

Software Tools

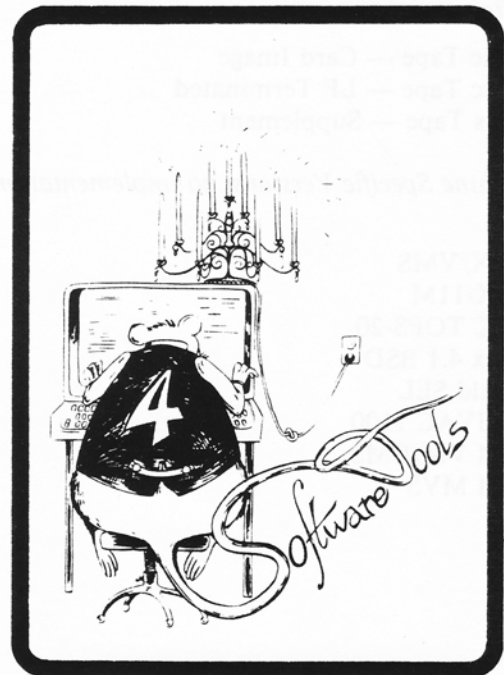
COMMUNICATIONS

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New Tapes Available

Nancy Travis
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IBM Implementation

STUG is currently offering two implementations of the Basic Tape specifically for IBM CMS and VMS operating systems. The IBM implementations are the same price as the Basic Tape and include documentation.

Toys Tape

Many new tools slated for the revision of the Basic Tape have been pre-released due to popular demand. Originally conceived as a "potpourri" of improved tools, the tape has been dubbed the Toys Tape. Despite its title, the tools included are far from trivial, including the long-awaited YACC, LEX, LISP, and TCS as well as improved versions of format, and the archiver. The new version of Ratfor which is included on the tape along with ratfix programs to upgrade pre-existing tools conforms to the standards outlined by the STUG standard committee.

A complete list of STUG tapes follows. An order form can be found in the rear of this newsletter.

Portable Tapes, requiring machine-specific implementation:

Basic Tape — Card Image
Basic Tape — LF Terminated
Toys Tape — Supplement

Machine Specific Versions, no implementation necessary:

VAX/VMS
RSX-11M
DEC TOPS-20
Unix 4.1 BSD
Gould SEL
UNIVAC 1100
IBM VM/CMS
IBM MVS

Summer 1984 Usenix

STUG Meeting

The USENIX Association will hold its 1984 Summer Conference in conjunction with Software Tools Users Group, Inc., in Salt Lake City, Utah, June 12-15, 1984.

Headquarters: Hotel Utah
Exhibit Hall: Salt Palace Center
USENIX and STUG Tutorials: June 12
USENIX Technical Sessions: June 13-15
STUG Technical Session: June 14

For pre-registration package, please contact:

USENIX Conference Office
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Sunset Beach, CA 90742
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STUG, Inc.

Barbara Chase
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Let Me Introduce Myself

I am now the Executive Director for the Software Tools Users Group. I am also responsible for the Distribution Function, and the Financial Function of the user group. If you have any questions regarding your tape order, or inquiries regarding the work other members are doing, you can contact me through the Software Tools Users Group mailing address, or you can call (213)641-5434 and leave me a message.

If you have general information or software HOTLINE questions, you should still call Nancy Travis at 415-486-6411.

The group will be working toward the Standards Effort and RatsNest this year. If you have ideas or interests you would like to see take place, please let me know about them. I also encourage you to send articles to Nancy Travis, the Newsletter Editor. The more interesting articles we receive, the more newsletters we will be able to publish each year.

Incorporation

The Software Tools Users Group became a nonprofit corporation in the State of California on November 17, 1983. Now that we are incorporated, we have accomplished several things:

- We have established a new bank account, and are considering the possibility of accepting VISA/MasterCard.
- We are now able to accept purchase orders.
- We are filing for tax-exempt status with the IRS.

