



# 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)

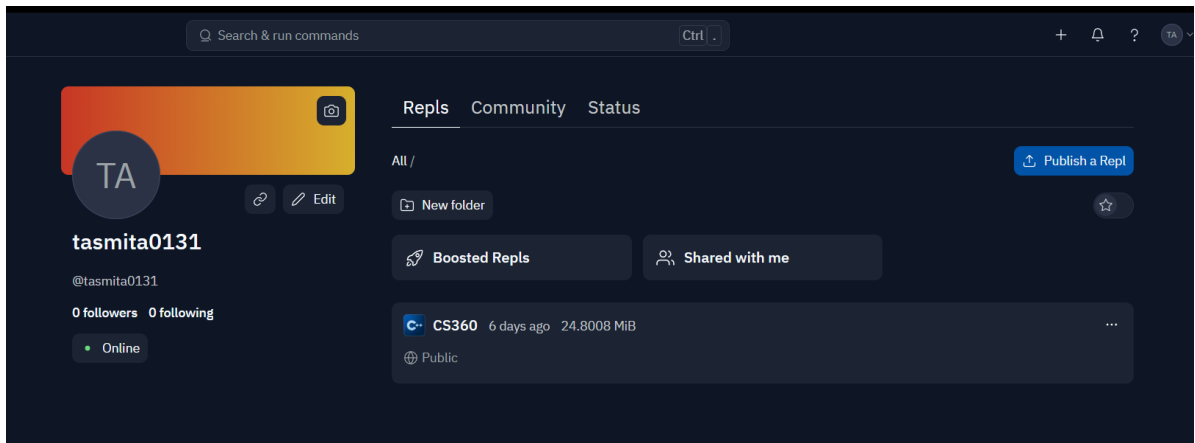
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Account link: <https://replit.com/@tasmita0131>

<https://replit.com/@tasmita0131/CS360>

GITHUB LINK: [https://github.com/tasmita0131/CS360\\_lab0000](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\n0.0\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 > C++ Q1.cpp
26 return w;
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\n0.0\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$
```

- 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;
}

```



```

Lab0 > C++ Q2.cpp
1  #include <iostream>
2  using namespace std;
3  int main(){
4  int inches;
5  cout << "Enter the number of inches on a side "
6  << endl;
7  cout << "Press the return key."
8  << endl;
9
10 cin >> inches;
11 cout << endl
12 << "The area is " << inches * inches << "."
13 << endl;
14 return 0;
15 }
16

~/CS360/Lab0$ g++ Q2.cpp -o Q2_output
~/CS360/Lab0$ ./Q2_output
Enter the number of inches on a side
Press the return key.
3

The area is 9.
~/CS360/Lab0$

```

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:

The screenshot shows a C++ IDE with a file explorer on the left, a code editor in the center, and a console on the right. The code editor displays the same C++ code as in the previous block. The console shows the execution results: the user enters '2004', and the program outputs '2004 is a Leap year'.

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

```

      *
     * *
    * * *
   * * * *
  * * * * *
 * * * * *
* * * * *
 * * * * *
  * * * * *
   * * * *
    * * *
     * *
      *

```

——— 1 asterisk & 0 white space  
 ——— 2 asterisks & 1 white space  
 ——— 2 asterisks & 3 white spaces  
 ——— 2 asterisks & 5 white spaces  
 ——— 2 asterisks & 7 white spaces  
 ——— 2 asterisks & 9 white spaces  
 ——— 2 asterisks & 11 white spaces

### 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 << "*";

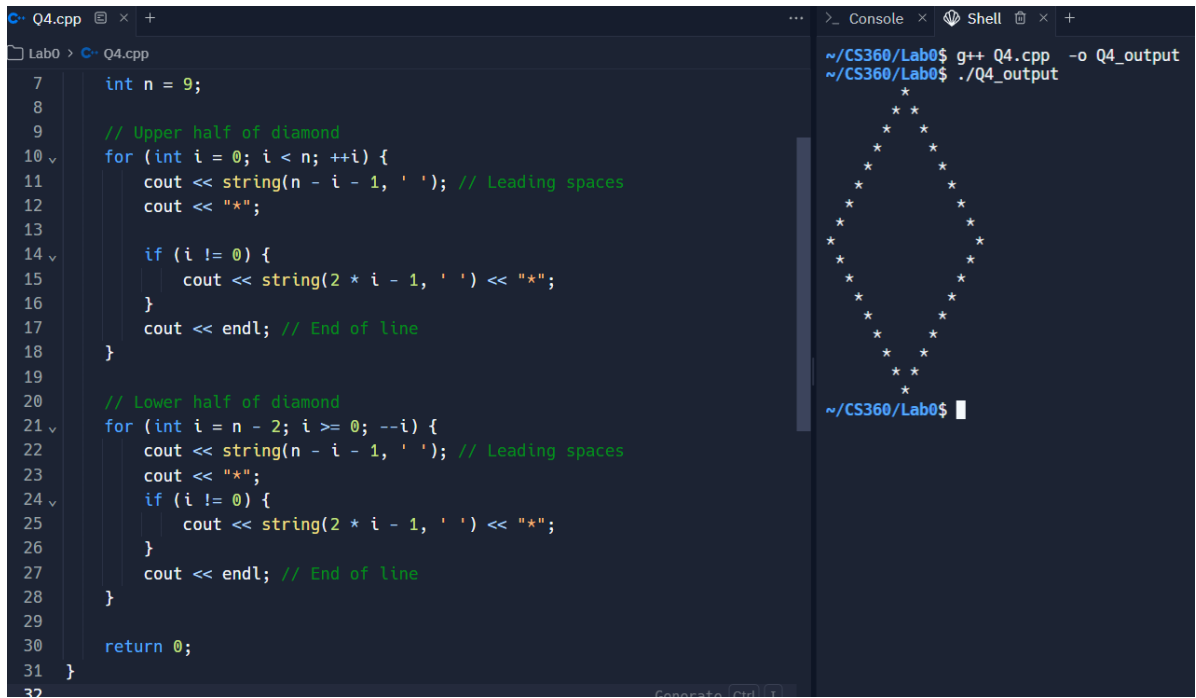
    if (i != 0) {
        cout << string(2 * i - 1, ' ') << "*";
    }
    cout << endl; // End of line
}

// 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:



```

Q4.cpp
Lab0 > C++ Q4.cpp
7   int n = 9;
8
9   // Upper half of diamond
10  for (int i = 0; i < n; ++i) {
11      cout << string(n - i - 1, ' '); // Leading spaces
12      cout << "*";
13
14      if (i != 0) {
15          cout << string(2 * i - 1, ' ') << "*";
16      }
17      cout << endl; // End of line
18  }
19
20  // Lower half of diamond
21  for (int i = n - 2; i >= 0; --i) {
22      cout << string(n - i - 1, ' '); // Leading spaces
23      cout << "*";
24      if (i != 0) {
25          cout << string(2 * i - 1, ' ') << "*";
26      }
27      cout << endl; // End of line
28  }
29
30  return 0;
31  }

```

```

~/CS360/Lab0$ g++ Q4.cpp -o Q4_output
~/CS360/Lab0$ ./Q4_output
  *
 * *
* * *
* * * *
* * * * *
 * * * *
  * *
   *
    *
     *
      *
       *
        *

```