

Digital Computer Laboratory  
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To: Scientific and Engineering Computations Group  
From: A. Zabludowsky  
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SUBJECT: GENERALIZED NIM PLAYING ROUTINE

The above routine is available for demonstration on  
tc tape no. 131-247-12.

Generalized Nim is a game in which a number of groups  
are available, in this routine eight marked A to H. Each group  
is composed of a number of pieces. The game consists of each  
player (computer vs human) in his turn removing up to a certain  
maximum number (n) of pieces from any one group affecting not more  
than (m) number of groups in each turn. The winner is the one who  
removes the last piece. The game is displayed on the scope and  
shows decimally the number of pieces in each group at the time of  
display.

When the tape is read in the display will show 0 pieces  
in each group. (n) has then to be set on FF2 using its octal equi-  
valent (n can be in the range 0-99) and (m) has to be set on FF3  
using its octal equivalent (m can be in the range 0-8). After  
FF2 & 3 have been set, upper activate button has to be depressed  
for read in.

In order to fill in the groups with the desired number  
of pieces, the number has to be inserted in right MIR and upper  
activate button depressed. This has to be repeated eight times in  
order to fill all groups. The groups will fill beginning with A.

The right MIR setting is done using the four rightmost  
columns, each two columns representing octally a decimal digit.  
Numbers set in right MIR cannot exceed 99 decimal.

After all groups have been filled to the desired initial  
values (if zero is desired in any group, a zero has to be inserted)  
the game can be started.

Removing pieces from the groups is done by setting the  
desired number in right MIR and the address in left MIR using the  
rightmost column where the groups are 0-7 for A-H consecutively.  
Pressing upper activate button will read in the above amount and  
display the new numbers in the groups. m removals have to be made

in each move; if less than  $m$  are desired, 0 has to be removed until  $m$  removals are completed. After  $m$  removals have been done, upper activate button has to be pressed for computer move.

The routine will type human or machine win on direct type-writer and new game can be started again by first setting PPE & S and filling in the groups to the desired numbers.

The routine will type a wrong move if any of the following occurs:

1. Number larger than 9 set in any two columns of right MIR.
2. Number larger than 99 set in right MIR.
3. An attempt to remove number larger than  $n$  from any group.
4. An attempt to remove twice from the same group during the same turn.
5. Number larger than 7 set in left MIR.

After the wrong move output, wrong move has to be corrected and repeated.

Signed: \_\_\_\_\_

A. Zabłudowsky

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