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S&SMC#9: Optimized 42S (and 41C) RPN solution

Message #1 Posted by [Valentin Albillo](#) on 26 May 2005, 9:42 a.m.

Hi,

The RPN solution I gave for the 42S yesterday was an unoptimized, direct translation of my original solution for the 71B, and would run only on a 42S because it used more subroutine levels than the 41C would allow.

On the other and, this optimized translation, despite still using the exact same logic as the 71B version, does include the following improvements over the first one:

- Appreciably shorter (80 steps, 149 bytes vs. 92 steps, 167 bytes) and faster.
- Doesn't use subroutine levels in a recursive manner, so its maximum depth is 1, and thus will run on the HP-41C essentially unchanged.

The only modification necessary to make it run in the HP-41C is to expand the RCL arithmetic at steps 44 (RCL+ IND 01) and 53 (RCLx IND 03) into two separate steps each (RCL, + and RCL, x, respectively), thus the 41C version will be 82 steps long.

01*LBL "SR"	21 STO IND 02	41 FS? IND ST X	61 3
02 0.009	22 CF 15	42 GTO 03	62 XEQ 06
03 STO 04	23 X=Y?	43 INT	63 RUP
04*LBL 05	24 SF 15	44 RCL+ IND 01	64 GTO 00
05 CF IND ST X	25 3	45 STO IND 03	65*LBL 04
06 ISG ST X	26 FC? 15	46 RCL 00	66 RCL IND 02
07 GT0 05	27 STO- IND 02	47 MOD	67 CF IND ST X
08 1	28 1E5	48 X#0?	68*LBL 03
09 STO 00	29 STO/ IND 02	49 GTO 03	69 ISG IND 02
10 5	30 RCL 04	50 RCL IND 02	70 GTO 01
11 STO 01	31 STO+ IND 02	51 SF IND ST X	71 -3
12 6	32 4	52 10	72 XEQ 06
13 STO 02	33 FS? 15	53 RCLx IND 03	73 GTO 04
14 7	34 STO+ IND 02	54 9	74*LBL 06
15 STO 03	35 RCL 00	55 RCL 00	75 STO+ 01
16 0	36 2	56 X<Y?	76 STO+ 02

```
17*LBL 00      37 MOD          57 GTO 02      77 STO+ 03
18 STO IND 01  38 STO+ IND 02  58 VIEW ST Z   78 SIGN
19 RCL 00      39*LBL 01      59 GTO 04      79 STO+ 00
20 5           40 RCL IND 02   60*LBL 02      80 END
```

To run it, simply:

```
SIZE 32
SF 21
XEQ "SR" -> ST Z=3,816,547,290 (in the HP42S)
          ->      3,816,547,290 (in the HP-41C)
```

after a few seconds in the 42S or a few minutes in the 41C. No other solutions do exist, but you can make certain by continuing the search by pressing [R/S]. After a while it will signal that further solutions are nonexistent by displaying "Nonexistent" (42S) or "NONEXISTENT" (41C), which is achieved by forcing that error message when the search is over, thus saving the steps required to display an alpha prompt.

This same program would also run in an HP-15C (despite the effects of using system flags 8 and 9) with a small change to cater for the fact that you can't use the X-register for indirect addressing (simply $X \leftrightarrow I$, indirect operation using I, $X \leftrightarrow I$) and also bringing the solution to the X-register before pausing/stopping for the user to see it (the 42S/41C version above displays the solution using a VIEW Z, because it is in the Z-register at that time).

Best regards from V.

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