20th April 2021

Previous Day:-

- loops
  - for loop
  - while loop
- right angle pyramid
  - printing pyramid using for loops
  - printing pyramid using while loops
- MCQs

Python loops 1:-

Lecture Flow:-

Pyramid questions

Topics and Explanation:-

Question 1:-

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doing it with two loops

```
1    # using for loop
2    a=int(input("Enter a number: "))
3    print("using for loop")
4    for i in range(1,a):
5        print("*"*i)
6    for i in range(a,0,-1):
7        print("*"*i)3
8
9    # using while loop
10   print("using while loop")
11   i=1
12   while i<=a-1:
13       print("*"*i)
14       i=i+1
15   i=a
16   while i>=0:
17       print("*"*i)
18       i=i-1
```

for the first 3 lines given in the picture below we are using 1st for / while loop (line4,5 / line11,12,13,14)

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```
4    for i in range(1,a):
5        print("*"*i)
```

```
11   i=1
12   while i<=a-1:
13       print("*"*i)
14       i=i+1
```

for the next 2 lines given in the pictures below we are using 2nd for / while loop (line 6,7/ line 15,16,17,18)

```
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```

```
6    for i in range(a,0,-1):
7        print("*"*i)3
```

```
15    i=a
16    while i>=0:
17        print("*"*i)
18        i=i-1
```

doing it with single loop

```
68    n = input("enter in number of lines: ")
69    n = int(n)
70    for line_number in range(1, n+1):
71        if line_number <= (n//2 + n%2):
72            print("*"*line_number)
73        else:
74            print("*"*(n-line_number+1))
75
```

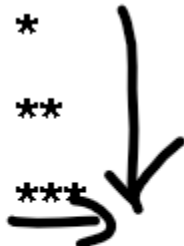In line 70 shown in the above picture, the loop will run upto n times given by the user.
In line 71 shown in the above picture, it divides the line in two half as shown in the picture below, apply formula->   line_number <=(n//2 + n%2):

```
61    # *
62    # **
63    # *** (5//2 = 2) + (5%2 = 1)
64    # **
65    # *
```

line 72, print("*"*line_statement) print the star in straight increasing order

```
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```

In line 74, print("*"*(n-line_number+1)) print the star in the decreasing reverse order

```
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```

Question 2:-

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

or

```
//*//
/***/
*****
```

```
91    print(" "*2, end="")
92    print("*"*1, end="")
93    print(" "*2, end="")
94    print()
95    print(" "*1, end="")
96    print("*"*3, end="")
97    print(" "*1, end="")
98    print()
99    print(" "*0, end="")
100   print("*"*5, end="")
101   print(" "*0, end="")
102   print()
```

using for loop

Note:- to obtain the series of odd numbers (eg., 1,3,5,7,9....) there is a formula 2n-1.

```
144   num = int(input("enter no; "))
145   for line in range (1, num+1):
146      print(" "*(num-line),"*"*(2*line -1)," "*(num-line))
```
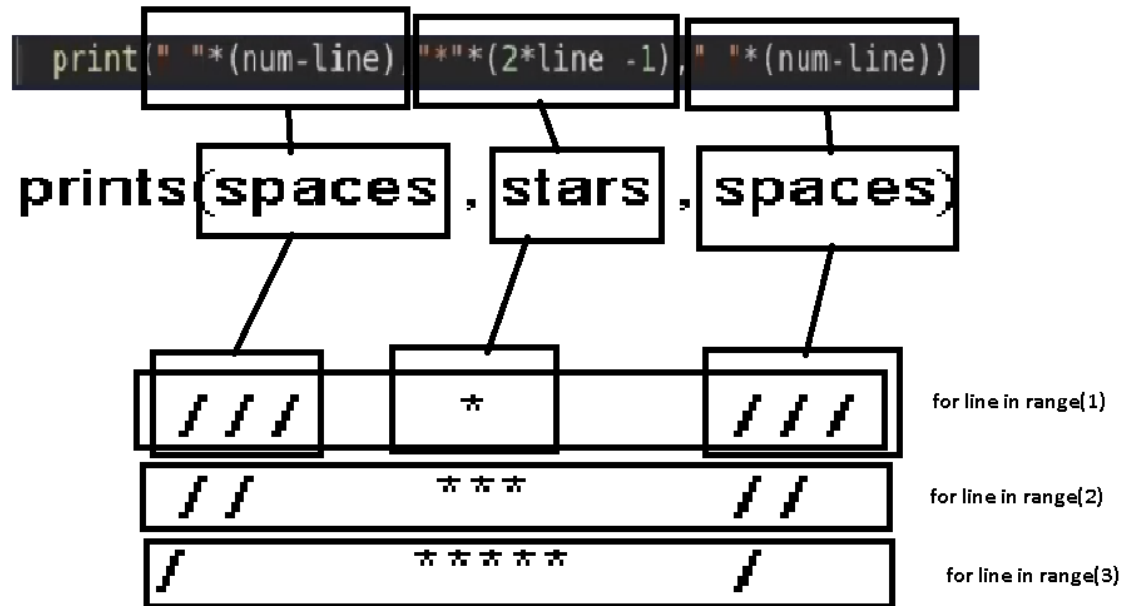
In this above image,
In line 144 user have given input, let's say num=3
In line 145 loop runs from 1 to num
In line 146 it prints(spaces , stars , spaces)

```
/ / /      *        / / /
/ /       ***       / /
/        *****       /
```

```
print(" "*(num-line)"*"*(2*line -1)," "*(num-line))
```

prints(spaces , stars , spaces)

/ / /	*	/ / /	for line in range(1)
/ /	* * *	/ /	for line in range(2)
/	* * * * *	/	for line in range(3)

using while loop

```
144    line_number = 1
145    while line_number <= n:
146        print(" "*(n-line_number), end="")
147        print("*"*(2*line_number-1), end="")
148        print(" "*(n-line_number), end="")
149        print()
150        line_number = line_number + 1
```

In the below image (2 * line_number-1) is similar to the formula 2n-1, it prints odd number stars.

```
147        print("*"*(2*line_number-1), end="")
```

MCQs:-

What is the set of values of range(1, 11, -2)?

☐ 11, 9, 7,5, 3, 1	8.33%
☐ 11, 9, 7, 5, 3	8.33%
☑ None of the above	83.33%

what is the output of?

```
line_number = 3
while line_number > 0:
  print(" "*(n-line_number), end="")
  print("*"*(2*line_number-1), end="")
  print(" "*(n-line_number), end="")
  print()
  line_number = line_number - 1
```

[/ means space]

☐ ***** /n *** /n *	13.89%
☐ * /n ** /n ***	50%
☑ ***** /n /***/ /n //*//	36.11%

n=3, in the above problem and it prints reverse pyramid

What is the equivalent for loop of this while loop:

I = 10

while I > 0:

 I = I - 2

☐ for i in range(10,0,1)	2.56%
☐ for i in range(10,0,2)	12.82%
☐ for i in range(10,2,-2)	17.95%
☑ for i in range(10,0,-2)	69.23%

In this pattern with one loop, how do you find the halfway point?
[n = no. of lines]

```
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```

☐ n/2	2.7%
☐ n//2	5.41%
☐ n//2+1	24.32%
☑ n//2+n%2	70.27%