

About the paper computer

The computer is based on the WDR paper computer (or Der Know How computer), developed by Wolfgang Back and Ulrich Rohde. It contains a program memory, which contains line numbers to keep track of the program, and instructions with their respective data.

The computer also has registers (temporary memories) that contain values for computing.

The processor in this computer is **you**.

It uses an instruction set that contains 5 instructions: INC, DEC, JMP, ISZ and STP

Register A: 4

INC A \rightarrow +1
=5

INC tells to increment a register. For an example, INC A tells to increment register A.

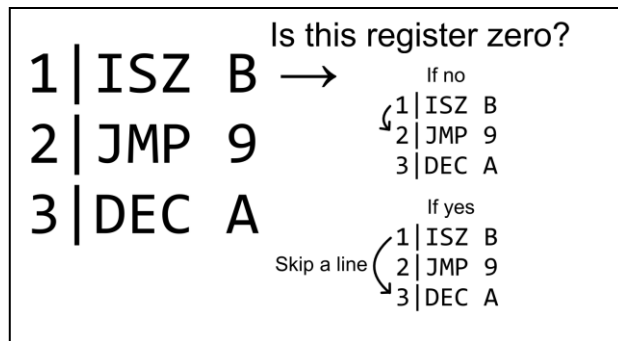
Register B: 3

DEC B \rightarrow -1
=2

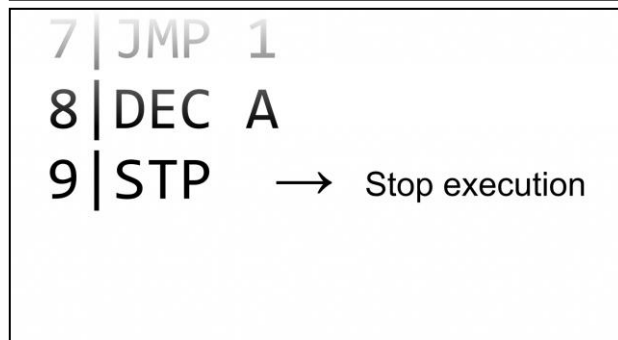
DEC is similar, but decrements a register.

1 | INC A
2 | DEC B
3 | JMP 1 $\xrightarrow{\text{Go to line 1}}$ 1 | INC
2 | DEC
3 | JMP

JMP tells to jump to a line. For an example, JMP 1 tells to jump to line 1.



ISZ is a special instruction, this checks for a register if it's zero. If not, go to the next line. If it's zero, skip the next line and execute the line after it.



STP just tells to stop executing the program.

How to use it

To use the computer, you first need a lot of small sticks to store values in the registers and a small object to keep track of the program by pointing at the current line.

When starting to execute a program, **always start at line 1**.

If you want to write your own program, I suggest using another piece of paper and a pencil (in case if you mess up something).

Happy computing!

Used source: https://en.wikipedia.org/wiki/WDR_paper_computer

Paper computer

Program memory

- 1 |
- 2 |
- 3 |
- 4 |
- 5 |
- 6 |
- 7 |
- 8 |
- 9 |
- 10 |
- 11 |
- 12 |
- 13 |
- 14 |
- 15 |

Registers

A	
B	
C	
D	

Note: you can also attach an external program memory

Pre-written programs

Program memory

Add

```
1 | JMP 4
2 | INC A
3 | DEC B
4 | ISZ B
5 | JMP 2
6 | STP
```

It adds two registers (A and B).
The output appears in register A.

Program memory

Subtract

```
1 | ISZ B
2 | JMP 4
3 | STP
4 | DEC A
5 | DEC B
6 | JMP 1
```

It subtracts register A from B.
The output appears in register A.

Program memory

Multiply

```
1 | ISZ B
2 | JMP 4
3 | JMP 8
4 | DEC B
5 | INC D
6 | INC A
7 | JMP 1
8 | ISZ D
9 | JMP 11
10 | JMP 14
11 | DEC D
12 | INC B
13 | JMP 8
14 | DEC C
15 | ISZ C
16 | JMP 1
17 | ISZ B
18 | JMP 20
19 | STP
20 | DEC B
21 | JMP 17
```

It multiplies register B and C,
using register D. The output
appears in register A.

Program memory

Copy

```
1 | ISZ B
2 | JMP 4
3 | JMP 7
4 | DEC B
5 | JMP 1
6 | -
7 | ISZ A
8 | JMP 10
9 | JMP 15
10 | DEC A
11 | INC B
12 | INC C
13 | JMP 7
14 | -
15 | ISZ C
16 | JMP 18
17 | STP
18 | DEC C
19 | INC A
20 | JMP 15
```

It copies register A into B,
using register C.