24.

Table E-1. Diskette Capacity

Number of Jobs in Project File	Number of Files Per Diskette
25	45
50	24
75	18
100	14
125	11
150	9

BIBLIOGRAPHY

Battersby, A., Network Analysis for Planning and Scheduling, Macmillan, 1967.

Bove, T., "Project Planning With a Personal Computer," DataCast.

Lockeyer, K. G., An Introduction to Critical Path Analysis, Business Publications, 1966.

Nevison, J., "Executive Computing," Addison-Wesley, 1981.

Sayer, J. S., Critical Path Scheduling, Documentation Inc., GEC, Washington DC.

Wiest, J. and Levy, F. K., A Management Guide to PERT/CPM, Prentice-Hall Inc.

"The ABCs of the Critical Path Method," Harvard Business Review, September-October 1963, or reprint No. 63508.

Critical Path Scheduling—A Powerful New Production Planning Tool, Metalworking Production, October, 1961.

CPM in Construction Management, McGraw Hill, 1971.

Planning and Control with PERT/CPM, McGraw Hill, 1966.

GLOSSARY

Completion date   The date when all jobs in a project are finished.

Critical path   The set of jobs that must be completed on schedule for the project completion date to be met. The jobs in the critical path have no slack time.

Deadline   A date, which is separate from the scheduled start and finish, by which a job must be completed. In the Schedule menu, the deadline is shown with a plus sign (+). It is used only to flag an important deadline, not for scheduling. The deadline does not affect the schedule.

DIF   A standard means of storing data so that it can be accessed and used by different programs. It allows the interchange of data between different programs.

Duration   The length of a job in time units, either days or weeks.

Earliest start   A job cannot begin before this date. This is a constraint on the schedule that you enter with the Earliest option. The initial value is time period 0.

Early finish   The earliest date on which a job can be completed. In other words, the date the job will be finished if it starts on the early start date.

Early start   Either the earliest start date or the date when all prerequisites are completed, whichever is later. The job cannot begin earlier than this date.

File   A collection of related data stored on a device such as a floppy diskette.

Free slack time   The slack time for a noncritical job, which does not affect the start of any subsequent job. Compare with total slack time.

Job   A basic activity with which the VisiSchedule program operates. It is an easily definable task.

Late finish   The latest date the job can finish and not delay the project completion date. In other words, the date on which the job will finish if it is started at the late start date.

Late start   The latest date a job can begin without changing the completion date of the project. That is, the late start uses all the slack time available to the job.

Leveling   The process of moving jobs within their slack times to reduce the peak manpower requirements. Leveling can be done for only one skill category at a time.

Milestone   An event, such as the start or finish of a job, on which progress of the project is measured. A milestone is an informational marker only; it does not affect scheduling.

Noncritical job   A job that has slack time. That is, its start date can be changed, within the limits of the slack time, without changing the project completion date.

Normal workweek   The days of the week that are worked as part of a normal schedule. In the VisiSchedule program, Monday through Friday is assumed to be the normal work week unless changed by the user.

Pascal   Pascal is both a programming language and an operating system. The VisiSchedule program is written in this language and operates under this operating system.

Prerequisite   A job that must be finished before another job can start.

Project   The major goal to be accomplished. It is broken up into manageable jobs. Each project is stored in a file.

Scheduled start   A start date established with the Schedule or Level options. The job begins at the early start if a scheduled start date is not created.

Skill category   An occupation with a specific salary assigned to it. The sum of salaries for a job is the total manpower cost for the job.

Slack time   The flexibility within noncritical jobs that allows their start times to be changed without affecting the project completion date. See also free slack time and total slack time.

Slash tag   The part of a job name that is separated from the rest of the name with a slash (/). The job names can be sorted by the name proper, or by the slash tag and the name. The slash tag is useful for sorting jobs by departments. In this use, the slash tag would contain the number of the department that is responsible for it.

Start date The date at which the first job in a project begins. All scheduling is done from this date.

Successor A job whose start depends on the completion of one or more previous jobs called prerequisites.

Total slack time The slack time for a noncritical job, which does not affect the completion date of the project, but does delay the start of a subsequent noncritical job. Compare with free slack time.

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 7066 SAN JOSE, CA 95134

POSTAGE WILL BE PAID FOR BY ADDRESSEE

VISICORP
2895 Zanker Road
San Jose, CA 95134

READER'S CRITIQUE

VisiCorp's Publications Department wants to provide documents that meet the needs of all our product users. Your feedback helps us produce better manuals.

Please tell us how you rate this manual in the following areas:

	Excellent	Good	Average	Fair	Poor
1. Completeness of information.	☐	☐	☐	☐	☐
2. Clarity of information.	☐	☐	☐	☐	☐
3. Organization of manual.	☐	☐	☐	☐	☐
4. Appearance of manual.	☐	☐	☐	☐	☐
5. Quantity of examples.	☐	☐	☐	☐	☐
6. Usefulness of examples.	☐	☐	☐	☐	☐
7. Quantity of photographs and illustrations.	☐	☐	☐	☐	☐
8. Appropriateness of photographs and illustrations.	☐	☐	☐	☐	☐
9. Degree to which this manual meets your expectations and needs.	☐	☐	☐	☐	☐
10. Appropriateness of the manual level to a person of your experience.	☐	☐	☐	☐	☐
11. Overall manual.	☐	☐	☐	☐	☐

	2 years or less	2-5 years	Over 5 years
How much computer experience do you have?	☐	☐	☐

Please specify, by page, any errors you found in this manual.

We would appreciate hearing any other comments and suggestions you have about this manual.

Name _____

Company _____

Street _____

City _____ State _____ Zip _____