The FORTH Programming Language

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History of FORTH

- Created around the same time as C (70's)
- File holding the interpreter was named "FOURTH", but the IBM 1130 OS restricted filenames to five characters.
- Thus, FORTH

Q1

History of FORTH

- Compact, Portable
- Full interpreter is only two files with a total of under 320 KB.
- Used in boot loaders and embedded systems.

Let's try it out!

- Open the terminal and run the forth file.
- Try entering these commands:
  - Enter "showstack" to see the stack after every command
- 4 .
- 2 3 + .
- 1 2 dup + . .
- 56 9 /mod . .
- 1 2 3 4 .s
- 1 2 3 4 rot .s
- 1 2 3 rot 2dup 2dup + pick * * -rot + over * rot * swap - .

Q2

Defining Words

- Every input is either a word or an integer.
  - Integers are put onto the stack.
  - Words manipulate the stack.
- Words are usually defined with ":"
  - Some implemented in assembly for speed
- ":" is followed by the name of the word, its definition, and finally ";"
  - Example:
  - : plusOne 1 + ;
  - : plusTwo plusOne plusOne ;

If (else) then

- Conditionals:
  - (condition) if (consequence) else (alternative) then (finally)
  - (condition) if (consequence) then (finally)
- The “if” looks at the top of the stack
  - Nonzero -> true
  - Zero -> false

Factorial and Fibonacci

- Watch us

Q3

Memory management

- Variables:
  - variable (variablename)
- Dereference the value using “@”
- Mutation is possible using:
  - (value) (address) !

Q4

REPL Example

- Watch us again