CSci 1113
Midterm 1

Name: _____

Student ID: _____

Instructions: Please pick and answer any 6 of the 7 problems for a total of 60 points. If you answer more than 6 problems, only the first 6 will be graded. The time limit is 50 minutes. Please write your answers in the space provided. The exam is open book and notes. You may use electronic devices to ONLY look at either an e-book version or electronic notes. You may not use the internet, compiler or any other outside resources. (If you are typing on your keyboard/input device for anything other than ctrl-F to find words in the e-book or notes, this is probably not acceptable.)

Problem (1) [10 points] Write a C++ program that reads 10 integers from the keyboard and displays the second largest number entered. (Note: if there is a tie for the largest number, the you should cout the first number smaller than this largest number. For example, if the input is "4 4 4 4 1 1 1 1 3 3", the "second largest" should be "3").

Problem (2) [10 points] What is the output of this code segment?

```
int x;
int y;
y=x;
x=3;
-(x++);
cout << x << " " << y << endl;

int a = 3;
int b = ++a % 2;
cout << b++ << " " << a << endl;
```

Problem (3) [10 points] Write a C++ program that reads in a single integer from the keyboard and displays the factorial of that number. (Note: The factorial of "n" is $n! = (n \cdot (n-1) \cdot (n-2) \cdot ... \cdot 2 \cdot 1)$, where $0! = 1$.)

Problem (4) [10 points] The "Pax calendar" has 13 months each with 28 days. Like our normal calendar, there are rules to ensure the seasons do not drift too far apart from specific dates. The rules for the Pax calendar are: add an extra week if the last two digits are divisible by 6 (00 is counted as being divisible) or the last two digits are 99. However, if the year is divisible by 400 then there is no extra week. Write a C++ program that will cin a year, then cout whether or not that year is has an extra week.

Problem (5) [10 points] Eytan and Sabas strive to out do each other in total twitter posts. Each individually will double the number of total twitter posts until they have more than the other. For example if Eytan stats with 3 twitter posts and Sabas starts with 10, Eytan will double to 6 then double again to 12 posts. Now that Sabas is behind, they will reach 20 posts (double 10). Write a C++ program that reads Eythan (cin first) and Sabas' (cin second) initial number of twitter posts. Your program should say who will be the first with more than 100 total posts on twitter (following the process described above).

Problem (6) [10 points] What input should you give to the following program so that it will cout as many "Yes!" lines as possible (and no "No..." lines)? (Note: please clearly indicate where spaces and enters are.)

```
int x, y;
cin >> x >> y;
if(x+2 == y*2) {
    cout << "Yes!\n";
}
else if(x/y == 1) {
    cout << "No...\n";
}
else if (x+1 == y){
    cout << "Yes!\n";
}

string a, b;
cin >> a;
getline(cin, b);
if(a == "its a secret") {
    cout << "Yes!\nYes\n";
}

if(a == "kit") {
    if(a == "ty") {
        cout << "Yes!\n";
    }
    else if(b == "kat") {
        cout << "Yes!\n";
    }
    else {
        cout << "No...\n";
    }
}
else {
    if(b == " chen") {
        cout << "Yes!\n";
    }
    else {
        cout << "No...\n";
    }
}
```

Problem (7) [10 points] Fill in the blanks with a single statement (use may use only 1 or zero semi-colons and no braces (e.g. { or })) to complete the following C++ code:

```
int i=1;
int total=0;
----------
{
    if(i%6 != 0) {
        i++;
        ---------
    }
    -----------
    i++;
}
cout << "Amount of numbers between 1 and 150 divisible by 6 is "
     << ________ << endl;
```

Problem (8) [10 points] Find 3 errors in the code below. Assume that the code is completely shown except for #includes and "using namespace std". For each error, identify whether it is a runtime error, syntax error or logic error. You must also precisely describe why you think the part of code you identify is an error.

```
for(int i=0, i < 10; i++) {
    for(int j=1; j < i; j++) {
        int sum=0;
        if(i%j == 0) {
            sum++;
        }
    }
    cout << j << " is divisible by " << sum << " numbers" << endl;
    if(sum==2) {
        cout << "It's a prime!" << endl;
    }
}
```