Washington DC Board Meeting

The following resolutions were made at this meeting:

- An attempt will be made to coordinate an effort with Usenix to hold a parallel technical session at the Salt Lake conference.
- STUG would also like to sponsor a full-day tutorial on Tuesday at the Salt Lake conference.
- A proposal will be drawn up outlining the financial arrangements for the joint-effort at the Salt Lake conference (100% of the tutorial — expenses, plus a proportional percentage of the technical session).
- Arrangements will be made with PP&S to pursue selling the San Diego proceedings to book distributors and bookstores.
- STUG will still receive the orders for the proceedings, and PP&S will handle the mailing arrangements.
- The bylaws were adopted (after a few minor changes were made)
- The current directors will retain their position until the Salt Lake conference.
- The Officers of the Incorporation were elected:

President: Dave Martin
Vice President: Neil Groundwater
Chairman of the Board: Bill Meine
Chief Executive Officer: Barbara Chase
Secretary/Treasurer: Barbara Chase

- Tax-Exempt status will be pursued
- There is a general interest in finding out exactly what "public domain" means legally and in actuality.
- There will be at least two board meetings per year (one at each conference)
- There will be an annual meeting of the members during the summer conference

Board of Directors Election in Salt Lake

There will be an Election of Directors at the Salt Lake Conference. There will be a Members Meeting, where the election will take place. Following this meeting will be an Implementor's Meeting where we will discuss the Standards Effort and new directions for Implementor's. These two meetings will be held Tuesday, June 12 at 8:00 pm in the *Bonneville #1* room located in Hotel Utah. This is the main conference hotel, so the room should be easy to find. There will be signs posted in the general information areas of the conference center.

The Nomination Committee has selected the following candidates for election:

Phil Davidson, Carousel Microtools
*Neil Groundwater, Analytic Disciplines, Inc.
*Dave Martin, Hughes Aircraft
*Bill Meine, Sun Microsystems
Chris Peterson, Consultant
*Dave Stoffel, Group L
Theresa Breckon, RTSG/LBL
*incumbent

Five members may nominate candidates for directorships at any time before the day preceding the election. So, if any of you would like to get together and nominate someone, please contact us in writing before the election and your recommendations will be added to the list. I would like to encourage you to submit nominations; we are sincerely interested in seeing more activity from the members of the group.

European Unix Users Group

Teus Hagen
decvax!mcvax!teus

The European Unix Users Group (EUUG) is currently distributing the Software Tools tapes. EUUG is an organization which is a parallel group to USENIX and STUG, i.e., the function and goals are similar although membership in one group does not constitute membership in another. Some STUG members may find EUUG membership to be useful considering the delay of shipping tapes overseas. For further information, contact

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YAUG

Yet Another Users Group

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There is a move afoot to form a macro-users-group in the DC area. This is to be a group which meets locally approximately once a month for an evening presentation by vendors, users, implementors, etc.

It is a macro users group in the sense that it is for USENIX & /usr/group & STUG & Unicorn (the government unix users). It is expected to evolve a newsletter and already has a few vendors willing to come up with some seed money to get hotel-rooms rather than borrowed conference rooms for meetings.

I was asked to represent the Tools community in the setup of this group and the other participants are:

Susan Dugoff — Tender Learning Curve
(a /usr/group board member)
Gary Donnelly — Wollongong
(formerly with Interactive, RIG)
Mike O'Dell — Hacker Extraordinaire
Group L
Walt Lazear — MITRE

The name of the group is tentatively "Capital Shell" (case insensitive).

Membership Renewals

If you are uncertain as to when your membership expires, check the current expiration date on the address label of this newsletter. 3Q85 for example, means your membership is good until the third quarter of 1985. Yearly memberships extend one year from the quarter you applied, instead of for a fiscal or calendar year.

Proceedings

Barbara Chase

San Diego Conference, Jan 1983

There are still a few proceedings available from The Software Tools Users Group. The cost is \$25.00 for domestic orders, and \$35.00 for foreign orders. Please

send your orders to Software Tools Users Group at 1259 El Camino Real #242, Menlo Park, Ca. 94025.

