

→ *Repetition*

# Loops

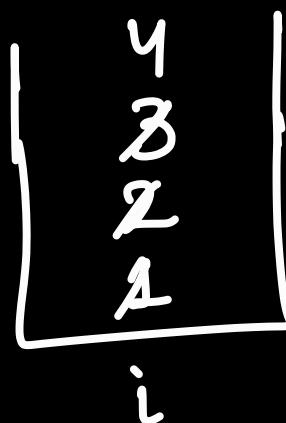
## for, while, do while

# Contents

1. For Loop
2. Questions
3. Break & Continue
4. While & Do-while Loop
5. Questions

# What and Why?

```
1 baar noga  
for (int i=1; i<=3; i++) {  
    cout ("Shubham");  
    3  
baar baar honge
```



initialization

condition check  
work  
increment

Output

- Shubham
- Shubham
- Shubham
-

# For Loop

Q. Print numbers from 1 to 10 .

H.W.

~~Ques:~~ Print yashika ‘n’ times. Take ‘n’ input from user

# How For Loop works : the various parameters

**Ques:** Print numbers from 1 to 100

**Ques:** Print all even numbers from 1 to 100

2, 4, 6, 8 . . . . . 98, 100

**HW:** Print all odd numbers divisible by 3 from 1 to 100

Ques: Print the table of ~~10~~ 17

17 34 51 68 85 102 . . . 170

**Ques:** Print numbers from 'n' to 1.

Decreasing Loop

```
for(int i=n ; i>=1; i--) {  
    |    cout(i)  
    3
```

**Ques:** Display this AP - 2,5,8,11.. upto 'n' terms

```
for( int i= 2; i<=3n-1 ; i+=3){  
    sout(i);  
}
```

$$a_n = a + (n-1) d$$

$$2 + (n-1) \cdot 3$$

$$2 + 3n - 3$$

$$\boxed{3n - 1}$$

Ques: Display this GP - 1,2,4,8.. upto 'n'

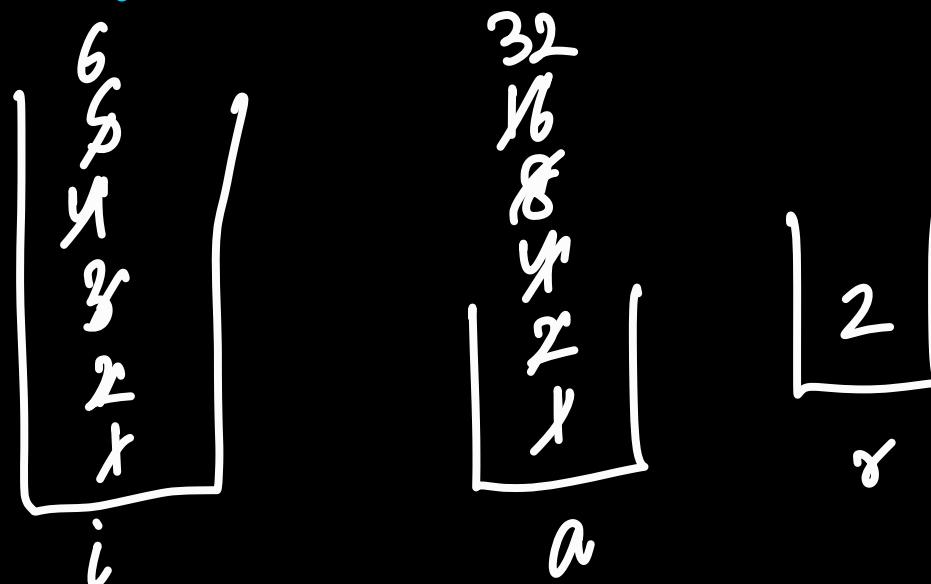
terms

$$n=5$$

int a=1, r=2;

for(int i=1; i<=n; i++) {

    Sout(a);  
    a \*= r;



Output

• 1  
• 2  
• 4  
• 8  
• 16

**HW: Print this series - 99,95,91,87,.. upto all terms which are positive**

Method-1 Using 'i' condition pata ho

Method-2 Using 'a'  $\rightarrow$  no. of terms

**Ques:** Print all alphabets with their corresponding ASCII values.

A 65

B 66

C 67

.

.

.

.

Z 90

**HW: Take 'n' as input from user and print the following sequence..**

$n=5$

1	1
n	5
2	2
n-1	4
3	3
n-2	4
...	2
	5
	1

# Break & continue

is used to skip iterations.

```
for (ini; condition; inc/dec){  
    if(---) break;  
}
```

```
for( ) {  
}  
}
```

loop → iterations

**Ques:** WAP to check if a given number is prime or not.

Q, WAP to print if number is composite or not.



