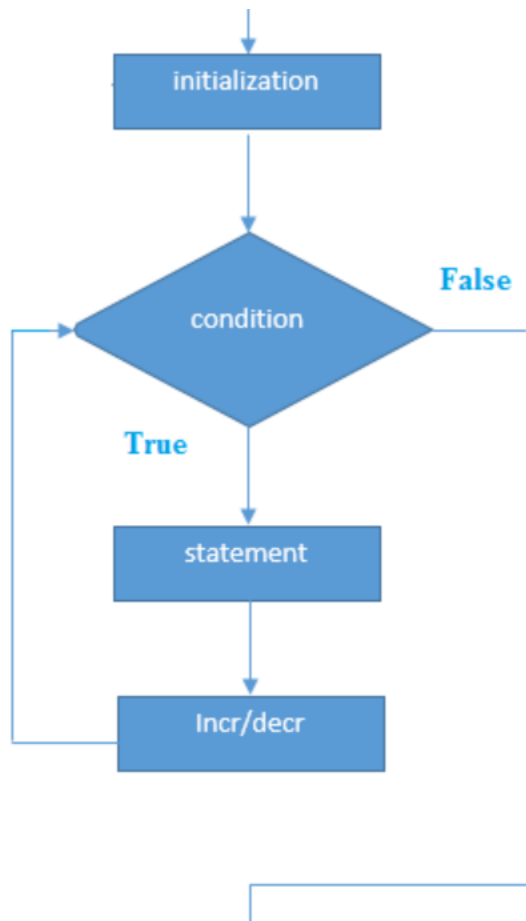


Loops in Java

Loops : Loops are used to execute a set of instructions/functions repeatedly when some conditions become true. There are mainly three types of loops in Java.

1. **for loop** -> used to iterate a part of the program several times. If the number of iterations are fixed, it is recommended to go for "for loop".
2. **while loop** -> used to iterate a part of the program several times. If the number of iterations are not fixed, it is recommended to go for "while loop".
3. **do-while loop** -> used to iterate a part of the program several times. If the number of iterations are not fixed and you must **have to execute the loop atleast once**, it is recommended to go for "do-while loop".

for loop :



```
Example : for(i = 1; i<=10 ;i++){  
    System.out.println("Hello World"); // statement  
}
```