Toronto Conference, June 1983

These proceedings are available from the Usenix Association. If you are interested in ordering one of these proceedings, please contact the Usenix Office at P.O. Box 7, El Cerrito, Ca. 94530. The cost is \$30.00 for domestic orders, and \$35.00 for foreign orders.

Dynamic Memory, Symbol Tables and Environments

*Theresa Breckon
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At the last implementors meeting I was assigned the task of proposing a set of portable routines for Software Tools dynamic memory, symbol tables, and environments. I have come up with these proposals; actually they have already been revised a couple of times because of excellent feedback from STUG members here at LBL. I have also modified the basic-tape shell to use environments, i.e. to recognize the builtin commands 'setenv' and 'unsetenv'. I would like to send out my proposals to any interested implementors and get some more feedback. If you are interested in commenting on these proposals, please contact Nancy Travis at the STUG hot-line, or drop a note to her at the STUG PO address, and she will send the copies to you in the mail.

Tools Lex

*Vern Paxson
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RTSG has developed a Lex tool similar to the Lex program available with the Unix operating system. Lex takes as input a list of *patterns* which are specified using a superset of the VOS regular expressions. Associated with each pattern is an *action*, which is a sequence of Ratfor statements. The output of Lex is a tool which, once compiled and executed, will read text from its standard input, and whenever one of the *patterns* is read by the tool, the associated Ratfor *action* will be executed.

Lex is useful for both simple filtering tasks and for much more complicated pattern-matching problems,

such as generating scanners for compilers. The major goals of the design were for Lex to generate pattern-matchers that are both small and fast yet able to recognize a large number of complicated patterns. We feel these goals have been met. In particular, our Lex program generates tools which are significantly smaller than those generated by the Unix Lex program.

Lex is available on the Toys tape available for experimental use. It will be part of the extension section of the Basic Tape in the near future. The primary porting concerns are that RTSG's Yacc tool must be available and that a bit-string library used by Lex be ported as well (bringing up the bit-string library should at most involve writing assembly-language routines to do low-level bit-pushing, and this will be necessary only if the local Fortran compiler does not support bit operations).

Editor's Note: A more detailed view of Lex will be presented by Vern at the Summer Unicom in Salt Lake City.

Shell Enhancements

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Terminal Software
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HP-3000 implementation

I have been asked about the status of my shell muching.

I have implemented much of the csh in Ratfor: with a simple if and goto, I have enhanced RTSG's sh with Joe Svntek's *history*, full syntax aliases, foreach and while loops, if-then-else-if, and shell variables (some used to control shell operation). Miscellaneous other commands include Joe's *ask*, a builtin *print*, several flavors of *set* command, and an explicit *local* command. I am in the process of adding Ratfor-style expressions for if and while.

As to portability, this shell has been on the 3000 too long; its grown somewhat localized. I am working on removing (or ifdef'ing) local dependencies now. I think that it is reasonably protable now, but I can save a lot of work for others by doing this myself.

Address space will be a problem for some: the shell code compiles into about 32K on the 3000, exclusive of libraries and data space. (The 3000 allows 64K data space plus 2Meg code space.) Data space is fairly

controllable via defines. I am keeping small machines in mind; I am cutting data space requirements wherever possible, but it is likely that 64K machines will have to ifdef out some features (as on RSC currently). This I will leave to the implementor.

I will place a copy of my current doc on lbl-csam: ~poulton/sh.d. This shell is not in production yet, so its spec is not set in concrete. Anyone interested is invited to peruse this and send me your comments.

The CP/M Software Tools Package

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I have been running the Carousel Toolkit CP/M version of the tools as a program development environment on a 64K machine (a Transam Tuscan) with two 8" and two 5 1/4" disc drives.

