Loops — 2

Today's Agenda

1 — Recap

2 — Range

3 — For Loops

4 — Problem Solving

      → Print 1 to N

      → Print odd numbers from N to 1

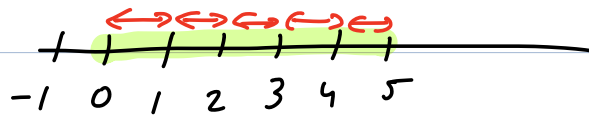5 — Pattern Printing

      → Stars in a row

      → Square of * of size N×N

range   print all numbers from 0 to 5

                                      ⟶ start = 0 | i = 0
(i)   range(6) ⟶ end = 5 | while i <= 5 :
                      ↑ | print (i)
List   [0, 5] | i += 1
                               [0, 6)
       [0, 1, 2, 3, 4, 5]
       ⟵——————————⟶
                6

       -1 0 1 2 3 4 5

          Print   a   range of numbers from 0 to 5.

              0 → 1 → 2 → 3 → 4 → 5.

maths {
notation
           Range   (Open and
           [0, 5]   =>   0, 1, 2, 3, 4, 5   closed
                                                     interval)
           [0, 6)   =>   0, 1, 2, 3, 4, 5
           (0, 6)   =>   1, 2, 3, 4, 5

       [=> included   (=> excluded
       ]   )

       (0, 5]   =>   1, 2, 3, 4, 5

$$1,2,3,4,5$$

$$[1,6)$$

ii) range$(1, 6)$ The end. point is

            ↑   ↑   not included.

           start   end.

$$[1,2,3,4,5]$$

                                     end $-$ start

range$(2, 8)$ $2,3,4,5,6,7$ $8-2=6$

default
inc$=1$.

range$(1, 7)$ $1,2,3,4,5,6$ ~~7~~ $7-1=6$

Maths $[1, 7)$ count how many numbers.

             $= 7-1 = 6$

       $[1, 7]$ $1,2,3,4,5,6,7$

            $= (7-1)+1 = 7$

$$\overset{2}{\overset{\curvearrowright}{1,}} \overset{2}{\overset{\curvearrowright}{3,}} \overset{2}{\overset{\curvearrowright}{5,}} \overset{2}{\overset{\curvearrowright}{7,}} 9$$

iii)   range(1 , 10 , 2)
              ↑   ↑   ↵ increment/step

          start   end

          [1,10)   increment

*   range (10, ⑫ -2)   =   [ ]

                                              > end

← ← ← ← ← ← ⊙   •   Is 10 > 12 ?

−2   0   2   4   6   8
                          Start=10   end =12

*   range (10, 0, −2)   [10, 8, 6, 4, 2]

          ↑ ← ← ← ← ← ↑
              2   4   6   8
          end=0   Start=10

          > end

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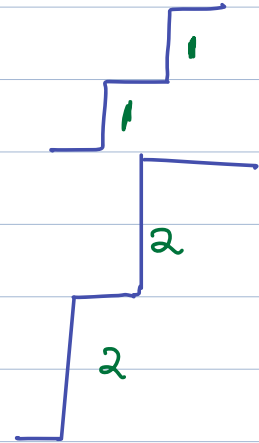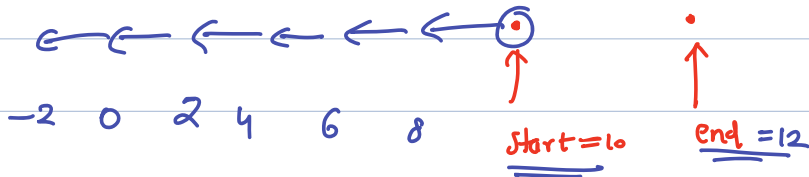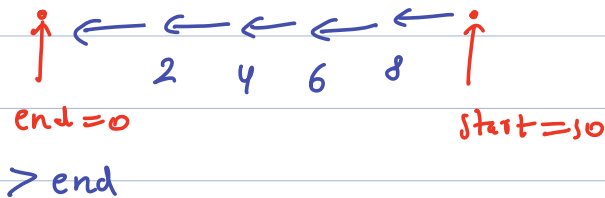
positive increment =) | nums   < end |
          tve

negative   increment =) | nums > end |
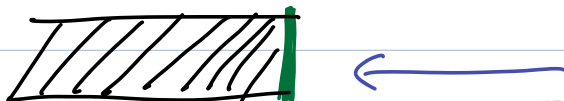
Quizzes

range (5, 9, 3)   < 9   5 → 8   [5, 8]

range (9, 0, -1)   > 0   9 → 8 → 7 → 6 → 5 → 4 → 3 → 2 → 1
                            [9, 8, 7, 6, 5, 4, 3, 2, 1]

range (1, N)   =) cnt of numbers
               N-1 numbers   [1, 2, 3 - -. N-1]

range (9, 5, 4)   = [ ]

|
end=5   start=9
           +4 +4
         •—→ —→ —→

start

Q1. Find the sum of all the numbers from ① to N.

