Ques: Print n stars "*"

N = 5 * * * * *

N = 3 * * *

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

    S.O.P ("*");

}
```

Quiz

N = 5

✓
```
for (int i = 1 ; i <= N ; i++){
        S.O.P ("*");
}
```
i = 1 2 3 4 5 ⇒ 5 times

N = 5

X
```
for (int i = 1 ; i < N ; i++) {
        S.O.P ("*");
}
```
i = 1 2 3 4 ⇒ 4 times

N = 5

X
```
for (int i = 0 ; i <= N ; i++) {
        S.O.P ("*");
}
```
i = 0 1 2 3 4 5 ⇒ 6 times

Ques. Print a square

3 x 3

N = 3

N = 5

Hello → N times

[loop]

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

    // Print N stars
    for (int j = 1 ; j <= N ; j ++ ) {
        S.O.P ("*");
    }

    S.O.Pln( ) ; // → go to the next line
}
```

N = 3

Output →

i [i<=3]	j [j<=3]
1 ✓	1 ✓
	2 ✓
	3 ✓
	4 x [break]
2 ✓	1 ✓
	2 ✓
	3 ✓
	4 x [break]
3 ✓	1 ✓
	2 ✓
	3 ✓
	4 x [break]
4 x → [break]	

Ques. Print the following stair case pattern

N = 3

```
1  *
2  *  *
3  *  *  *
```

N = 5

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

row	stars
1	1
2	2
3	3
4	4
5	5

count of stars = row

```
for (int row = 1; row <= n; row++) {

    // Print stars = row

    for (int star = 1; star <= row; star++) {
        S.O.P ("*");
    }
    S.O.Pln ();

}
```

N = 4

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

row [row <= 4]

1 ✓

2 ✓

star [star <= row]

1 [1 <= 1] ✓
2 [2 <= 1] x break

1 [1 <= 2] ✓
2 [2 <= 2] ✓
3 [3 <= 2] x break

3 ✓

1 [1<=3] ✓
2 [2<=3] ✓
3 [3<=3] ✓
4 [4<=3] ✗ break

4 ✓

1 [1<=4] ✓
2 [2<=4] ✓
3 [3<=4] ✓
4 [4<=4] ✓
5 [5<=4] ✗ break

5 ⟶ break

Ques: Print a rectangle (rows) N = 3 M = 5
(count of stars in each row)

1 * * * * *
2 * * * * *
3 * * * * *

N = 2 M = 4

1 * * * *
2 * * * *

```
int N = scn.nextInt();
int M = scn.nextInt();

// N rows
for(int row = 1; row <= N; row++) {
```

[row<=2] [star<=4]

row	star
1 ✓	1 ✓
	2 ✓

```
// Print M stars
for(int star = 1; star <= M; star++){
    S.O.P ("*");
}
S.O.Pln();
}
```

N = 2 M = 4

* * * *
* * * *

3 ✓
4 ✓
5 x break

2 ✓

1 ✓
2 ✓
3 ✓
4 ✓
5 x break

3 x → break

Ques. reversed staircase pattern

N = 3

```
1  * * *
2  * *
3  *
```

stars

3 ⇒ 4

2 ⇒ 4

1 ⇒ 4

(N+1)

N = 5

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

row + stars = N+1

⇒ stars = (N+1 - row)

N = 4

row

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

+1 ↓

stars

4 [5-1] ⇒ 5

3 [5-2] ⇒ 5

2 [5-3] ⇒ 5

1 [5-4] ⇒ 5

-1 ↓

[N+1 - row] (N+1)

```
for (int row = 1 ; row <= N ; row++) {

    // Print star = (N+1 - row)
      int x = N+1-row ; // total stars
    for (int star = 1 ; star <= x ; star++){
          S.O.P ("*") ;
    }
    S.O.P ln ();
}
```

N=3

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

(row <= 3) row	x (4 - row)	star (star <= x)
1 ✓	3	1 ✓
		2 ✓
		3 ✓
		4 (false)
2 ✓	2	1 ✓
		2 ✓
		3 (false)
3 ✓	1	1 ✓
		2 (false)
4 x	⟶	break

N = 4

row			Star
4	→	* * * *	4
3		* * *	3
2		* *	2
1		*	1

count of Stars = row

(4) → 1

```
for(int row=N; row>=1; row--){
    for(int star=1; star<=row; star++){
        S.O.P("*");
    }
    S.O.Pln();
}
```