1. Intialization i = 1

2. Condition i <= 10 -> true -> execute the statement inside the for loop

3. Updation i++

i = 1 => 1<=10 => true

Hello World

i++ => i + 1 = 2

i = 2 => 2<=10 => true

Hello World

i++ => i + 1 = 3

i = 3 => 3<=10 => true

Hello World

i++ => i + 1 = 4

i = 4 => 4<=10 => true

Hello World

i++ => i + 1 = 5

i = 5 => 5 <= 10 => true

Hello World

i++ => i + 1 = 6

i = 6 => 6 <= 10 => true

Hello World

$i++ \Rightarrow i + 1 = 7$

$i = 7 \Rightarrow 7 \leq 10 \Rightarrow \text{true}$

Hello World

$i++ \Rightarrow i + 1 = 8$

$i = 8 \Rightarrow 8 \leq 10 \Rightarrow \text{true}$

Hello World

$i++ \Rightarrow i + 1 = 9$

$i = 9 \Rightarrow 9 \leq 10 \Rightarrow \text{true}$

Hello World

$i = i + 1 = 10$

$i = 10 \Rightarrow 10 \leq 10 \Rightarrow \text{true}$

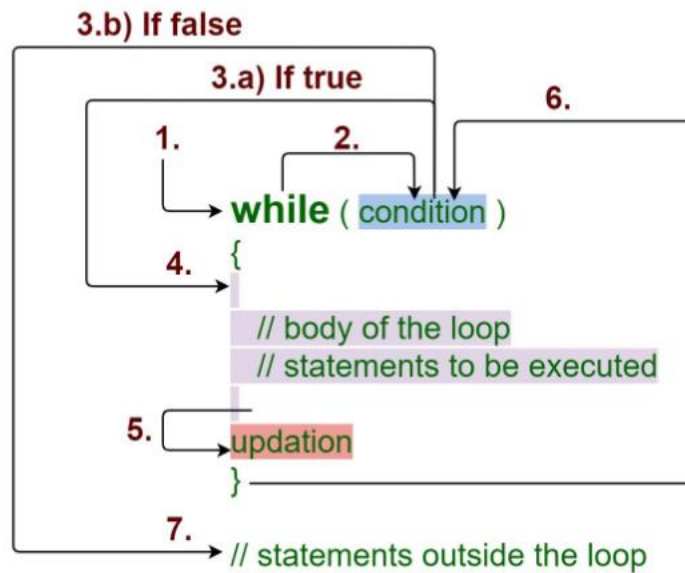
Hello World

$i++ \Rightarrow i+1 = 10+1 = 11$

$i = 11 \Rightarrow 11 \leq 10 \Rightarrow \text{false}$

while loop :

While Loop



Example :

```
x = 1
```

```
while(x < 6){
```

```
System.out.println("Hello World");
```

```
x++; // x = x + 1
```

```
}
```

```
System.out.println("Bye");
```

Output :

```
x = 1
```

```
1 < 6 => true
```

```
    Hello World
```

```
x = 1 + 1 = 2
```

```
2 < 6 => true
```

Hello World

$x = 2 + 1 = 3$

$3 < 6 \Rightarrow \text{true}$

Hello World

$x = 3 + 1 = 4$

$4 < 6 \Rightarrow \text{true}$

Hello World

$x = 4 + 1 = 5$

$5 < 6 \Rightarrow \text{true}$

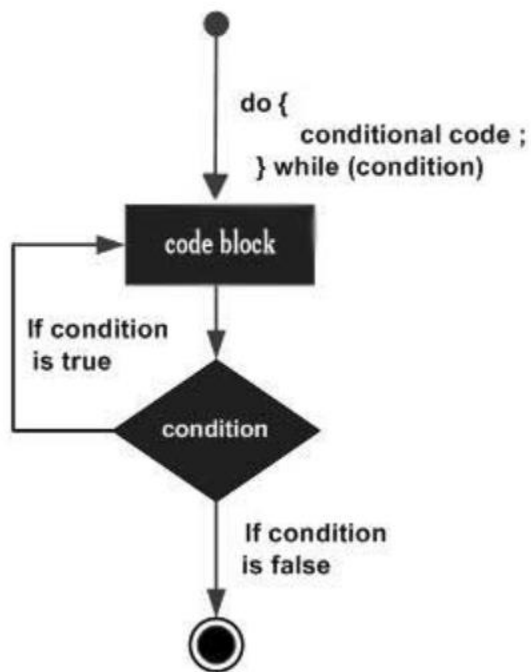
Hello World

$x = 5 + 1 = 6$

$6 < 6 \Rightarrow \text{false}$

Out of the while loop and will not print anything now

do-while loop :



Example :

```
int x = 10;
```

```
do {
```

```
    System.out.println("value of x : " + x );
```

```
    x++;    // x = x + 1
```

```
}while( x < 20 );
```

Output :

x = 10

value of x : 10

x = 10 + 1 = 11

11 < 20 => true

value of x : 11

$x = 11 + 1 = 12$

$12 < 20 \Rightarrow \text{true}$

value of x : 12

$x = 12 + 1 = 13$

$13 < 20 \Rightarrow \text{true}$

value of x : 13

$x = 13 + 1 = 14$

$14 < 20 \Rightarrow \text{true}$

value of x : 14

$x = 14 + 1 = 15$

$15 < 20 \Rightarrow \text{true}$

value of x : 15

$x = 15 + 1 = 16$

value of x : 16

$x = 16 + 1 = 17$

value of x : 17

value of x : 18

value of x : 19

$x = 19 + 1 = 20$

$20 < 20 \Rightarrow \text{false}$, our loop will end

