The Cover Story

Take a look at the cover of the APL\360: User's Manual. It contains a printout generated by this simple APL program, printed on page 2 in the manual:

\[ \begin{align*}
  \text{\texttt{G z[m g c;1' \ z[::2Ym"=2Um"R 2 4 1 3 Þ::m;3 4',Rc"Rc};<<Qm;1 2'RRc'} \\
  \end{align*} \]

You start the program:

\[
13 13 3 5 \ ' \ APL\360 \ ' 
\]

And get the following output:

```apl
666660000066666PPPPLL\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\n\end{apl}
```
Of course, this is not identical to the picture on the cover of the manual: The image depends upon the random number generator in APL. How can we reproduce the image exactly as shown on the cover? This is simple, we just have to set the correct random number seed before starting the program.

The random number generator used in APL repeats itself after $2^{31}-1$ steps, this would take too long time on the simulator. I wrote a small C program that test all possible values, and bingo! The value 1975574597 is the right seed value. The program has to take into account that we don't know if a space in the printout comes from the first or the last space i text string.

The public library no. 1 contains a working space named WSFNS. This contains the function SETLINK that can be used to set the random number seed. Originally, this function was locked, but here we can see how it is implemented. It uses a secret i-beam function. Type the following:

```
6I1 1975574597
13 13 3 5 G ' APL\360 '
```

And you get:

```
3333300000000000\\\\L L LLLPPPPP66666\\\\AAAAAAA AAAAAA AAAAAA AAAAAA AAAAAA 6666
3333300000000000\\\\L L LLLPPPPP66666\\\\AAAAAAA AAAAAA AAAAAA AAAAAA 6666
3333300000000000\\\\L L LLLPPPPP66666\\\\AAAAAAA AAAAAA AAAAAA AAAAAA 6666
LP PPPP AAAA A A AAAAA AAAAA AAAAA AAAAAA 6666
PPP P PPPP AAAA 66666\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\\\\\,\n```
Exactly like the cover page.