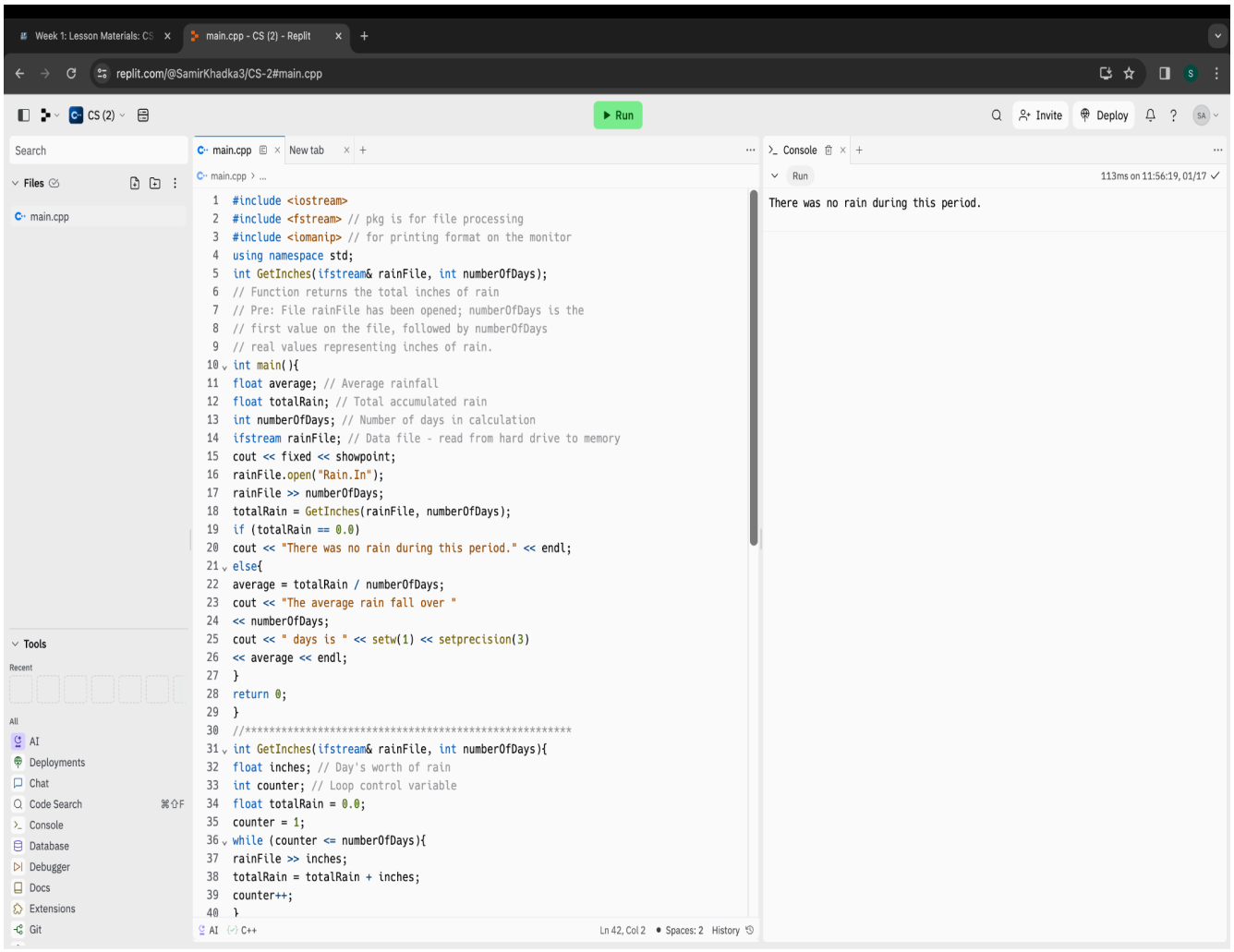
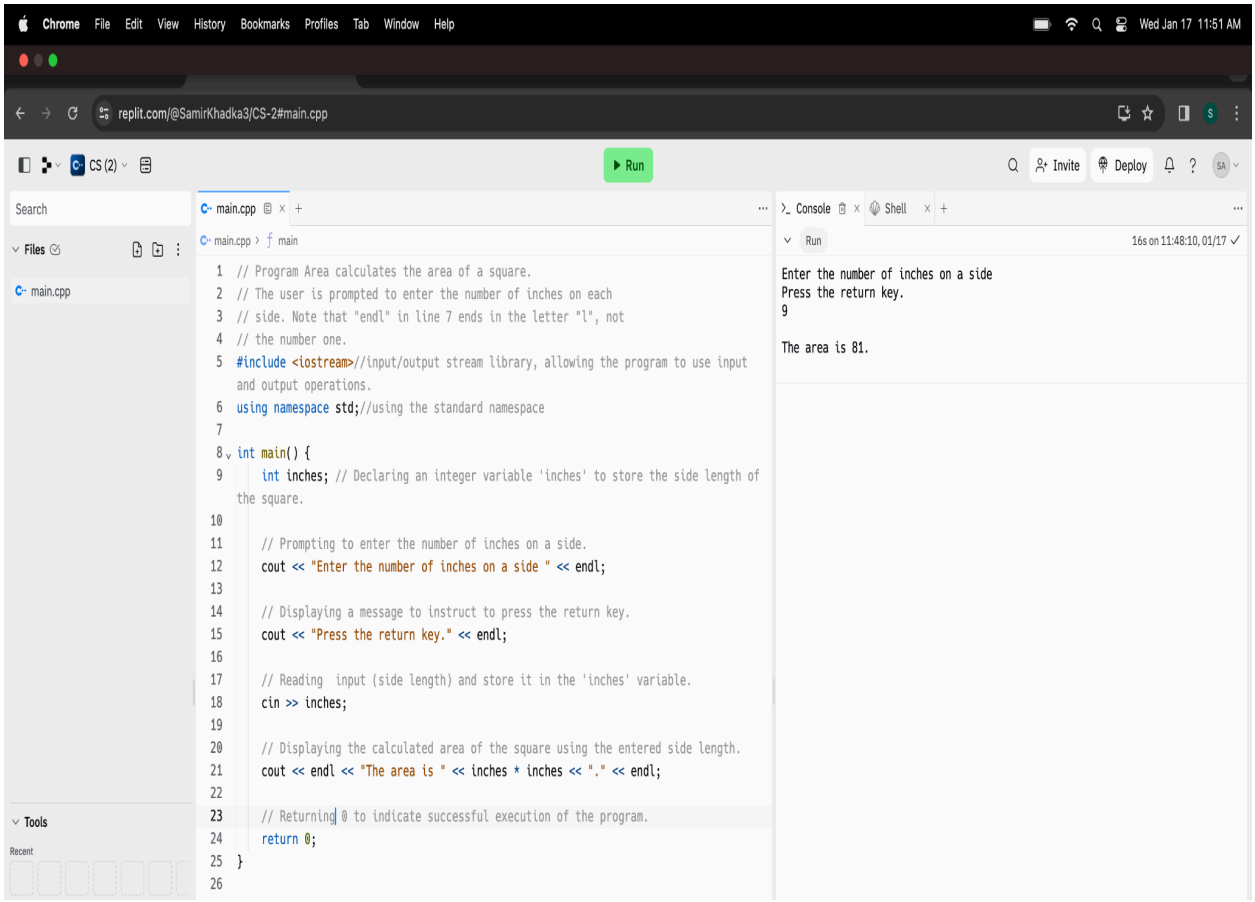
1. Create your personal account of C++ online compiler at the following link and run the first program on it.



