

Pattern Problems

18th - Doubt session

Agenda

- Inverted Stair
- Pattern with spaces
- Mirror Stair Pattern
- Pyramid
- Diamond Pattern

```
for i in range(—)
    for j in range(—)
```

i → Rows

j → Cols

Challenge:

Given $N = 4$, Print below Star Pattern

<u>Row = i</u>		<u>Stars</u>	<u>$N - i + 1$</u>	
1	* * * *	4	$4 - 1 + 1 = 4$	Rows = N
2	* * *	3	$4 - 2 + 1 = 3$	
3	* *	2	$4 - 3 + 1 = 2$	
4	*	1	$4 - 4 + 1 = 1$	

No of stars = $N - \underline{i} + 1$
in each row

for i in range(1, N+1):

In each row, print $N - i + 1$
stars

for j in range(N - i + 1):
print("*")

Challenge:

Given $N = 5$ print below pattern. _ indicates space

Row

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

No of rows = N

[1, N]

↓
range($1, N+1$)

- 1) Observe behaviour across rows
- 2) Observe behaviours over each row

Behaviour across each row

1) Print 1 star

2) $N-2$ spaces

3) Print 1 star

4) Print New line space

Challenge:

Given $N = 5$ print below pattern

<u>Row</u>		<u>$N-i$</u>	
1	_____*	//	spaces 4
2	___**	//	spaces 3
3	__***	//	spaces 2
4	_****	//	spaces 1
5	*****	//	spaces 0

Row = N

Across row

→ Spaces = $N-i$

→ Stars = i

Challenge:

Given $N = 5$ print below pattern

<u>rows</u>		<u>spaces</u>	<u>stars</u>	<u>$2i - 1$</u>
1	----*	4	1	$2(1) - 1 = 1$
2	---***	3	3	$2(2) - 1 = 3$
3	--*****	2	5	$2(3) - 1 = 5$
4	-*****	1	7	$2(4) - 1 = 7$
5	*****	0	9	$2(5) - 1 = 9$
			↑	

Across rows

No of rows = N

$$\rightarrow \text{spaces} = N - i$$

$$\rightarrow \text{stars} = 2i - 1$$

Break

till

10:00 AM

KISS - Keep It Simple, Stupid

Challenge:

Given $N = 5$ print below pattern

<u>Row</u>		<u>Stars</u>	<u>$N-i+1$</u>	<u>Spaces</u>	<u>$2i-2$</u>
1	*****	5	$5-1+1$	0	$2(1)-2$
2	**** * *	4	$5-2+1$	2	$2(2)-2$
3	*** * *	3	$5-3+1$	4	$2(3)-2$
4	** * *	2	$5-4+1$	6	$2(4)-2$
5	* * *	1	$5-5+1$	8	$2(5)-2$

Across rows

No of rows = N

$$\rightarrow \text{Stars} = N - i + 1$$

$$\rightarrow \text{Spaces} = 2i - 2$$

$$\rightarrow \text{Stars} = N - i + 1$$

Challenge:

Given $N = 5$ print below pattern

<u>Row</u>		<u>Stars</u>	<u>Spaces</u>	<u>$2N - 2i$</u>
1	*-----*	1	8	$10 - 2(1) = 8$
2	**-----**	2	6	$10 - 2(2) = 6$
3	***-----***	3	4	$10 - 2(3) = 4$
4	****-----****	4	2	$10 - 2(4) = 2$
5	*****-----*****	5	0	$10 - 2(5) = 0$

Across rows

No. of rows = N

$$2(N-i) = 2N - 2i$$

$$\rightarrow \text{Stars} = i$$

$$\rightarrow \text{Spaces} = 2N - 2i$$

$$\rightarrow \text{Stars} = i$$

Challenge:

Given N = 5 print below pattern

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

← Upper Diamond

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

← Lower diamond

Challenge:

Given $N = 6$, print below pattern.

Pattern A ***** → Print N stars

Pattern B * * ← 3 spaces

 * * ← 2 spaces

* * ← 1 spaces

** ← 0 spaces

Pattern C * → Print 1 star

Pattern B → Rows = $N-2$ $N=6$

→ Star

→ Spaces = $N-i-2$

→ Star

		<u>spaces</u>
$i=1$	<u>* *</u>	3
$i=2$	<u>* *</u>	2
$i=3$	<u>* *</u>	1
$i=4$	<u>**</u>	0

Range - $[1, 4]$
 $[1, N-2]$
↓
 $\text{range}(1, N-1)$

Challenge:

Given $N = 5$, print the following pattern

Row Length = i No of rows = N

1	1	1
2	1_2	2
3	1_2_3	3
4	1_2_3_	4
5	1_3_5	5

Col numbering - [1, i]
↳ range(1, i+1)

Across rows

→ Printing odd nums &
space at even positions

for i in range(1, N+1):

for j in range(1, i+1):

If j is odd → print j

If j is even → print space

if j % 2 == 1 : ← odd

print(j, end="")

else:

print(" ", end="")

print()

Doubts

Thank
you

Next - Doubt session 10th

Next Class - Monday (21st)

↳ If you clear the transition test

Good
Night

Thank
You

Monday
(21st)