For a start, mounting the tools was completely painless. The Tuscan can accept almost any disc format, and I have all the tools I need on a single double-sided double-density 8" disc with lots of room to spare. I only use a fairly small selection of the tools, and for these I use the run tools rather than the shell.

My prime objective in obtaining the package was to get ratfor on the micro-computer. I have been using ratfor exclusively for several years, but the tools version is more complete than I have been used to. Somewhat to my surprise, ratfor provides an entirely practical language for program development on these small machines. Granted, the edit-ratfor-fsort-fortran-linker cycle is rather a pain when correcting small errors, but the readability of the code more than compensates for this. The tools editor is a pleasure to use, and the archiver keeps everything in order.

My next move will be downwards to the Osborn 1. I'm not sure that the small discs will not be too restrictive for large-scale work. In the other direction, we shall shortly mount the tools on our Perkin-Elmer 3220, and from there the path within the London University leads through various PDP-11's and VAX's to the Amdahl and Cray I machines. The prospect of program portability across this range of equipment is extremely enticing.

I would welcome contact with other tools users in the UK.

Automated Testing using the Shell

Steve Hopkins
Analytic Disciplines, Inc
Vienna, Virginia

We have been engaged in software development using the Software Tools environment, and have developed an automated testing procedure that we find quite efficient. Although we are sure that others have come up with a similar scheme on their own, we haven't seen it in print, and would like to share it with those who haven't stumbled onto it yet.

The procedure is centered around the use of the archiver and typical shell command files we all are so familiar with. We store our programs in the typical format as delivered in the Tools distribution. That is, in a 'program.w' archive stored under TCS. The 'program.w' archive contains the 'program.r' archive, a 'program.fmt', and perhaps some common blocks. The archives of our programs under discussion differ from the archive format in the Tools distribution only in that the 'program.w' archive has an additional member, 'program.tes'. This 'program.tes' is an archive containing test input, expected output, and information necessary to automate certain aspects of the testing process. A key element of this archive is an 'auto.sh' file containing the shell commands that automate the testing process.

By way of example, we have a program 'sum', which reads in a large file of integer data produced from another program, and summarizes it into a smaller, more manageable file. The test archive contains test input data, expected output, and the shell file 'auto.sh':

```
von
sum data1 > out1.new
diff out1.old out1.new
sum data2 > out2.new
diff out2.old out2.new
sum baddata > junk ? out3.new
diff out3.old out3.new
```

This command file contains 3 tests. In each test, sum is run on a set of existing test data, and the output is sent to a temporary file. This temporary file is then compared with the expected results by 'diff'. In the third test, bad input data is used to test error handling capability by re-directing ERROUT to an output file for comparison with expected error messages. Of course it is a simple matter to construct more involved tests, by invoking options of the test program or taking input from other sources, etc.

If we have to make a change to 'sum' we can make sure we haven't added any new bugs by running the automated test, after we are satisfied that our change has been properly implemented. We simply extract the test data and results out of the archive, and invoke 'auto.sh'. If the 'diff' commands don't produce any output we know that all our existing test cases still work. If a 'diff' command does produce output, we have a clue as to where we went wrong. When we are satisfied that 'sum' works properly for the old tests as well as performing the new task, we can add new tests to the archive to cover the new code.

This automated test procedure is most useful late in the development phase, or early in the maintenance phase of a given program. After the programmer has made a modification or fixed a bug, he/she can quickly check to see whether any inadvertent changes have affected the performance of the program on the existing test cases. When the modification is complete, test cases for the new situation can be added to the archive.

Of course, the reliability of this method is a function of how thoroughly the test cases test the program in the first place. However, archiving the test cases reduces the necessity of trying to reproduce old input data, and if the test cases are well chosen the time saved by this method can free the programmer for other activities.

Editor's Note: A similar system of tool-testing scripts was developed by Ben Cranston and Russell Rew. See "Minimal Test Cases for the VOS Software Tools" in the Toronto Unicom Proceedings (reviewed in STUG news issue #11).