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



- #include <iostream>: Includes the input/output stream library, letting the program use input and output operations.
- using namespace std;: Declares that the program will use the standard namespace (includes the standard C++ library components.)
- int main() {: Starting point of the program.
- int inches;: Declares an integer variable named 'inches' to store the side length of the square.
- cout << "Enter the number of inches on a side " << endl;: Prints a message, prompts the user to enter the number of inches on a side.
- cout << "Press the return key." << endl;: Instructs the user to press the return key.
- cin >> inches;: Reads the user input (side length) from the console and stores it in the 'inches' variable.
- cout << endl << "The area is " << inches * inches << "." << endl;: Calculates and prints the area of the square using the entered side length.
- return 0;: Indicates successful execution.

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.

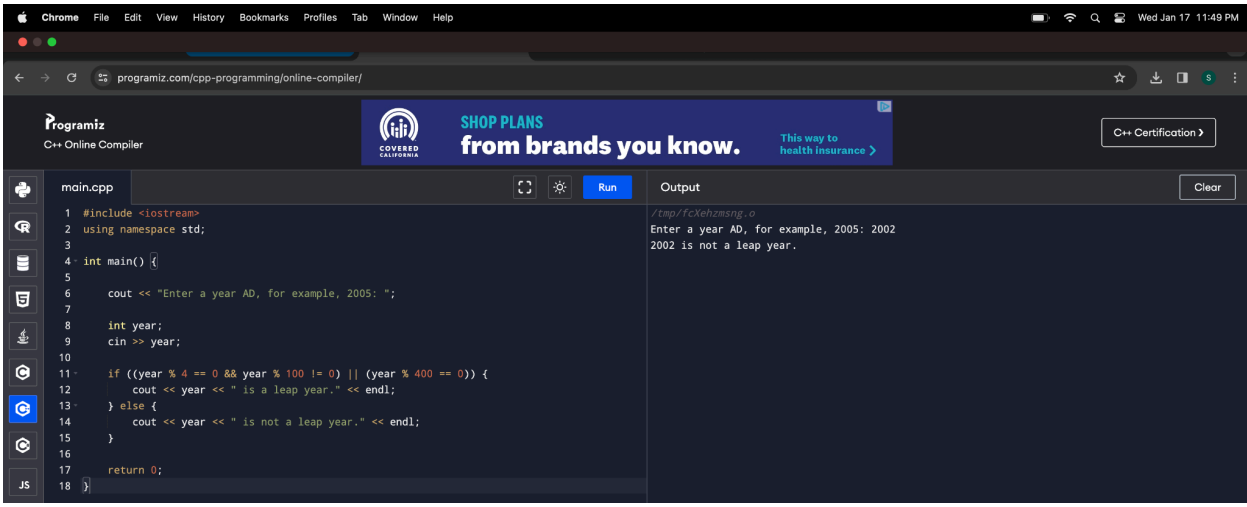
main.cpp

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

int main() {

    cout << "Enter a year AD, for example, 1997: ";

    int year;
    cin >> year;

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

    return 0;
}
```

Output

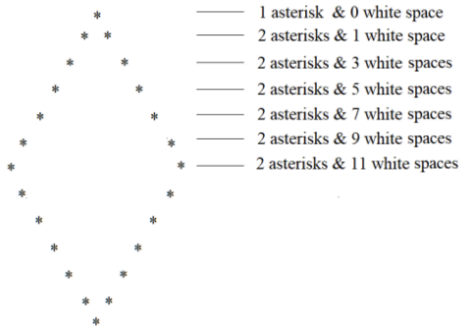
```
/tmp/fcXehzmsng.o
Enter a year AD, for example, 1997: 1997
1997 is not a leap year.
```

c. Change the prompt so that the example year is 2005



4.

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



main.cpp

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

int main() {
    int n, i, j;
    cout << "Enter number of rows: ";
    cin >> n;

    for(i = 0; i <= n; i++) {
        for(j = 0; j < n-i; j++)
            cout << " ";
        for(j = 0; j < 2*i-1; j++) {
            if(j == 0 || j == 2*i-2)
                cout << "*";
            else
                cout << " ";
        }
        cout << "\n";
    }

    for(i = n-1; i >= 1; i--) {
        for(j = 0; j < n-i; j++)
            cout << " ";
        for(j = 0; j < 2*i-1; j++) {
            if(j == 0 || j == 2*i-2)
                cout << "*";
            else
                cout << " ";
        }
        cout << "\n";
    }

    return 0;
}
```

input

```
Enter number of rows: 7

      *
     * *
    *   *
   *     *
  *       *
 *         *
*           *
 *         *
  *       *
   *     *
    *   *
     * *
      *
```