UMass Boston CS 240
Homework 7
Due 4/25/2019 17:00

Make a subdirectory hw7 in your home directory for this assignment. Copy these files from `/home/ming/240/hw7`: `calc.h`, `getch.c`, `getop.c`, `main.c`, `stack.c`, and `Makefile`. The objective of this assignment is to let you practice with managing multiple files and using the `make` utility.

1   Postfix Notation

The standard way to write an expression, such at `a + b * c` is called the infix notation. The same expression in the *postfix notation* is `a b c * +`. You can convert between infix and postfix using an online tool here: `http://www.mathblog.dk/tools/infix-postfix-converter/`.

Read the provided code `calc.h`, `getch.c`, `getop.c`, `main.c`, and `stack.c`. The program implements a simple calculator that reads input from keyboard in the postfix notation, and performs calculation for floating-point numbers. You can create the executable `calc` by entering the command `make`. Run the program a few times to become familiar with it.

Your tasks in this asignment is to convert the code from floating-point calculation to integer calculation – mostly replacing `double` with `int`. The original code uses `atof()` to convert ASCII to a floating-point number. You can use `atoi()` to convert ASCII to integer. Additionally, you add functionality to the calculator by impementing the following operations.

- Four *bitwise* operations: AND (`&`), OR (`|`), XOR (`^`), and NOT (`~`). Note that AND, OR, and XOR are binary operators, but NOT is a unary operator. For example, `a b &` is the bitwise AND of a and b; `a ~` is the bitwise NOT of a.

- Three comparison operations: GREATER-THAN (`>`), EQUAL-TO (`=`), and LESS-THAN (`<`). The resulting values are either zero or one. Note that EQUAL-TO is denoted `=`, rather than `==` as in C.

- One logical operation NOT (`!`). It returns zero for a non-zero number, and returns one for zero. For example, `0 !` is 1, and `5 !` is 0.

- One ternary operation ?: The usual ternary expression `a ?  b :  c` in C will be written as `c b a ?`. If a is non-zero, the value of the expression is b, otherwise it is c.

Make sure your C code follows the style guidelines. Add comments at the top of each file. In the `readMe.txt` file, discuss what you found difficult about this assignment and what you learned completing it.

2   Grading Rubric

1. (10 points)

   (a) Existence of the directory `/home/user??/hw7`

   (b) Inside hw7: `calc.h`, `getch.c`, `getop.c`, `main.c`, `Makefile`, `stack.c`

   (c) Other files are allowed

2. (30 points) Coding style in `*.c` and `*.h` files

   (a) Adherence to the style guidelines

   (b) Sensible pseudo code, variable names, comments, etc.

   (c) `make calc` gives no warnings or errors

3. (60 points) Correctness
   `./calc < /home/ming/240/hw7/testPostfix.txt` produces correct output