2 to  $n-1$  tak koi factor mile 'n' ka  
to 'n' composite ho jayega

$60 \rightarrow 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60$

'i' is factor of 'n' if  $n \% i == 0$

**Ques:** WAP to check if a given number is prime or not.

4 → 1, 2, 4

9 → 1, 3, 9

25 → 1, 5, 25

49 → 1, 7, 49

60 = 1, 2, 3, 4, 5, 6 | 10, 12, 15, 20, 30, 60  
 $\sqrt{60}$

If 'i' is a factor of 'n' then  
'n/i' is also a factor of 'n'

**Ques:** Print all even numbers from 1 to 100 'Continue Statement'

H.W. Take a number input & print all of its factors.

```
for( int i=1 ; i<=n ; i++ ) {  
    if( n%i==0 ) {  
        cout(i);  
        cout(n/i);  
    }  
}
```

# While Loop

UseCase : Generally used when conditions are more than one.

Jab bhi iterations nahi pata ho ki kitni rai

```
for(int i=1; i<=10; i++) {  
    sout(i);  
}
```

initialization

condition  
body  
increment

```
int i=1;  
while(i<=10){  
    sout(i);  
    i++;  
}
```

# Do-While Loop

# Infinite Loop

# Ques: Count digits of a number

$n = 56132$

↓

5613

↓

561

↓

56

↓

5

↓

0

$n = 991$

↓

99

↓

9

↓

0

`int n = sc.nextInt();`

`int count = 0;`

`while (n != 0) {`

`n /= 10`

`count++;`

3

# Ques: Print sum of digits of a number

$$n = 56142$$

$$n = 999$$

$$\begin{aligned} \text{Sum} &= 5 + 6 + 1 + 4 + 2 \\ &= 18 \end{aligned}$$

$$\text{Sum} = 9 + 9 + 9 = 27$$

Hint no. 1 .

$$5 + 6 + 1 + 4 + 2 = 2 + 4 + 1 + 6 + 5$$

Hint no. 2

$n \% 10$

## Ques: Print sum of digits of a number

$$n = \underline{\cancel{5} \cancel{6} + \cancel{4} \cancel{2}} \quad \underline{\cancel{5} \cancel{6} + \cancel{9}} \quad \underline{\cancel{5} \cancel{6} \cancel{1}} \quad \underline{\cancel{5} \cancel{6} \cancel{2}} \leq 0 \quad n \% 10$$

$$\text{sum} = \cancel{0} \cancel{2} \cancel{6} + \cancel{1} \cancel{3} \cancel{1} 8$$

gives the last digit  
of any number 'n'

while ( $n \neq 0$ ) {

$$(-a) \% b = - (a \% b)$$

```

  |   sum += n \% 10
  |   n /= 10
  |
  3
```

## ~~Ques: Sum of digits of a number~~

int       $-2^{31}$  to  $2^{31} - 1$

long       $-2^{63}$  to  $2^{63} - 1$

## Ques: Reverse of a number

$$n = 1 \ 2 \ 8 \ 6$$

$$r = 6 \ 8 \ 2 \ 1$$

$$6000 + 800 + 20 + 1$$

Steps :  $6 \rightarrow 60 \rightarrow 68 \rightarrow 680 \rightarrow 682 \rightarrow 6820 \rightarrow \boxed{6821}$

H.W. Point sum of number & its reverse.

## Ques: Reverse of a number

$n = 1 \underline{2} \underline{8} \underline{6} \quad \cancel{128} \quad \cancel{12} \quad 1 \quad 0$

$r = 0 \ 0 \cancel{6} \ 60 \ 68 \ 680 \ 682 \ \cancel{6820} \ 6821$

while ( $n \neq 0$ ) {

$r * = 10;$

$r += (n \% 10);$

$n /= 10;$

}

# Ques: Factorial of a number

Both are simple.

$$\text{Ex: } 5! = 5 \times 4 \times 3 \times 2 \times 1$$

$$\text{Ex: } 8! = 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$$

$$\text{Ex: } n = 1 \times 2 \times 3 \times \dots \times n$$

## Ques: 'a' raise to the power 'b'

$$a^b = (a \times a \times a \times a \dots)$$

*b times*

$$2^6 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

$P = 1$

```
for ( ) {  
    | P *= 2  
    ?
```



THANKYOU  
*Cuties*