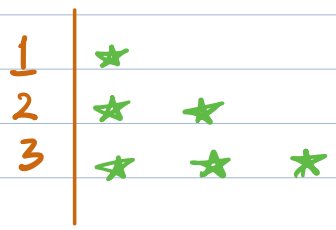
Patterns all around !

Challenge 1 : (staircase pattern)

n = 3



n = 5

=> Can we apply nested loop here ?

1 star
2 star
3 star
4 star
5 star

=>
```
for i in range(1, 6):
    print(i, end=" ")
```

1 2 3 4 5

⇒ 

⇒

```
for i in range(1,4):
    for j in range(2):
        print('*', end='')
    print()
```

if i = 1

range (i+1) → range (2) ⇒ [0, 1]
range (0, i-1) → range (0, 0) ⇒ [ ]
range (1, i) → range (1, 1) ⇒ [ ]
range (1, i+1) → range (1, 2) ⇒ [1]

range (1, 3) ⇒ [1, 2]
range (1, 4) ⇒ [1, 2, 3]

⇒

```
for i in range (1, 6):
    for j in range (1, i+1):
        print ('*', end = '')
    print ()
```

Next challenge :

n = 5

1 ★
2 ★ 2
3 ★ 2 ★
4 ★ 2 ★ 4
5 ★ 2 ★ 4 ★

n = 3

★
★ 2
★ 2 ★

n = 6

1 ★
2 ★ 2
3 ★ 2 ★
4 ★ 2 ★ 4
5 ★ 2 ★ 4 ★
6 ★ 2 ★ 4 ★ 6

```
for i in range(1, 6):
    for j in range(1, i+1):
        if j % 2 == 1:
            print('★', end=' ')
        else:
            print(j, end=' ')
    print()
```

⇒ Next challenge :

n = 3

n = 5


```
for i in range (1, N+1):
    for j in range (n - i + 1):
        print ('*', end = ' ')
    print()
```

i) find no. of rows ⇒ range (1, N+1)

ii) Count no.

iii) find relationship b/w * & each row

⇒ range (1, 6) ⇒ 1 2 3 4 5

n=5	no. of stars in each row	rows (i)
	5	$n - (i-1) \Rightarrow n - (1-1)$
	4	$n - i + 1 \Rightarrow 5 - 2 + 1 = 4$
	3	$n - i + 1 \Rightarrow 5 - 3 + 1 \Rightarrow 3$
	2	$n - i + 1 \Rightarrow 2$
	1	$n - i + 1 \Rightarrow 1$

n=5

$n - i + 1$, $i = 1$ $\Rightarrow 5 - 1 + 1 = 5$

$n - i + 1$, $i = 2$ $\Rightarrow 5 - 2 + 1 = 4$

$n - i + 1$, $i = 3$ $\Rightarrow 5 - 3 + 1 \Rightarrow 3$

$n - i + 1$, $i = 4$ $\Rightarrow 5 - 4 + 1 \Rightarrow 2$

$n - i + 1$, $i = 5$ $\Rightarrow 5 - 5 + 1 \Rightarrow 1$

Next challenge :

$n = 3$

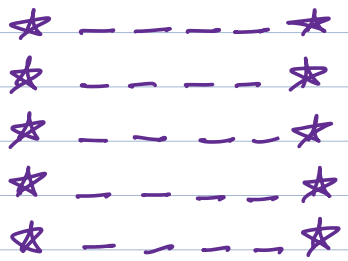
1	★ _ _ ★
2	★ _ _ ★
3	★ _ _ ★

$n = 4$

1	★ _ _ _ ★
2	★ _ _ _ ★
3	★ _ _ _ ★
4	★ _ _ _ ★

no. of elements in each row = $n+1$

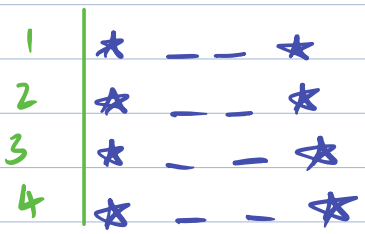
n = 5



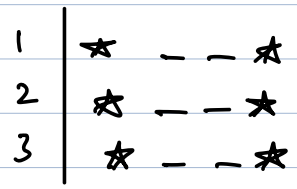
⇒ Quiz : range(N-1+1) , i = 1 , N = 5 :

⇒ range(5) ⇒ [0 1 2 3 4]

⇒ n = 4



n = 3




```
for i in range(1, N+1):
    for j in range(1, 5):
        if j == 1 or j == 4:
            print('*', end='')
        else:
            print('_', end='')
    print()
```

Actual question:

i) range (1, n+1)

ii) n+1 elements in inner.

range (1, N+2)

iii) print * in i^{st} & $(n+1)^{th}$ col

rest print space.