

→ Repetition

Loops

for, while, do while



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What and Why?

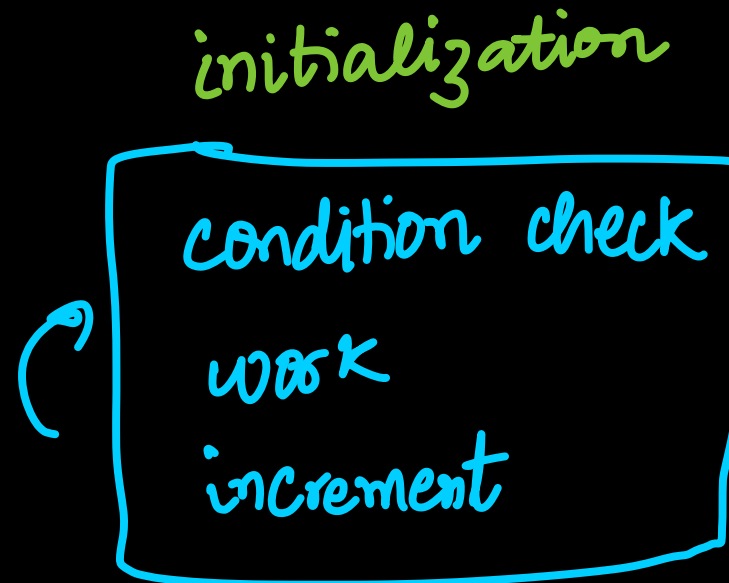
`for (int i = 1; i <= 3; i++) {`
`Sout("Shubham");`
`}`

1 baar hoga (pointing to `i = 1`)
baar baar honge (pointing to `i <= 3` and `i++`)

|
 3

4
3
2
1

i



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

$n=5$

Output

`int a=1, r=2;`

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

`cout<<a<<endl;`

`a*=r;`

↑
3

6
5
4
3
2
1
i

32
16
8
4
2
1
a

2
r

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' → 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	3
...	4
	2
	5
	1

Break & continue

is used to skip iterations.

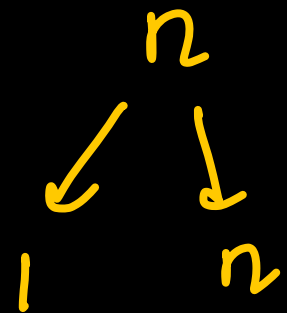
for (ini; condition; inc/dec) {
| if(---) break;
}

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 → 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.

$$4 \rightarrow 1, 2, 4$$

$$9 \rightarrow 1, 3, 9$$

$$25 \rightarrow 1, 5, 25$$

$$49 \rightarrow 1, 7, 49$$

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

$\sqrt{60}$

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<=sqrt(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 hai

```
for (int i=1; i<=10; i++){
    |   sout(i);
    |
    3
```

```
int i=1;
while (i<=10){
    |   sout(i);
    |   i++;
    |
    3
```

initialization

condition
 body
 increment



Do-While Loop



Infinite Loop

Ques: Count digits of a number

$n = 56132$



$n = 991$



```
int n = sc.nextInt();
```

```
int count = 0;
```

```
while (n != 0) {
```

```
    n /= 10;
```

```
    count++;
```

```
}
```




Ques: Print sum of digits of a number

$$n = 56142$$

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

$$n = 999$$

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

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

$n = \underline{5} \underline{6} \underline{1} \underline{4} \underline{2} \quad \cancel{5614} \quad \cancel{561} \quad \cancel{56} \quad \cancel{5} \quad 0 \quad n \% 10$

Sum = ~~0~~ ~~2~~ ~~6~~ ~~7~~ ~~13~~ 18

*$n \% 10$
gives the last digit
of any number 'n'*

```
while (n != 0) {
```

```
    | sum += n % 10  
    | n /= 10  
    |  
}
```

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

~~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

$$n = 1286$$

$$r = 6821$$

$$6000 + 800 + 20 + 1$$

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

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

Ques: Reverse of a number

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

$$r = 0 \quad 0 \quad 6 \quad 60 \quad 68 \quad 680 \quad 682 \quad 6820 \quad 6821$$

```
while (n != 0) {
    r *= 10;
    r += (n % 10);
    n /= 10;
}
```

Ques: Factorial of a number

But hi simple.

$$\underline{5} \text{ or } 5! = 5 \times 4 \times 3 \times 2 \times 1$$

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

$$\underline{n} = 1 \times 2 \times 3 \times \dots \times n$$

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