Advanced Operating System and Virtualization

Brainf*ck

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- OverView of Brainf*ck
- Implement Brainf*ck interpreter

What is Brainf*ck?

Brainf*ck is an esoteric programming language created in 1993 by Urban Müller, and notable for its extreme minimalism.
The language consists of only **eight simple commands** and an instruction pointer. While it is fully **Turing-complete**, it is not intended for practical use, but to challenge and amuse programmers.

by Wikipedia

Implementing BF interpreter is a good practice to know what is an interpreter

Turing machine

- Operates infinite memory tape which is divided into cells
- Positions its head over a cell and execute read/write operation
- Stop when its state changes to terminate

Brainf*ck

- Enough memory spaces (e.g., char memory[10000])
- Prepare pointer which move to left/right and read/write from/to memory
- Stop when a program ends

Model of BF machine

Memory  .....

Initial values in the memory set to 0

Program **++++++++++[>+++++++++<-]>.**

Instructions

- +
  - Increment value
- -
  - Decrement value
- >
  - Move head to the right
- <
  - Move head to the left
- [
  - Begin of a loop
  - If the value pointed by head equals 0, jump right next to the memory that corresponding “]”
-]
  - End of a loop. This is used as a pair with ”[”
- .
  - Show a number pointed by the head as an ascii character
- ,
  - Read from stdin and store it as a number to the memory pointed by the head

An example of programs for BF

++++++++++[>++++++++++<-]>.

H

Can you imagine why?

Lets try!

- Any programming language is possible
  - Recommend C language
- What is the goal
  - Execute 4 programs on the web
    - test.bf
    - test2.bf
    - test5.bf
    - test8.bf