Read: Kernighan & Ritchie

- **Due Thursday, Feb 23**
  4.3: External Variables
  4.4: Scope Rules
  4.5: Header Files
  4.6: Static Variables

- **Due Tuesday, Feb 28**
  4.7: Register Variables
  4.8: Block Structure
  4.9: Initialization

- **Due Thursday, March 2**
  4.10: Recursion
Demonstrate Basic Skills & Code Review

- Postfix code walk-through
  1) Compliant with bracket and indenting standard?
  2) Do non-local variables have descriptive names?
  3) Do functions make logical units that are not too long?
  4) Can the programmer describe algorithm used by each function?
  5) Does program avoid repeated code?

- Demonstrate Basic Skills
  1) Copy input files from the web site (with cp or with download → FTP, **NOT** copy/paste).
  2) Edit input files (with vim or emacs): Make only one line of input.
  3) Add if (DEBUG) print statement to the top of each function in postfix lab that prints the function name, and all argument **names** AND **values**.
  4) Do a diff test (it is okay if the test does not pass).

Quiz: Which lines have indenting not in compliance with the CS-241 standard?

1) \textbf{if} (num <= 50) \\
2) \{ \\
3) \texttt{printf}("%d\n", num); \\
4) \} \\
5) \textbf{else} \\
6) \{ \\
7) \texttt{printf}("error\n"); \\
8) \} \\

a) 5, 6, 7, 8 \\
b) 2, 3, 6, 7 \\
c) 3, 7 \\
d) 2, 4, 6, 8 \\
e) 2, 6
Quiz: Infix to Postfix

Which is the correct translation of the infix expression below to postfix?

\[ (4 \times (2+3)) \div (1 + 7) \]

a) \[ 4 \ 2 \ 3 \ + \ 1 \ 7 \ + \ / \]
b) \[ 4 \ 2 \ 3 \ + \ 1 \ 7 \ + \ * \ /

c) \[ 4 \ 2 \ 3 \ + \ 1 \ 7 \ + \ / \ * \]
d) \[ 1 \ 7 \ + \ 2 \ 3 \ + \ 4 \ * \ /

e) \[ 1 \ 7 \ + \ 2 \ 3 \ + \ / \ 4 \ *

Quiz: Postfix Evaluation

What is the value of postfix expression:

\[ 2 \ 3 \ 4 \ + \ * \ 5 \ 3 \ - \ * \]

a) 40
b) −40
c) 27
d) −31
e) 28
### Postfix and a Stack

**Infix:**  \((1+2)/(4+8)\)

**Postfix:**  \(1 \  2 + 4 \ 8 + /\)

```
push 1
push 2
push 4
push 8
pop 2, pop 1, add push 3
pop 8, pop 4, add push 12
pop 3, pop 12, divide push 0
```

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### Lab: Postfix Calculator with header files

- Implement the reverse polish (postfix) calculator of section 4.3 using the header file layout and scope in section 4.4 and 4.5.

- This program is given a series of lines, each containing a space delimited postfix expression.

- The program output for each line of input is the value of the expression or "Error".
Infix to Postfix

Infix: \((1+2)/(4+7)\)
Postfix: 1 2 + 4 7 + /

Infix: \(4*(2+3)\)
Postfix: 4 2 3 + *

Infix: \((7^2 + 3(2 + 16))/(56 + 123)\)
Postfix: 7 7 * 3 2 16 + * + 56 123 + /

Quiz: Postfix Evaluation

What is the value of postfix expression:

\[2 3 4 5 + * +\]

a) 29
b) 27
c) 25
d) 40
e) 45

\[2 3 4 5 + \]
2 3 9
2 3 9 *
2 27
2 27 +
29
Postfix to Infix Examples

Postfix: 3 7 2 1 + + *
Infix: 3*(7+(2+1))

Postfix: 3 7 2 + 1 + *
Infix: 3*(7+2 + 1)

Postfix: 10 4 8 + -3 2 * + * 6 /
Infix: (10* (((4+8)+(-3*2)))/6)