CSci 1113
Midterm 2

Name: _____

Student ID: _____

Instructions: Please pick and answer any 6 of the 7 problems for a total of 90 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) [15 points] Write a function (in C++) that returns a random vowel (with equal probability). You may assume the vowels are "a", "e", "i", "o" and "u". You do not need to "srand(time(0))" (nor should you in the function anyways).

Problem (2) [15 points] Write a function in C++ that returns the number of times an array of bools has consecutive true values (this array is input to the function, along with the size). For example:

```
Input: Array = {T, T, T, F, T, F, T, T}, size = 8
Output: 3
(first two Ts, 2nd two Ts, and last two Ts)
```

Problem (3) [15 points] Write a *recursive* function in C++ that counts the number of times a letter appears in a sentence. For example:

```
Input:  Sentence = "I am a sentence", letter = "e"
Output: 3
```

Problem (4) [15 points] Find 3 possible places for errors in the following code fragment. Explain specifically what causes the error and whether it is a syntax, runtime or logic error. You may assume all includes are done properly, the code is inside a valid function, it is using namespace std and there are no manually declared global variables. The "average" function should return the mean of the sum of numbers between 1 and "a" (inclusive). So in the main() below, it should compute: $(1+2+3+4+5+6+7+8+9+10)/10 = 5.5$

```cpp
double average(int a, int b, int c)
{
    if(a = 0)
    {
        return c/b;
    }
    average(a--, b, c+a);
    cout << "Still going!\n";
}

int main()
{
    cout << average(10, 10, 0);
}
```

Problem (5) [15 points] Write code (in C++) that makes a right triangle (as shown below). Assume there exists some variable "size" that indicates how big the triangle should be (i.e. assume "size" has been initialized). You may assume size is greater than 1.

```
size = 2:
X
XX

size = 5:
X
XX
X X
X  X
XXXXX
```

Problem (6) [15 points] Write C++ code to open a file called "stuff.txt". Display how many periods (".") there are in this file. You may assume the file exists and can be opened.

Problem (7) [15 points] Write a C++ function that takes as input a single string called "fileName". Open a file with the "fileName" and then do one of the following at random:

```
70% chance: write your favorite color to the file
20% chance: write your favorite number to the file
10% chance: write your favorite animal to the file
```

If the file cannot be opened, cout this information then stop the function (not the program). (Again, don't call srand(time(0)) inside this function.)