STUG Tutorial Review Winter 1984 Uniforum

Van Jacobson
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Dave Martin: Kermit

Dave gave an overview of Kermit, a file transfer protocol for microcomputers that was developed at Columbia University. He announced that the ratfor version should be available by the next conference (June 84). Kermit will:

- provide reliable file transfer between dissimilar systems,
- utilize ordinary dial-up serial lines,
- be simple enough to come up on almost any machine,

- transmit ascii and binary.

In addition, he discussed Kermit host requirements, e.g. "must pass all printable characters".

Michael Bourke: Portability and Filenames

Michael discussed some of the VOS portability problems due to different operating systems' file naming conventions:

- Lexical conventions (length of names, special characters or fields)
 - Different types of file storage (disk, device, net, etc.)
 - Directory structure (depth, root, links),
 - Name conflicts with local names
- Choices for resolution include:
- Use host filename
 - Store file names separately from file contents (e.g. David Hanson's Portable Directory System, PDS)
 - Only translate the awkward filenames (Eunice and Carousel CP/M do conversions only when needed.)

The current Software Tools standards use host names and conform to FORTRAN 66 rules. Suggested improvements and possibilities includes:

- The University of Arizona PDS
- A solution similar to the one used by Eunice.

Jim Roseburg: Metatype

Jim discussed METATYPE, a CP/M based word processor written in Ratfor. It's a "what you see is what you get" style editor that uses either one character inline commands (screen mode) or two character commands (command mode). Features include true proportional spacing, insert/delete line/character, clear, etc. Some changes would have to be made to make it portable, the biggest problem being overlaying. The program is currently approximately 128K on CP/M.

Steve Hopkins: Instrumentor for Ratfor Programs.

Steve discussed some fascinating work done at Analytic Disciplines to "instrument" and analyze Ratfor

programs. They have developed a modified Ratfor compiler that will automatically add software "probes" along each of the control paths of a program. In addition, they have done analysis tools for the trace file written by the probe code. They can look at the paths taken and the frequency of execution of each path and, given any path, interactively display the source code on the path.

Other tools they have developed are:

pretty — a ratfor pretty printer

A tool to interactively add annotation comments to a module (prompts for "algorithm").

box — an improved version of the tool to show a Ratfor program's block structure

A tree structured call graph printer.

A program that checks that all variables are declared.

Van Jacobson and Dave Martin: Toys Tape

Van Jacobson and Dave Martin outlined the contents of the new STUG "Toys" tape which includes yacc, lex, new ratfor, format, header/trailer archiver, lisp, lisp tests. There was also discussion of the work being done to add the Tools' Source Code Control System, TCS.

Bill Meine: Standards Effort

Bill Meine, Standards Committee Chairman, discussed the first/second ballot scheme. The second ballot is intended solicit input on major issues:

- hybrid coupling
- access modes for create and open and different file types
- layer under getlin, gettyp, etc., that removed problems but kept old interface around.

The next ballot was projected to appear in February 1984 in order to produce a new tape in time for the Salt Lake Conference.

Editor's note: As of this printing, the ballot has not materialized. Committee members and interested parties should contact Bill Meine.

Wanted

Nancy Travis

The STUG Hot-line has generated inquiries for specific implementations and tools which are not yet available for distribution. In case any of our members have expertise or have improved tools to offer, we are publishing requests. If you have any requests for the next issue write me a short note c/o STUG.

HP-9000 implementation

requested by:

Louis C. Just
6041 W. Pacific Circle
Lakewood, CO 80227

An improved SPELL tool (not the current script) with UNIX-like capabilities.

Implementors List

The list of Implementors continues to grow as more new members are successful in bringing the Software Tools up on a variety of operating systems. Although we receive many applications from veteran implementors, the majority of applicants are simultaneously ordering the Basic Tape and have not yet gotten their fingers into implementation.

We would like to hear from you after you have installed the tools. Please take a moment to send us your name and the machine(s) on which you have implemented the tools or call the STUG Hotline (particularly if you have broken ground on an obscure machine!).

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