Homework 3

This homework includes short answer questions and a programming assignment. The short answer questions are worth 5 points each. The programming assignment is worth 30 points. The short answer questions may cover topics that are in the text, but were not covered in the lectures. Push a preliminary version of the programming assignment to Github before Wednesday's class. Push the final version of your source code, Makefile, and a text file with your short answer questions to Github before 5PM Friday.

1. What is wrong with the following code and how would you fix it?

```
int min;
for(int i=0; i<10; ++i) {

    int value;
    scanf("%d", &value);
    if(i=0) min = value;
    else if(value<min) min = value;

} // end of loop over input

printf("The smallest or the 10 values you entered was %d\n", min);
```

2. What is wrong with the following code and how would you fix it?

```
int* pointerToMax(int a, int b) {
    if(a>b) return &a;
    else    return &b;
}
```

3. What is wrong with the following code and how would you fix it?

```
int* ptr = NULL;
scanf("%d", ptr);
printf("You entered %d", &ptr)
```

4. Describe what each of the following declare:

   (a) int* a; — *Declares a pointer makes a space for*
   (b) const int b; — *b is an int cant chg the data*
   (c) const int* c; — *C is a pointer CANT change*
   (d) int* const d; — *const d is a pointer CANT chg*
   (e) const int* const e; — *? ?*

5. What is the difference between the * and & operators?
   * points and creates the space
   & Retrieves the pointer reference

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6. What is the difference between `const int* a` and `int* const b`?

[handwritten annotations: "Pointer is the Constant", "a is a int", "Cant chg", "The b is the point", "const"]

7. Write the following two programs. Put each in a subdirectory under your `hw03` directory.

   (a) Write a program that prints the number of times you have run it. The first time you run it, it should print "1". The next time it should print "2", etc. Hint: how can you store information when the program is not running?

   (b) Write a function that swaps the values of two variables. Write a program that calls this function, taking input from stdin and writing the values to stdout. Don't print from inside the function. Put the function in a separate file from your `main`. Hint: use pointers.