San Francisco Bay University

CS360L - Programming in C and C++ Lab
Lab Assignment #0

Due day: 1/17/2024

Instruction:

1. Push the answer sheets/source code to Github
2. Please follow the code style rule like programs on handout.
3. Overdue lab assignment submission can't be accepted.
4. Take academic honesty and integrity seriously (Zero Tolerance of Cheating & Plagiarism)

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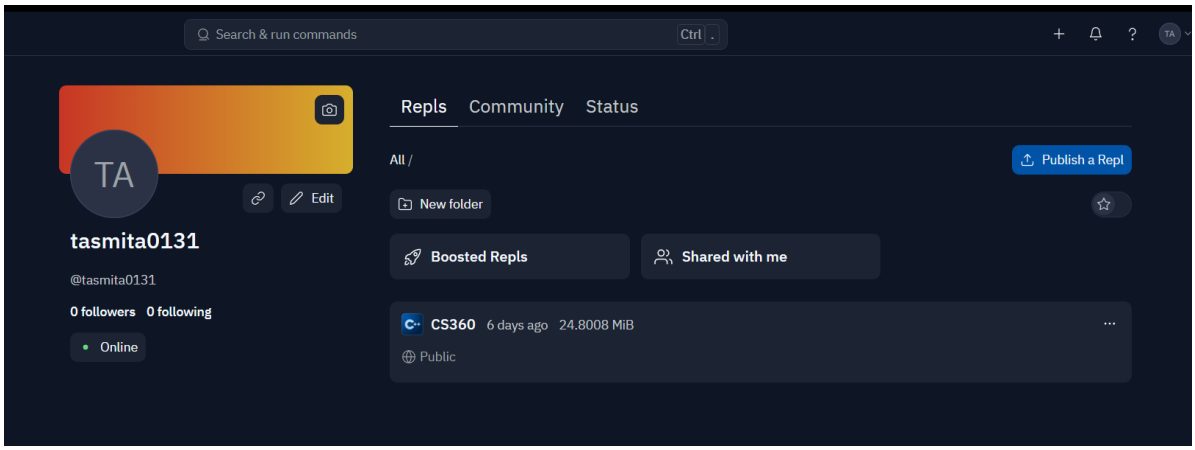
Account link: https://replit.com/@tasmita0131
https://replit.com/@tasmita0131/CS360

GITHUB LINK: https://github.com/tasmita0131/CS360_lab0000



1. Create your personal account of C++ online compiler at the following link and run the first program on it. *https://replit.com/*

```
// Program Rain calculates the average rainfall over a period
// of days. The number of days and the rain statistics are in
// file Rain.in.

#include <iostream>
#include <fstream>          // pkg is for file processing
#include <iomanip>          // for printing format on the monitor

using namespace std;
```

```
int GetInches(ifstream& rainFile, int numberOfDays);
// Function returns the total inches of rain
// Pre:  File rainFile has been opened; numberOfDays is the
//       first value on the file, followed by numberOfDays
//       real values representing inches of rain.

int main(){
        float average;          // Average rainfall
        float totalRain;        // Total accumulated rain
        int numberOfDays;       // Number of days in calculation
        ifstream  rainFile;     // Data file – read from hard drive to memory

        cout  << fixed  << showpoint;

        rainFile.open("Rain.In");
        rainFile >> numberOfDays;
        totalRain = GetInches(rainFile, numberOfDays);
        if (totalRain == 0.0)
                cout  << "There was no rain during this period."  << endl;
        else{
                average = totalRain / numberOfDays;
                cout << "The average rain fall over "
                     << numberOfDays;
                cout << " days is " << setw(1)  << setprecision(3)
                     << average  << endl;
        }

        return 0;
}
//*********************************************************
int GetInches(ifstream& rainFile, int numberOfDays){
        float inches;       // Day's worth of rain
        int counter;        // Loop control variable
        float totalRain = 0.0;
        counter = 1;
        while (counter <= numberOfDays){
                rainFile >> inches;
                totalRain = totalRain + inches;
                counter++;
        }
        return totalRain;
}
```

Notice that Data on Rain.In: 7 0.2 0.0 0.1 1.1 0.1 0.0 0.9

Creating a file named ‘Rain.In’ with the given data in the same folder.

```
~/CS360/Lab0$ echo -e "7\n0.2\n0.0\n0.1\n1.1\n0.1\n0.
9" > Rain.In
~/CS360/Lab0$ cat Rain.In
7
0.2
0.0
0.1
1.1
0.1
0.0
0.9
~/CS360/Lab0$
```

```
Lab0 > Q1.cpp
27  }
28  //*******************************************************
29  int GetInches(ifstream &rainFile, int numberOfDays) {
30   float inches; // Day's worth of rain
31   int counter; // Loop control variable
32   float totalRain = 0.0;
33   counter = 1;
34   while (counter <= numberOfDays) {
35   rainFile >> inches;
36   totalRain = totalRain + inches;
37   counter++;
38   }
39   return totalRain;
40  }
```

```
~/CS360/Lab0$ echo -e "7\n0.2\n0.0\n0.1\n1.1\n0.1\n0.
9" > Rain.In
~/CS360/Lab0$ cat Rain.In
7
0.2
0.0
0.1
1.1
0.1
0.0
0.9
~/CS360/Lab0$ g++ Q1.cpp  -o Q1_output
~/CS360/Lab0$ ./Q1_output
The average rain fall over 7 days is 0.286
~/CS360/Lab0$
```

