① Star Pattern

```
0 x
1 x x
2 x x x
3 x x x x
  0 1 2 3
```

⇒ outer loop runs from (i) 0 → n-1. (0, n) ~ n times

inner loop runs from (j) 0 → i+1 (0, i+1) i+1 times

{ printing is done by inner loop

---

② inverted Star pattern.

```
0 x x x x
1 x x x
2 x x
3 x
```

outer loop ⇒ 0 → n-1

inner loop ⇒ 0 → n-i

---

③ Half pyramid pattern.

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

outer loop ⇒ 0 → n-1 (0, n)

inner loop ⇒ 0 → i+1

print j+1

---

④ character pattern.

```
A
B C
D E F
G H I J
```

For capital → 65

For small → 97

ord (char)
↳ returns unicode code of the character.

chr (65).

So basically we need to have
Char variable = 'a'
print & increment it

---

⑤ Hollow Rectangle pattern.

```
x x x x
x     x
x     x
x x x x
```

For 0, n-1 row we need to
Print (*)
else if at the 0, n-1 col.
print (*)
else
Print (space).

⑥ Inverted & Rotated Half - Pyramid Pattern.

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

3 spaces, one star — for i=0
2 spaces, 2 stars — for i=1
n-i-1 spaces in first inner loop
i+1 stars in second inner loop

---

⑦ Inverted Half Pyramid with Numbers pattern.

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

⇒ j → n-i
print (j+1)

---

⑧ Floyd's Triangle pattern.

```
1
2 3
4 5 6
7 8 9 10
```

num = 0.
j → (0, i+1)
num += 1
print (num)

---

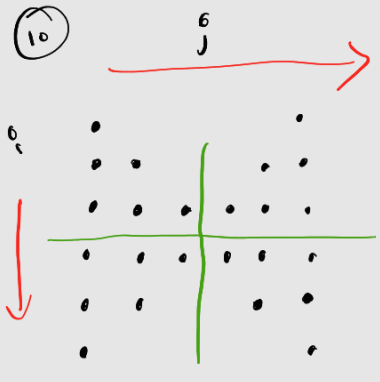
⑨ 0-1 Triangle pattern.

```
0 1
1 0 1
0 1 0 1
```

i j
0+0 = even = 1
1+0 = odd = 0 ✓

---

⑩ Butterfly pattern.



1st loop → 3 inner loops → * , — , *
i+1 2n-2i-2 i+1
6-2(0)-2
6-2-2

2nd loop → 3 inner loops
⇒ * , — , *
n-i 2i n-i

(11) Solid Rhombus pattern.

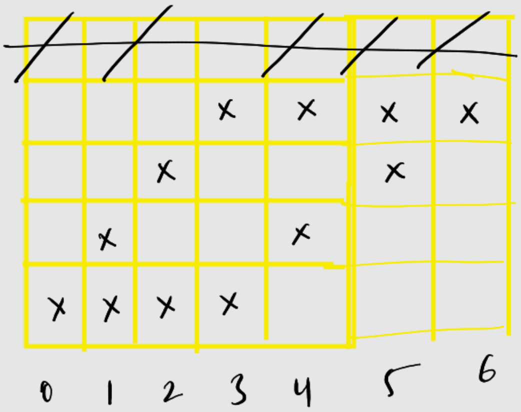
→ n-1-0
→ n-1-1
→ n-1-i

→ outer i → 0 → n-1
(0,n)

inner → j → (0, n-1-i)
print (space)

inner → J → (0,n)
print ('*')

(12) Hollow Rhombus Pattern.

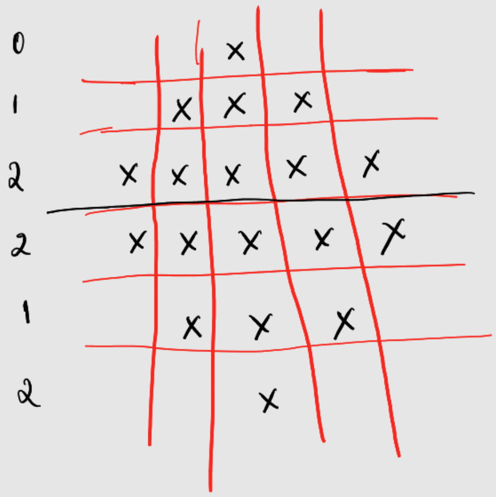


n=4
→ 2n-1. => 7.

Starting spaces
n-1-i

i=0,n-1,
J = 0,n-1 } *
else space

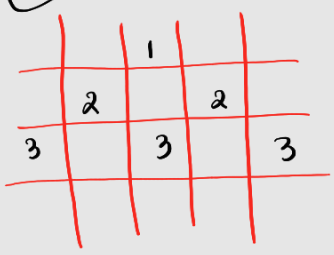
(13) Diamond pattern



i → 0 → n-1
|→ J → n-i-1 (spaces)
|→ J → 2i+1 (stars).

→ use reversed. ✓

(14)



Number pyramid.

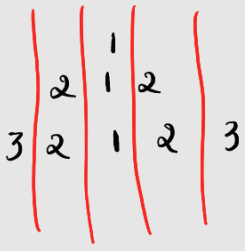
① $n = 3$.

② spaces ⇒ $n-i-1$

③ print num , space. ✓

---

(15)



Palindromic Pattern with numbers.

① $n = 3$

② Space ⇒ $n-i-1$

③ 2 loops ⇒

$i = 0 \rightarrow$ 1

$i = 1 \rightarrow$ 2 1 2

$i = 2 \rightarrow$ 3 2 1 2 3

$i = 3 \rightarrow$ 4 3 2 1 2 3 4

J+1 printed

$0 \rightarrow J = 0$

$1 \rightarrow J = 1$

$J = 2$

			1
		2	1
	3	2	1

(1, i+1)

J+1 print