We can't use a while loop.

N = 5

[1, 2, 3, 4, 5]

range (1, 6)   inc = 1

N+1

sum = 0

↳ sum = 1   +1   Prakash
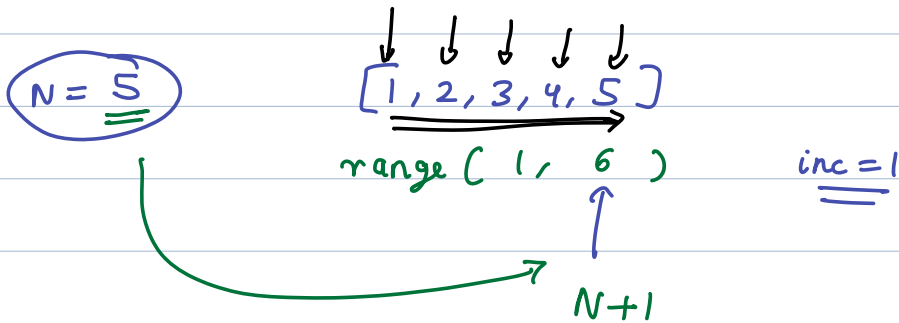
↳ sum = 3   +2   Afridi

↳ sum = 6   +3   Harshita

↳ sum = 10   +4   Himanshu

↳ sum = 15   +5   Mohd   → i

[1, 2, 3, 4, 5]

process
=
iteration   {

sum = 0

for ⓘ in range(1,6):

sum += ⓘ

iterator   iterable.

$$1 \longleftarrow \quad |$$
$$N = 10$$

a.)   **Print odd** numbers from N to 1.
$$\underline{(N >= 1)} \qquad \boxed{> 0}$$

✓   N = 5

$$5 \qquad 3 \qquad 1$$

range $(5, 0, -2) \Rightarrow [5, 3, 1]$

N = 6

$$\hookrightarrow \boxed{5} \quad 3 \quad 1$$

~~range $(6, 0, -2) \Rightarrow [6, 4, 2]$~~ ✗

N = 7

range $(7, 0, -2) \qquad 7 \quad 5 \quad 3 \quad 1$
$$\hookrightarrow [7, 5, 3, 1]$$

$$\boxed{\text{range } (N, 0, -2)}$$

N = 10
$$\hookrightarrow \boxed{9} \quad 7 \quad 5 \quad 3 \quad 1$$

N = 3 \qquad range $(3, 0, -2)$
$$\Rightarrow [3, 1]$$
$$3 \quad 1$$

N = 1 \qquad range $(1, 0, -2)$
$$\Rightarrow [1]$$
$$1$$

---

odd   num   N $\Rightarrow$ range $(N, 0, -2)$

even   num   N $\Rightarrow$ range $(N-1, 0, -2)$

N = 10

$$-2 \quad -2 \quad -2 \quad -2 \quad N$$

$$1, \quad 2, \; 3, \; 4, \; 5, \; 6, \; 7, \; 8, \; 9, \; 10$$

$$O \quad E \quad O \quad E \quad O \quad E \quad O \quad E \quad O \quad E$$
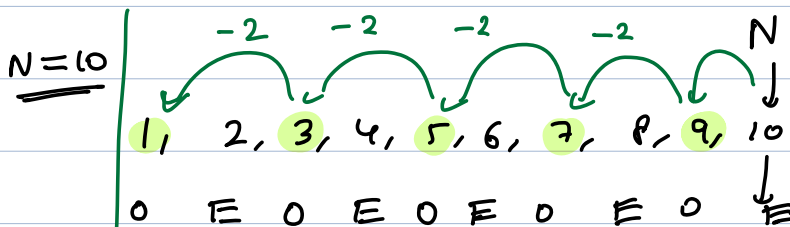
$$\boxed{0} = \text{end} \qquad\qquad \boxed{\underline{N-1}} = \text{start}$$

if   N   is   even $\Rightarrow$ range $(\underline{N-1}, \underline{0}, -2)$

N = 9 | 1, 2, 3, 4, 5, 6, 7, 8, 9

N is odd =>

range (N, 0, -2)

