Problem solving session :

i) factorial of a number
ii) factors of a number
iii) HW 3 (count no. of digits)
iv) HW 4 (Sum of digits)
v) Convert binary to decimal
vi) Count of 1s in a Binary no.

Q.1) Find factorial of a number n.

Ans : n! => factorial of n

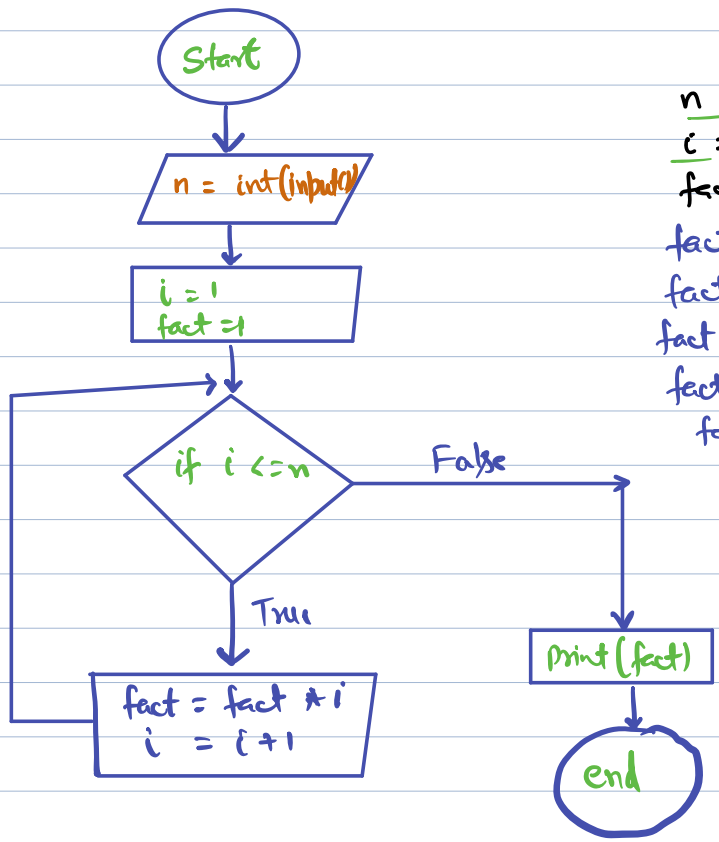
=> 5! = 1 x 2 x 3 x 4 x 5 => 120

=> 6! = 1 x 2 x 3 x 4 x 5 x 6 => 720

=> exception => 0! => 1

i	fact = fact * i
1	1
2	1 x 2 => 2
3	2 x 3 => 6
4	6 x 4 => 24
5	24 x 5 => 120

★ Flow chart :



n = 5

i = 1 2 3 4 5 6

fact = 1

fact = 1x1

fact = 1 x 2 => 2

fact = 2 x 3 = 6

fact = 6 x 4 = 24

fact = 24 x 5 = 120

fact = 120

1 x 2 x 3 x 4 x 5

n => ..... n

```
n = int(input())   # fact of n
fact = 1
i = 1

while i <= n :
    fact = fact * i      =) fact *= i
    i = i + 1
print(fact)
```

Q.2) find all the factors of a number?

Ans:

factors of 8.

possible : 1 ✓ 2 ✓ 3 ✗ 4 ✓ 5 ✗ 6 ✗ 7 ✗ 8 ✓

$1\overline{)8}\,8$ (8, 0) $2\overline{)8}\,4$ (8, 0) $3\overline{)8}\,2$ (6, 2) $4\overline{)8}\,2$ (8, 0)

rem => %. (modulo operator)

=>
```
n = int(input())   # factors of n.
i = 1

while i <= n :
```

Q.3) Counting number of digits in a number.

Ans) n = 153 ⇒ 3 digits.

n // 10 = 15.3

153 // 10 ⇒ 15

15 // 10 ⇒ 1

1 // 10 ⇒ 0

} 3

↳ 23 // 10 ⇒ 2

2 // 10 ⇒ 0

} 2

count = ~~0~~ 1 2

n = 23

↳ n = n // 10

count +1

n = 23 // 10 ⇒ 2

n = 2 // 10 ⇒ 0

⇒

```
n = int(input())
count = 0

while n > 0:
    n = n // 10
    count += 1

print(count)
```

123

⇒ ~~0~~ 1 2 3

123 > 0

n ⇒ 12 > 0

n ⇒ 1 > 0

0 > 0

Q.4 : Find sum of all digits of a number

Ans : ⇒ 123 %. 10 ⇒ 10) 123 (12

1-

23

20

Ans ⇒ 3

⇒ 522 %. 10 ⇒ 2

---

total = 0

⇒ n = 522

i) last = n %. 10 ⇒ 2

n = n // 10 ⇒ 52

⇒ total += last ⇒ 2

---

ii) last = n %. 10 ⇒ 2

n = n // 10 ⇒ 5

⇒ total += last ⇒ 4

---

iii) last = n %. 10 ⇒ 5

n = n // 10 ⇒ 0

⇒ total += last ⇒ 9

=> Q.5) n = 110101. Find count of 1s.

Ans:

last = n % 10

count = 0

if last == 1:

count += 1

n = n // 10

Q.6) Binary → Decimal

Ans:

=> 1 0 1

$2^2 + 2^1 + 2^0$ => $2^2 \times 1 + 0 \times 2^1 + 1 \times 2^0$

=> 4 + 0 + 1 = 5

2^3 2^2 2^1 2^0

=> 1 1 0 1

=> $1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$

=> 8 + 4 + 0 + 1 => 13

```
n = int(input())
pwr = 0
decimal = 0
while n > 0:
    last = n % 10
    n = n // 10

    decimal = decimal + (last * (2 ** pwr))

    pwr += 1

print(decimal)
```