Nested Loops

Agenda

- Reverse a number
- HCF
- Print N stars
- Print N*M star grid
- Stair Pattern

Combine two numbers

2 digits

10's place x	1's place y		Result
9	7	→ 9 x 10 + 7 =	97
2	5	→ 2 x 10 + 5 =	25
1	6	→ 1 x 10 + 6 =	16
7	4	→ 7 x 10 + 4 =	74
x	4	x x 10 + y	

x x 10 + y → 10x + y

Print all digits

792 → 2 9 7

N = 7 9 2 —N%10→ 2

r = N%10
print(r)

792 // 10 = 79 ✓

792 % 10 = 2

N % 10 → last dijit

N = 792 —N = N//10→ 79

N=79 —N%10→ 9

N=79 —//10→ 7

N=7 —N%10→ 7

N=7 —//10→ 0

1) Print last digit of N (N%10)

2) N = N // 10 Update N
Discard the last digit

3) Stop when N = 0

```
N = int(input())
while N > 0 :          or N != 0
    lastDigit = N%10
    print(lastDigit)
    N = N // 10
```

Reverse a number

N = 792 → 297

x = 0

while N > 0 :

y = N % 10

x = 10x + y

N = N // 10

print(x) # 297

↑ Reverse of N

Reverse at any given point

N	y	x = 0
792	2	2
79	9	29
7	7	297
0		

10(29) + 7

290 + 7 = 297

HCF

GCD - Greatest Common Divisor

Highest Common factor

15 : 1, 3, 5, 15

20 : 1, 2, 4, 5, 10, 20

Common : 1, 5

↑

HCF / GCD

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gcd(6, 8)

6 : 1, 2, 3, 6

8 : 1, 2, 4, 8

Common : 1, 2

---

gcd (17, 51)

17 : 1, 17

51 : 1, 3, 17, 51

Ans = 17

Common factors –

Range :

Smallest – 1

Largest – min(A, B)

[1, min(A,B)] → range(1, min(A,B) + 1)

```
A = int(input())
B = int(input())
hcf = 1
for i in range(1, min(A,B)+1):
    # Look for common factor
    if A % i == 0 and B % i == 0:
        # i is a common factor
        hcf = i
print(hcf)
```

You can also solve this problem with a reverse loop

Break till 10:15 AM

LCM — Lowest Common Multiple

10 : 10, 20, 30, 40, 50, 60 .....

15 : 15, 30, 45, 60, 75, 90 .....

LCM = 30

---

lcm(6, 8)

6 : 6, 12, 18, 24, 30, 36, ...

8 : 8, 16, 24, 32, 40, 48 .....

LCM : 24

---

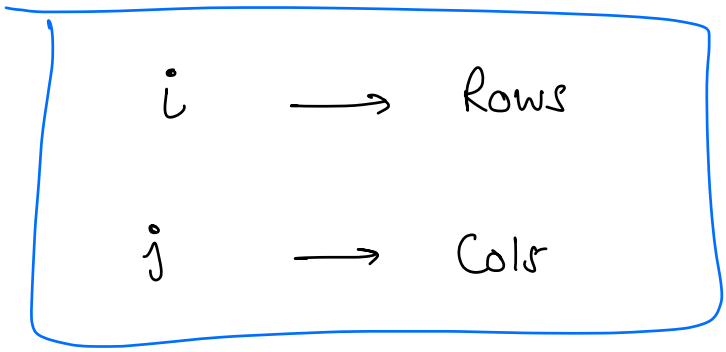
1) Using loops

2) Use some formula ← Simpler Faster

Pattern Problems

Nested Loops

↳ 2D Arrays



Challenge:

Given N, print N no of stars.