end = 0   start
                 = N
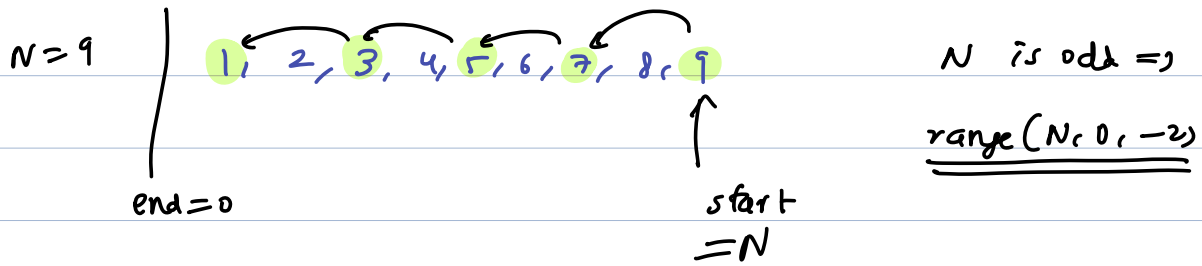
=> **Pattern printing**

```
N = int (input())
for i in range (N):
    print("*", end = "")
```

0 1 2
* * *

N = 3   * * *

Challenge: Given N as input, print a square of *
of size N×N.

N = 2   * *
               * *

N = 4   * * * *
               * * * *
               * * * *
               * * * *

N = 3   → * * *
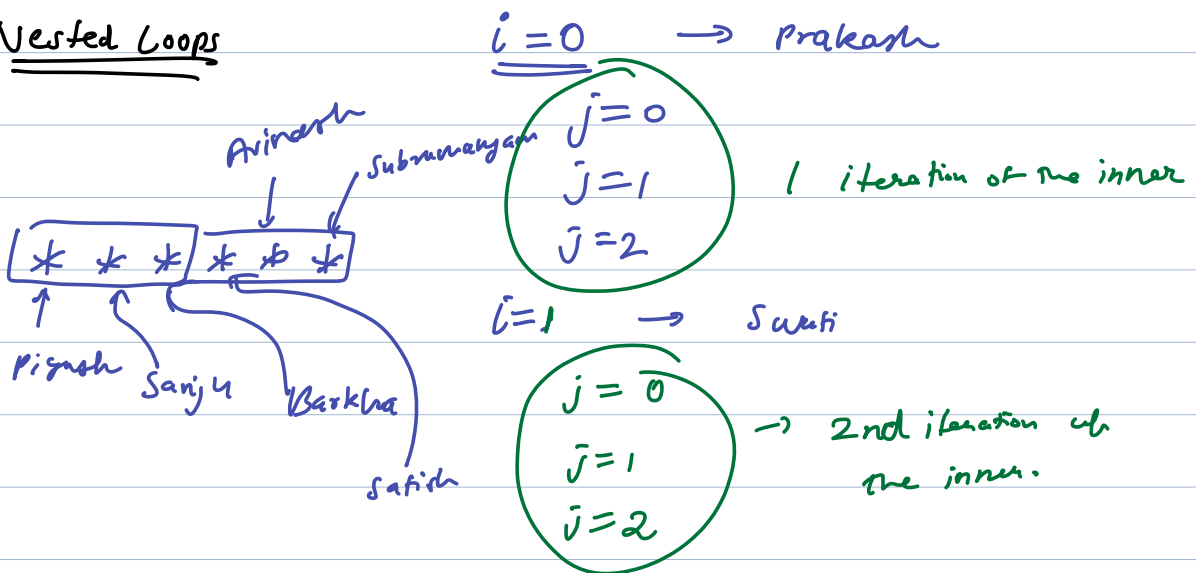   → * * *
           → * * *

$i=0$ $i=1$

N=3

* * * * * *

range(2)
= [0,1]

for   i   in   range(2) :

    for   j   in   range(N):

       print('*', end="")

range(3)=

[0,1,2]

Nested Loops

$i=0$ → Prakash

Avinash

Subramanyam

$j=0$
$j=1$
$j=2$

I iteration of the inner

* * * * * *

Pigush   Sanju   Barkha

Satish

$i=1$ →   Swati

$j=0$
$j=1$
$j=2$

→ 2nd iteration of
the inner.

function

Doubts

end

range(N)

range(1, N)
   ↑ ↑
  start end

range(1, N, 1)
 ↑ ↑ ↑
start end inc.

range function

range()

print()

[   ]