HP35s - RPN & Stacks

Note: If you would like to try using an HP calculator, you can download a free app on your cell phone

- Android: Free42. HP42s calculator (almost identical to an HP35s but out of production)
- Apple: ComplexRPN A generic RPN calculator which does complex numbers

Stacks

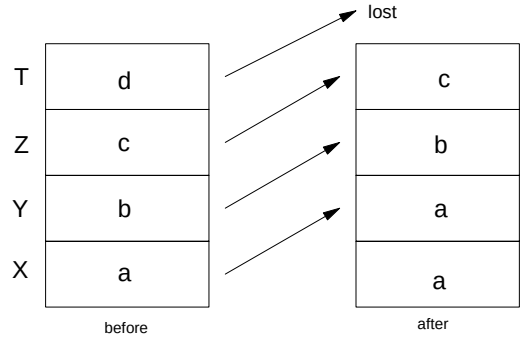
The HP35s uses makes extensive use of stacks. There are four registers in the stack

- T *top of stack*
- Z
- Y *top row of display*
- X *bottom of stack and bottom row of display*

When you type in a number, it goes into the X register

push (enter)

The enter key is a "push" command. This pushes data up one on the stack. Note that the contents of T are lost.

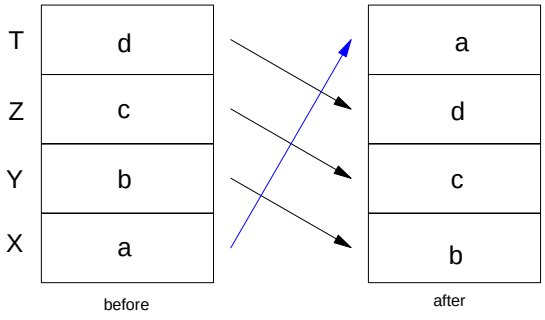


Result of an Enter command (push)

The X register remains unchanged. If enter a number, it clears the X register and replaces it with the number your typing.

Pop $(R\downarrow)$:

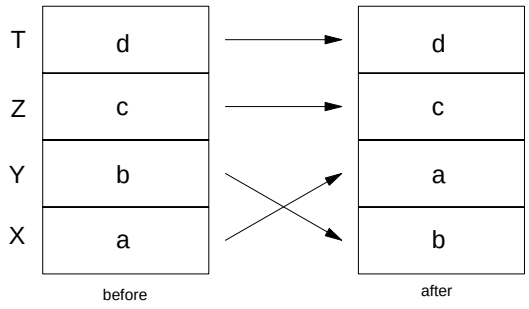
Rotate modes all data down one with the X register going to the T register



Result of a rotate down command $(R\downarrow)$

Swap X and Y $(X \overrightarrow{\leftarrow} Y)$

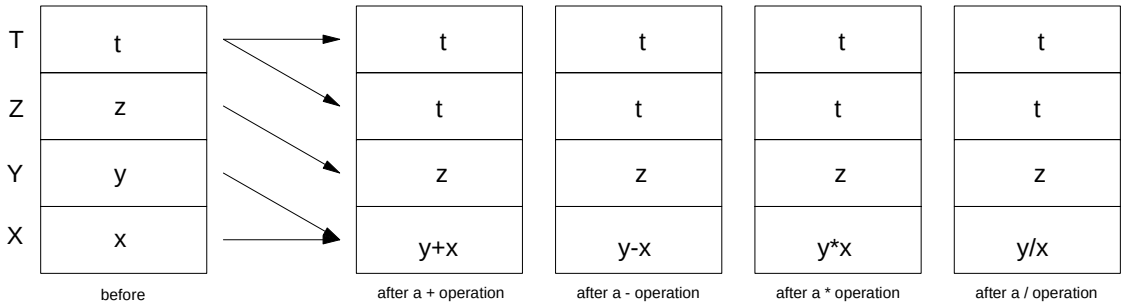
This just swaps the contents of the X and Y register



Result of a Swap X and Y command

RPN: Reverse Polish Notation

All operations operate on the X and Y register. Likewise, you need to set up the stack *before* you press the +, -, *, or other functions.



