Q1 Print * N times

N = 5 * * * * *

```
for(int i=1; i<=N; i++){
|       print('*')
}
```

Q2 Print a grid of size N×N with a * in each cell

N = 5

	1	2	3	4	5
1	*	*	*	*	*
2	*	*	*	*	*
3	*	*	*	*	*
4	*	*	*	*	*
5	*	*	*	*	*

Rows
Columns

To iterate on rows ⟹ i
To iterate on cols ⟹ j

row 1 → print N stars
row 2 print N stars

```
for( i=1 ; i<=N ; i++){
    for(int j = 1 ; j <= N ; j++){
        print ('*')
    }
    println()
}
```

Q3 Print a rectangle of size N×M with * in each cell

N = 3 M = 5

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

```
for( i=1 ; i<=N ; i++){
    for(int j = 1 ; j <= M ; j++){
        print ('*')
    }
    println()
}
```

04 Print staircase of size N

	row	number of steps
*	1	1
N = 5 * *	2	2
* * *	3	3
* * * *	4	4
* * * * *		5

i ---- i

```
for( i=1 ; i<=N ; i++){
    for(int j = 1 ; j <= i ; j++){
        print ('*')
    }
    println()
}
```

i = 1 — 1 star

i = 2 — 2 stars

Q5 Given N, print the pattern below

N = 5

```
*
* 2
* 2 *
* 2 * 4
* 2 * 4 *
```

Observation: How is this different from the staircase ?

If column number is odd → *
even → col no

```
for( i=1 ; i<=N ; i++){

    for(int j = 1 ; j <= i ; j++){
        if( j % 2 == 0)
            print (j)
        else
            print ("*")
    }
    println ()
}
```

Q Given N, print the given pattern

N = 5

```
* _ _ _ *
* _ _ _ *
* _ _ _ *
* _ _ _ *
* _ _ _ *
```

if col no is 1 or N *

else _

```
for( i=1 ; i<=N ; i++){
    for(int j=1; j<=N; j++){
        if(j==1 || j==N)
            print(*)
        else
            print("_")
    }
    println()
}
```

Q Print pattern

		row	stars
	* * * * *	1	5
	* * * *	2	4
N = 5	* * *	3	3
	* *	4	2
	*	5	1

row + stars = N+1

stars = N+1 - row

```
for( i=1 ; i<=N ; i++){
    for(int j = 1 ; j <= N+1-i ; j++){
        print ('*')
    }
    println()
}
```

Q N = 5

```
*_____*
*____*
*___*
*__*
**
```

row	_
1	4
2	3
3	2
4	1
5	0

_ = N - row

```
for( i=1 ; i<=N ; i++){
    print (*)
    for(int j = 1 ; j <= N-i ; j++){
    |       print (' ')
    }
    print (*)
    println()
}
```

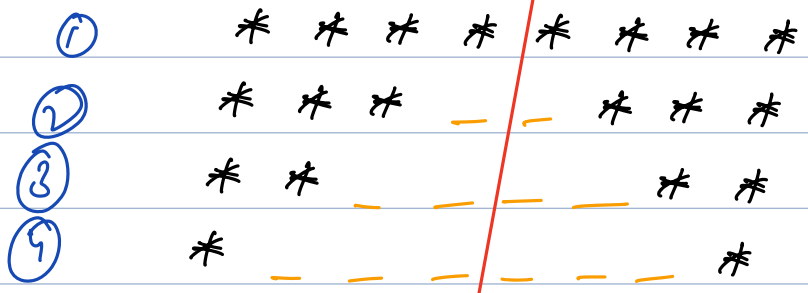
Q N = 5

```
1          *
2        * *
3      * * *
4    * * * *
5  * * * * *
```

row	spaces	stars
1	4	1
2	3	2
3	2	3
4	1	4
5	0	5

```
for( i=1 ; i<=N ; i++){
    for(int j = 1 ; j <= N -i ;j++){
        print (' ')
    }
    for(int j = 1 ; j <= i ;j++){
        print ('*')
    }
    println()
}
```

Q. N = 4



row	Left	right
1	4 *, 0 _	0 _, 4 *
2	3 *, 1 _	1 _, 3 *
3	2 *, 2 _	2 _, 2 *
4	1 *, 3 _	3 _, 1 *

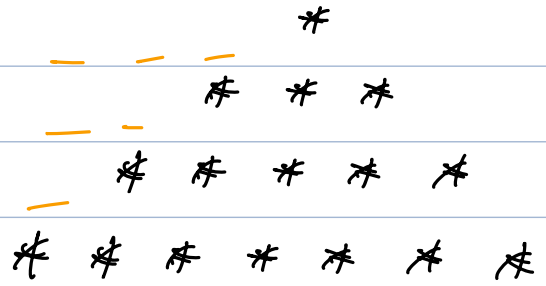
How many stars in row i?

N+1 − i

How many spaces i − 1

```
for(i=1;i≤N;i++){
    for(int j=1;j≤N+1-i;j++){
        print('*')
    }
    for(int j=1;j≤i-1;j++){
        print(' ')
    }
    for(int j=1;j≤i-1;j++){
        print(' ')
    }
    for(int j=1;j≤N+1-i;j++){
        print('*')
    }
}
```

Q N = 4



row	spaces	star		
1	3	1	2x1	-1
2	2	3	2x2	-1
3	1	5	2x3	-1
4	0	7	2x4	-1

spaces N - i

stars 2 * i - 1

```
for( i = 1 ; i ≤ N ; i++ ){
    for(int j = 1 ; j ≤ N-i ; j++){
        print (' ')
    }
    for(int j = 1 ; j ≤ 2*i-1 ; j++){
        print ('*')
    }
}
```