For N = 5,

* * * * *

N = 3

* * *

Challenge:

Given N = 3 , M = 5 print

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

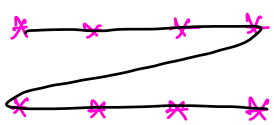
i → Rows N

j → Cols M

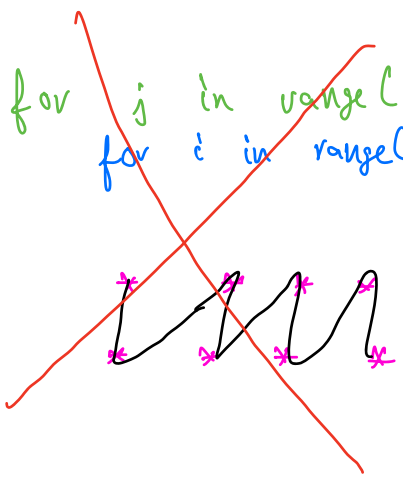
N rows

M cols

```
for i in range(N):
    for j in range(M)
```



```
for j in range(M):
    for i in range(N):
```



This is possible

← Print N rows

```
for i in range(N):
    # In each row, print M stars
    for j in range(M):
        print("*")
```

Challenge:

Given N = 4, Print Below Star Pattern

```
i
1 *
2 * *
3 * * *
4 * * * *
```

Rows = N

Row - [1, N]

for i in range(1, N+1)

for each row,
no of stars = Row no (i)

```
for i in range(1,N+1):
    # Row no = i
    # Print i stars
    for j in range(i):
        print("*", end='')
    # After stars, new line
    print()
```

```
N = 5
for i in range(1, N+1):
    for j in range(i):
        print(j+1, end='')
    print()
```

[1,2,3,4,5]

	range(i)	Output
i=1	0	1
i=2	0,1	1 2
i=3	0,1,2	1 2 3
i=4	0,1,2,3	1 2 3 4
i=5	0,1,2,3,4	1 2 3 4 5

Doubts

Thank
You

OOPS Basics → Intermediate

print() → end = "\n" (New line char)
print() → sep = " " (Space)

range (4)
↓
0, 1, 2, 3

start = 0 (default)
end = 4
inc = 1 (default)

range (1, 5)
↓
1, 2, 3, 4

start = 1
end = 5
inc = 1 (default)

HCF

A = 20 , B = 25

1, 5

1, min(20, 25)

[1, 20]

A = 10, B = 20

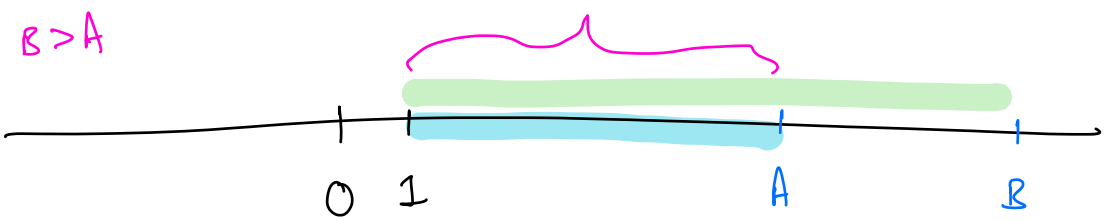
1, 2, 5, 10

Range of factors

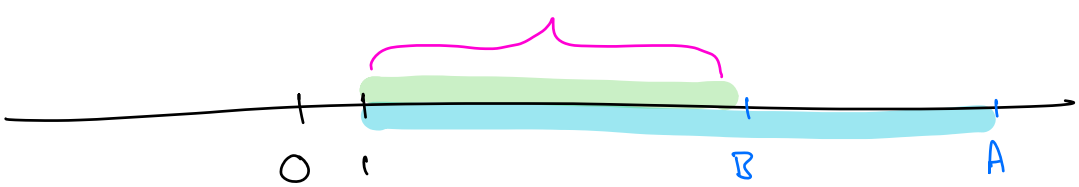
A → [1, A]

B → [1, B]

B > A



A > B



min(A , B)

Indentation Issues

→ Use tabs
→ Use VS Code / Pycharm

Good Night

Thank You

Monday

Doubt Session - Sunday 9 PM