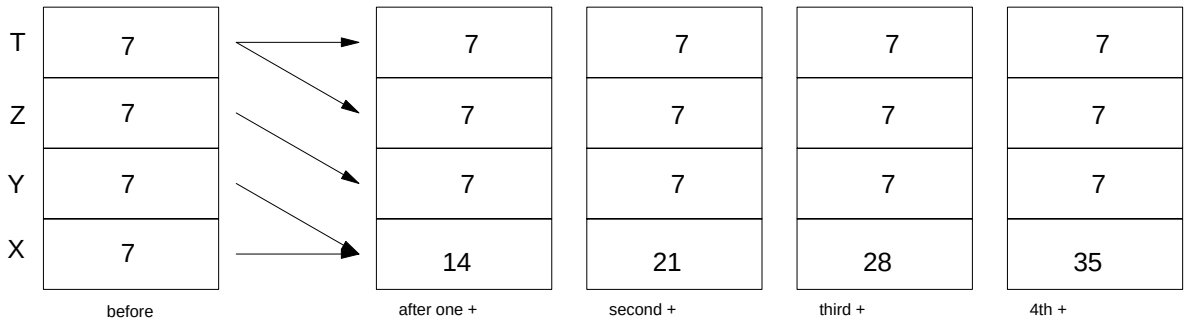
Note that the t-register remains unchanged. This lets you quickly find all multiples of N or products of N.

Example: Find all multiples of seven.

Solution: Push 7 onto the stack

```
7
Enter
Enter
Enter
```

Now hit the + button over and over again. This results in you adding 7 to the X register over and over.

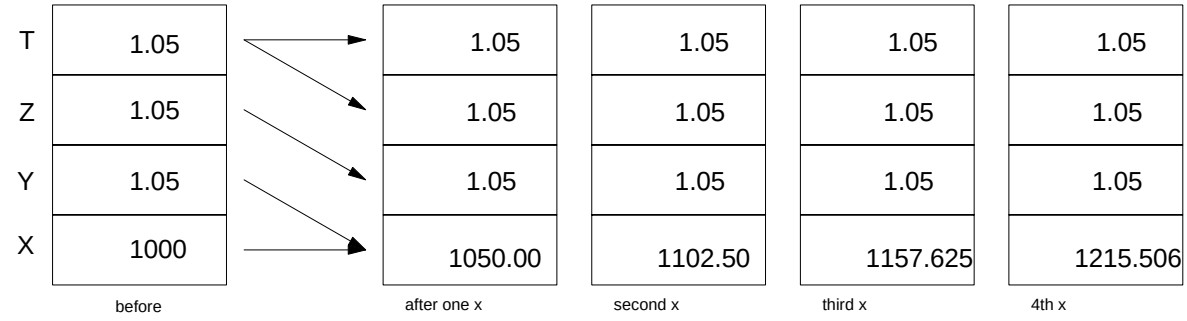


Example 2: Suppose you invest $1000 at 5% interest. How much do you have each year?

Solution: Push 1.05 (5% interest) onto the stack. When done, input 1000 into the X register.

```
1.05
Enter
Enter
Enter
1000
```

Now hit the multiply (x) button over and over



Sample Problems

Problem 1. Assume X = 3. Solve for Y:

$$Y(x) = \left(\frac{10(x+2)(x+20)}{x(x+15)} \right)$$

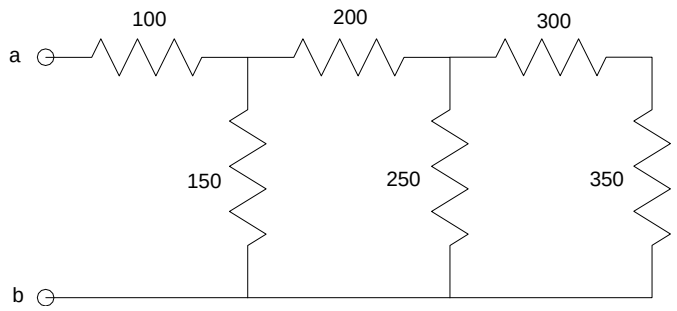
Solution:

```
3
STO X
2
+
RCL X
20
+
x
10
x
RCL X
/
RCL X
```

```
15
+
/
```

answer = 21.2963

Problem 2: Find the net resistance from A to B



Start from the right and start simplifying

300 and 350 are in series (they add)

this is in parallel with 250 (they add as the sum of the inverses inverted)

```
350
Enter
300
+            x = 650                300 and 350 Ohms in series
1/X
250
1/X
+
1/X         650 || 250 = 180.5556
200
+            inseries with 200 Ohms = 380.5556
1/X
150
1/X
+
1/X         in paralel with 150 Ohms = 107.5916
100
+           in series with 100 Ohms = 207.5916
```

Answer: 207.5916 Ohms