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 7 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] Chris likes to fail students, so he made a program that makes big ”F”s. Assume there is some variable size to control how many vertical ”F”s there are (you may assume size is odd). Use size to create the ”F” as shown below (the amount of horizontal ”F”s are (1+size)/2):

Sample output (size=5):

F  F  F
F
F  F  F
F
F
F
Problem (2) [10 points] Assume a user enters the following (underlined): $12,345,678.9 = my salary
Write C++ statements that will read this input and then store them into five variables called a, b, c, d and e as follows:

Variable "a" stores: $
Variable "b" stores: 12
Variable "c" stores: ,
Variable "d" stores: 345,678.9
Variable "e" stores: = my salary

Problem (3) [10 points] Write C++ code that allows the user to input a year. A year that is not a century is a leap year if it is divisible by 4. In the Gregorian calendar, centuries (years divisible by 100) are not leap year unless they are divisible by 400 (sound familiar?). In the Revised Julian Calendar, centuries are not leap years, unless they have remainder of 200 or 600 when divided by 900. Display whether the year is a leap year or not based on the Revised Julian Calendar.
Problem (4) [10 points] Allie alternates days eating pizza and working out. If she eats pizza, she eats 3 slices and each slice is 30g of carbs. When she works out, she burns 20 percent of her carbs. Assume there is a variable `time` that is initialized. Find out how many carbs Allie has after `time` days of doing this routine. Your program only needs to output her final carb value. Example calculation (for input of `time`=5, you should show: 219.6):

Day 1 = eat 3 slice (90g),
Day 2 = workout (72g),
Day 3 = eat 3 slices (162g),
Day 4 = workout (129.6),
Day 5 = eat 3 slices (219.6g),
... 

Problem (5) [10 points] Write C++ code that reads a number in, then displays whether or not it is a Fibonacci number. The definition of a Fibonacci number is that it is the sum of the previous two Fibonacci numbers \((F_n = F_{n-1} + F_{n-2})\). Here is code to generate \(n\) Fibonacci numbers:

```c++
int f0=0;
int f1=1;
for(int i=0; i < n; i++)
{
    int next = f1+f0;
    f0=f1;
    f1=next;
    cout << next << " ";
}
```
Problem (6) [10 points] Dan is feeling super lazy and wants to make an imperial to metric unit converter. There are 12 inches in 1 foot. One foot is 0.3 meters. Assume the user will input feet with a ' unit marker and inches with a " (as shown in the sample output). Make a program that converts to meters.

Sample output (user input is underlined):
6'11"
2.075

Problem (7) [10 points] Find 3 possible places for errors in the following code. The lack of #include and using namespace is not an error. You can assume it is in main(). Explain specifically what causes the error and whether it is a syntax, runtime or logic error.

```cpp
cout << "Here is \"TOM\" 33 times:" << endl;
int nums = 0;
while(nums < 100) {
    if(nums%3 == 0) {
        cout << "T";
    }
    else if(nums%3 != 2) {
        cout << 'O';
    }
    else {
        cout << "M\n";
    }
    nums++;
}
```