2. Enter the editor and key in the following program. And explain the meanings of each statement

```
#include <iostream>

using namespace std;

int main (){
        int  inches;

        cout  << "Enter the number of inches on a side "
              << endl;
        cout  << "Press the return key."
              << endl;
        cin   >> inches;
        cout  << endl
              << "The area is "  << inches * inches  <<"."
              << endl;

        return 0;
}
```

```
#include <iostream>      // includes the input/output stream library
using namespace std;     // declares that the program is using the std namespace
int main () {            //main function
```

```
int inches;    //declaring inches variable will be integer

// Asking user to enter the number of inches on a side
cout << "Enter the number of inches on a side " << endl;

// Prompt the user to press the return key
cout << "Press the return key."  << endl;

// Read the user input (inches) from the standard input (keyboard)
cin >> inches;

// Showing the calculated area
cout << endl
<< "The area is " << inches * inches << "."
<< endl;

// Return 0 to indicate successful completion of the program
 return 0;
}
```

3. Write the program to check leap year as the first programming exercise, and verify your program by the following cases

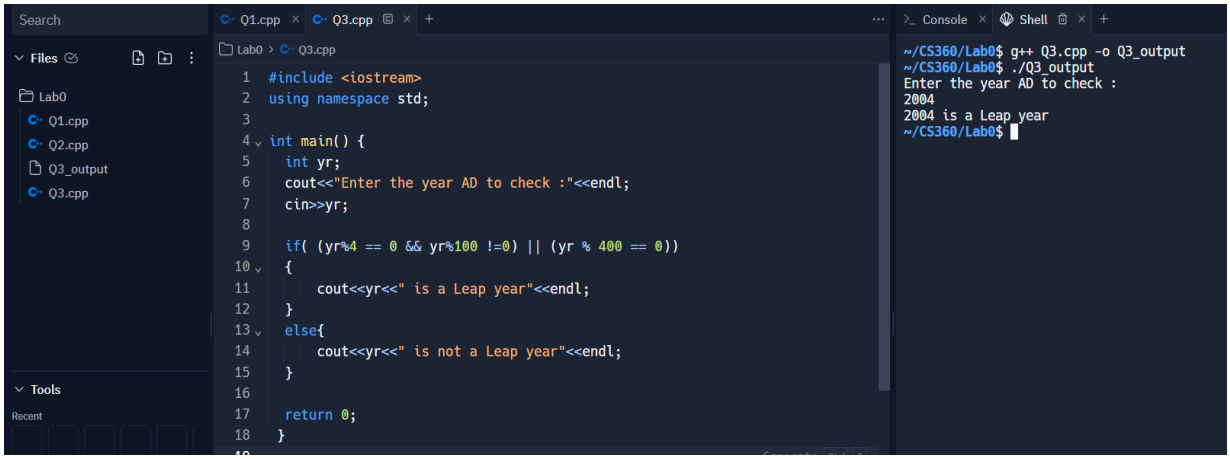
    a. The input prompt is *"Enter a year AD, for example, 1997"*
    b. Change the prompt so that the example year is *2005*

CODE:

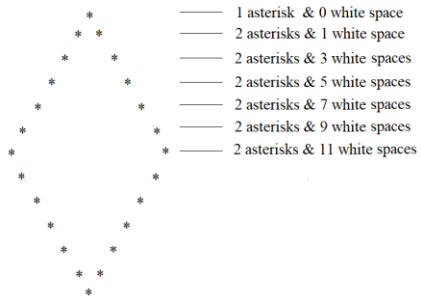
```
#include <iostream>
using namespace std;

int main() {
  int yr;
  cout<<"Enter the year AD to check :"<<endl;
```

```
 cin>>yr;

 if( (yr%4 == 0 && yr%100 !=0) || (yr % 400 == 0))
 {
    cout<<yr<<" is a Leap year"<<endl;
 }
 else{
    cout<<yr<<" is not a Leap year"<<endl;
 }

 return 0;
}
```

OUTPUT:



4. Figure out the program to print the following pattern by loop structure



CODE:

```
#include <iostream>
#include <string>

using namespace std;

int main() {
   int n = 9;
```

```
    // Upper half of diamond
    for (int i = 0; i < n; ++i) {
        cout << string(n - i - 1, ' '); // Leading spaces
        cout << "*";

        if (i != 0) {
            cout << string(2 * i - 1, ' ') << "*";
        }
        cout << endl; // End of line
    }

    // Lower half of diamond
    for (int i = n - 2; i >= 0; --i) {
        cout << string(n - i - 1, ' '); // Leading spaces
        cout << "*";
        if (i != 0) {
            cout << string(2 * i - 1, ' ') << "*";
        }
        cout << endl; // End of line
    }

    return 0;
}
```

OUTPUT: