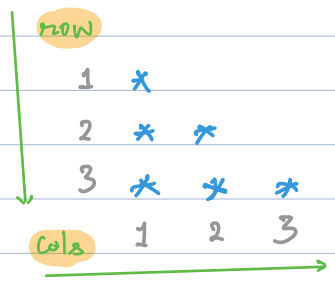
PATTERNS :

Problem 1 :

n = 3



n = 5

* Outer loop : No. of rows
* Inner loop : No. of cols in each row

Observation :

↳ The no. of rows depends on N
↳ The no. of cols depend on row no.

Approach :

i) Find no. of times you want to run outer loop.

ii) Find no. and kind of element in each col

iii) Find relation b/w i and no. of '*' in each row.

Ans :

i) range (3), range (1, 4)

⇒ range (1, 4) : 1, 2, 3 ✓✓

⇒ range (3) : 0, 1, 2

range (1, 2) — i+1

[1] empty

Code :

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

i range (1, 4)

i = 1

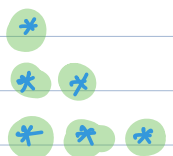
j ⇒ range (1, 2)

1

i = 2

j ⇒ range (1, 3)

1 , 2



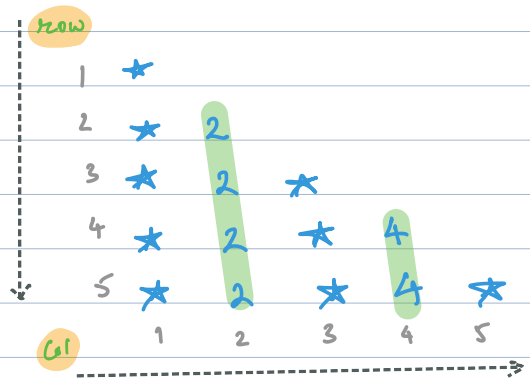
i = 3

j ⇒ range (1, 4)

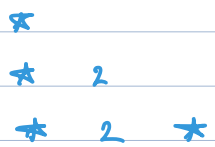
1, 2, 3

Problem 2 :

n = 5



n = 3



i) `range (1, n+1)` # outer loop

ii) `range (1, i+1)` # no. of col.

```
if col. == odd :
    print ('*')

if col == even :
    print ( col )
```

Pattern 3 :

n = 3

row	*	formula
1	* * *	3	n - 0
2	* *	2	n - 1
3	*	1	n - 2

n - (i - 1)

open ( ) ⇒ n - i + 1

n = 5

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

i) range (1, n+1) ⇒ outer loop

ii) print *

iii) range (n - i + 1) ⇒ inner loop

Pattern 4 :

N = 4

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

col : 1 2 3 4

N = 5

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

col : 1 2 3 4

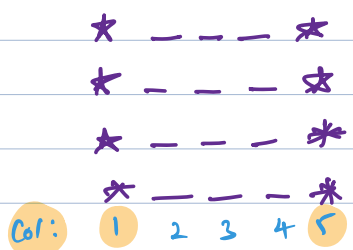
i) outer loop : range (1, n+1)

ii) range (1, 5) / range (4)

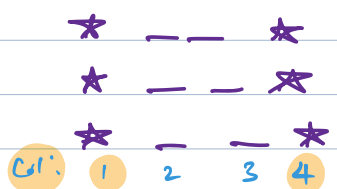
iii) if j == 1 or j == 4 :
print ('*', end = ' ')
else :
print ('_', end = ' ')

Pattern 5 :

n = 4



n = 3



inner loop : n+1

i) range (1, n+1) => outer loop

ii) range (1, n+1+1) => range (1, n+2)

inner loop