

CS251 Data Structures – Fall 2009

Homework 1 – 30 points

Due: Sept. 17

Note: Any problem that is prefaced with "(Program Required)" indicates that you need to turn in a program for that problem, as well as the written solution. For problems of this type, you should include a printout of your code, and place your code in your `submit` folder. The filename for the code should follow the following convention: for C++ programs use `h<n>p<m>xxx.cpp`, where `<n>` is the homework number, `<m>` is the problem number, and `xxx` are the first three letters of your last name (lowercase). For example, if I was turning in code for the last problem in this homework, my file would be named `h1p4bon.cpp`. For Java programs, use `H<n>p<m>xxx.java`.

1. (5 points) Write a C++ function `maxSwap(a, b)` which takes two integer arguments and swaps their values if the first is less than the second, i.e., upon return the first argument will always have the larger of the two values. This function should also return `true` if a swap occurred and `false` otherwise.
2. (5 points) Question 15, pg. 24.
3. (5 points) (Program Required) Question 23, pg. 25.
4. (15 points)
 - (a) (Program Required) Write a program `countStrings` which counts the number of string constants in a C++ program. Recall that a string constant is any set of characters within a pair of double quotes (`"`). Recall also that to embed a double quote in a string constant you must use an escape character `\`. You may assume the file contains no comments. Your code should start like the following:

```
#include <iostream>
#include <fstream>
using namespace std;

void main()
{
    cout << "Enter the file name --> ";
    string name;
    cin >> name;
    ifstream fin(name.c_str());
    if (!fin) {
        cerr << "ERROR: Could not open file " << name << endl;
        exit(-1);
    }

    ... rest of your code ...
}
```

We will discuss this code in class.

- (b) Suppose we now allow comments in the file. Explain how this complicates counting the number of string constants.