N = 4

row		star		
0	* * * *	4	[4-0] ⇒	4
1	* * *	3	[4-1] ⇒	4
2	* *	2	[4-2] ⇒	4
3	*	1	[4-3] ⇒	4
				[N]

row + star = N

star = N - row

Ques. Print the following pattern

N=3

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

N=5

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

row

+1 ↓

1
2
3
4
5

Spaces

-1 ↓

4 [5-1] ⇒ 5
3 [5-2] ⇒ 5
2 [5-3] ⇒ 5
1 [5-4] ⇒ 5
0 [5-5] ⇒ 5
N

[N-row]

row + spaces = N

⇒ spaces = N - row

In one row → 1 * spaces [N-row] 1 *

↳ Loop

```
for (int row = 1 ; row <= N ; row++) {

    S.O.P ("*");

    // Print (N-row) spaces (-)
    for(int space = 1; space <= (N-row); space++) {
        S.O.P ("-");
    }

    S.O.P ("*");

    S.O.Pln ();

}
```

N = 3

```
*--*
*-*
**
```

row [row<=3]	space (space <= 3-row)
1 ✓	1 [1<=2] ✓ 2 [2<=2] ✓ 3 [3<=2] (break)
2 ✓	1 [1<=1] ✓ 2 [2<=1] (break)

3 ✓

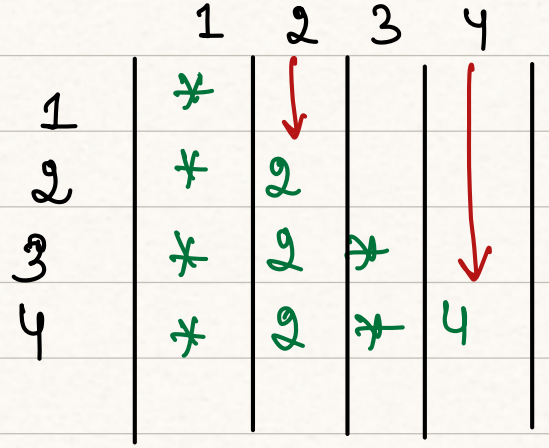
4 [break]

1 [1<=0]

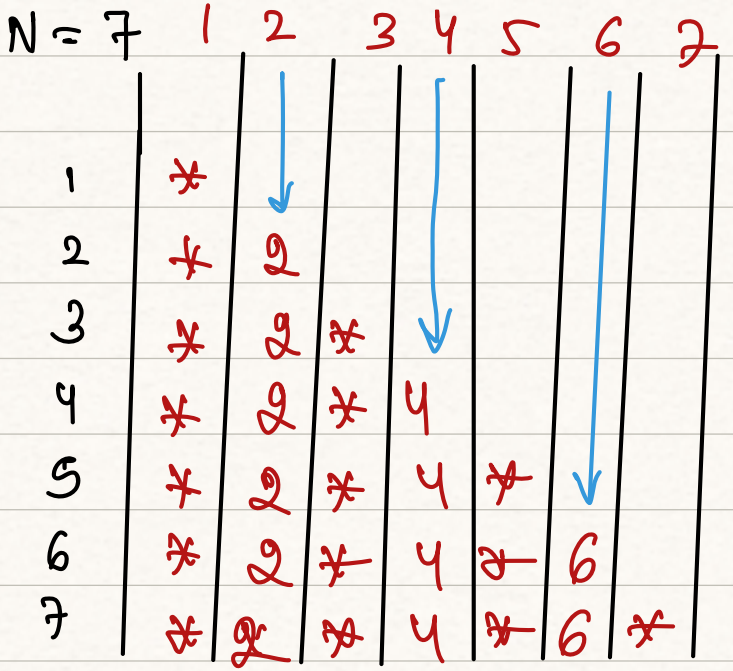
[break]

Ques. Print the following pattern

N = 4



N = 7



row	star
1	1
2	2
3	3
4	4

stars = row

```
for (int row = 1;  row <= n;  row++) {

    for (int star = 1; star <= row; star++) {

        if (star % 2 == 0) {
            S.O.P (star);
        } else {
            S.O.P ("*");
        }

    }
```

row
1 ✓
2 ✓

star
1 [1 <= 1] ✓
2 [2 <= 1] [break]
1 [1 <= 2] ✓
2 [2 <= 2] ✓
3 [3 <= 2] (break)

```
System.out.println();
}
```

N = 5

3 ✓✓

1 [1<=3] ✓✓
2 [2<=3] ✓✓
3 [3<=3] ✓✓
4 [4<=3] (break)

4 ✓✓

1 [1<=4] ✓✓
2 [2<=4] ✓✓
3 [3<=4] ✓✓
4 [4<=4] ✓✓
5 [5<=4] (break)

5 ✓✓

1 [1<=5] ✓✓
2 [2<=5] ✓✓
3 [3<=5] ✓✓
4 [4<=5] ✓✓
5 [5<=5] ✓✓
6 [6<=5] (break)

6 ⟶ break