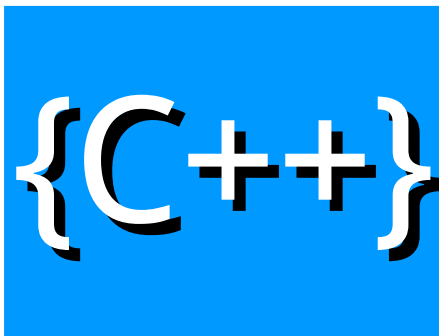




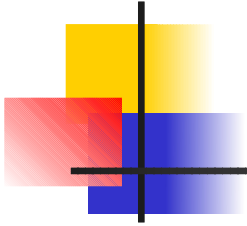
# Control Statements

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Week 3  
Nested for-loops



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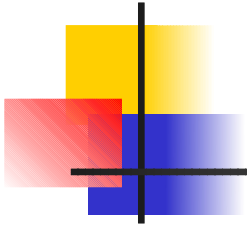


# Example

---






- Use asterisks(\*) to draw a regular triangle

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

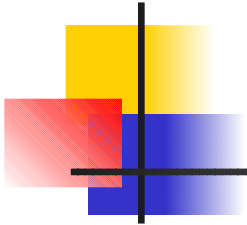


# Thought

- Find out how the graph changes

*		4		1	*
***		3		3	*
*****	=	2		5	*
*****		1		7	*
*****		0		9	*

 = space



# First Step

---

- Output the sequences of the total amounts of asterisks for each line

```
#include <iostream>
using namespace std;
int main(int argc, const char *argv[])
{
    int height = 0;
    cin >> height;
    cout << endl;
    for (int i = 1; i < 2 * height; i+=2) {
        cout << i << endl;
    }
    return 0;
}
```

1

3

5

7

9



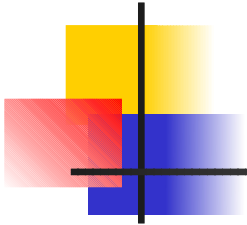
# Second Step

---

- Ignore spaces, just draw a right triangle

```
#include <iostream>
using namespace std;
int main(int argc, const char *argv[])
{
    int height = 0;
    cin >> height;
    cout << endl;
    for (int i = 1; i < 2 * height; i+=2) {
        for (int j = 1; j <= i; j++) {
            cout << "*";
        }
        cout << endl;
    }
    return 0;
}
```

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



# Last Step

## ■ Find the pattern

■ ■ ■ ■ \*

■ ■ ■ \*\*\*

■ ■ \*\*\*\*\*

■ \*\*\*\*\*

\*\*\*\*\*

=

■	*
4	1
3	3
2	5
1	7
0	9



# Last Step

- Add the condition to print spaces

```
#include <iostream>
using namespace std;
int main(int argc, const char *argv[])
{
    int height = 0;
    cin >> height;
    cout << endl;
    for (int i = 1; i < 2 * height; i+=2) {
        for (int m = height - 1 - i/2; m > 0; m--) {
            cout << " ";
        }
        for (int j = 1; j <= i; j++) {
            cout << "*";
        }
        cout << endl;
    }
    return 0;
}
```

■	*
4	1
3	3
2	5
1	7
0	9



# Week 3 Assignment

---

- Write a C++ program, let a user to input daily sales of pencils and ballpoint pens for the first four days, and use these data to draw a vertical bar graph.
- You can use asterisks(\*) or plus(+) to draw graphs.
- You should check the validity of the input values
  - Must be in the range 0~5
- You should check the validity of total daily sales
  - Must be in the range 0~5
- Use nested for-loops and condition control statements to solve this problem





# Input Format

---

## ■ Input Example

Please input the daily sales of pencils for the first four days( use a space to separate each character )

2 1 3 1

Please input the daily sales of ballpoint pens for the first four days( use a space to separate each character )

3 1 1 2



# Input and Output Format

---

## ■ Constraint

You should not use two dimension array

## ■ Output Example

\* daily sales of pencils  
+ daily sales of ballpoint pens

Total daily sales  $\leq 5$  .....▶

*			
*		*	
+		*	*
+	*	*	+
+	+	+	+
1	2	3	4

space .....▶