

Tender Heart High School, Sector- 33 B, Chandigarh

Class-IX

Subject- Computer Application

Topic- Iterative Construct or Loop

Teacher- Prabhdeep Kaur

Good Morning

This lesson is for class IX for the Subject of Computer Application. Our today's topic is Iterative Constructs. In this lesson we are going to focus on a construct in which a block of statements gets executed repeatedly unless the required task has been completed. Such repetitive construct is known as an iterative construct or a loop. So, let start with looping.

Iteration means repeated execution of a set of statements. This can be achieved by using a loop. Based on the flow of control, the looping divided into two types:

- * Entry Controlled Loop
- * Exit Control Loop

Entry Controlled loop: A looping construct in which the condition is checked in the beginning. If the condition is true, the control is allowed to enter into the loop otherwise the entry will be denied. Two types of looping

For Loop: 'For' loop is used when number of iterations is fixed and known.

Components of 'for' loop structure:

For(a=1;	a<=10;	a++)
↓	↓	↓
Control variable with initial value	test Condition	increment/ decrement/ Step value

Example

```
For(a=1; a<=10; a++)  
{  
    System.out.println(a);  
    S = S+a;  
}
```

Program prints 1 to 10

While Loop: while loop is used when the statements are to be executed repeatedly without knowing the number of iterations. In this looping construct, a block of statements gets executed repeatedly unless the given condition is false. while loop is unfixed or unknown loop

Example

```
int p=1000, r=10;  
while (p<= 10000)  
{  
    SI = (P*r)/100.0;  
    P = p + SI;  
}
```

Exit Controlled loop

In this type of looping condition is checked at the exit point of the loop. The control will repeat for the next iteration or exit from the loop depending on the condition is true or false.

Do- while Loop: The 'do-while' loop also works in the same way as while loop.

It is also unfixed or unknown iterative loop. Only difference is the position at which the condition will be checked. In while loop condition will be checked in the beginning of the loop whereas in do-while loop condition is checked at the end of the loop.

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Example:

while

```
int p=1000, r=10, si;
```

```
while (p >= 1000) Condition checked
```

```
{
```

```
    si = (p * r) / 100;
```

```
    p = p + si;
```

```
}
```

Do-while

```
int p=1000, r=10, si;
```

```
do
```

```
{
```

```
    si = (p * r) / 100;
```

```
    p = p + si;
```

```
}
```

Condition checked while (p >= 1000)

In while condition is checked first then loop is executed in do-while atleast a single time loop is executed first then condition is checked.

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Break Statement used in Loops

Sometimes, it may happen that the loop has not been completed but the requirement ~~been~~ fulfilled. The user then would like to terminate the loop without its completion. In this situation 'break' Statement is used to send the control out of the loop, if certain condition is true.

For loop

```
for(i=1; i<=10; i++)  
{  
    if(i==5)  
        break;  
    S = S+i;  
}
```

while loop

```
i=1;  
while(i<=10);  
{  
    if(i==5)  
        break;  
    S = S+i;  
    i++;  
}
```

do-while loop

```
i=1;  
do  
{  
    if(i==5)  
        break;  
    S = S+i;  
    i++;  
}  
while(i<=10)
```

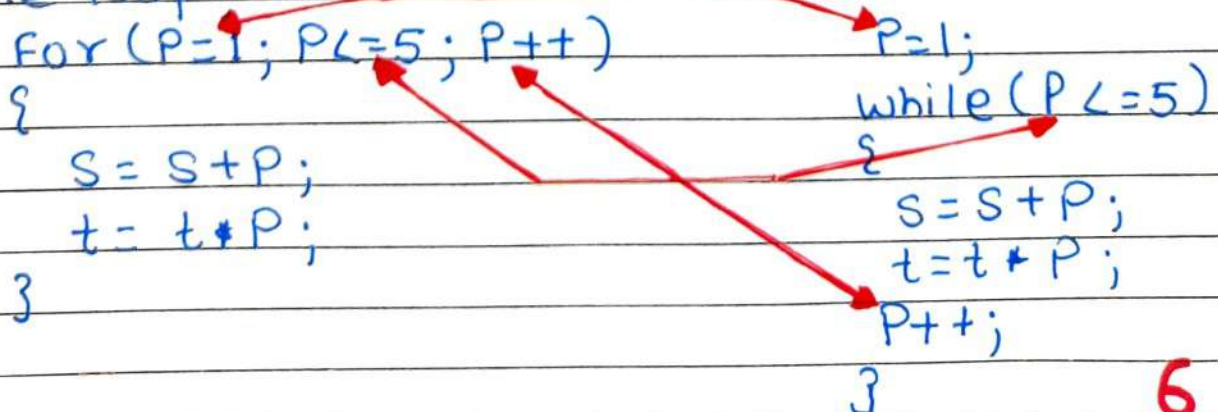
Continue Statement used in Loops

The 'Continue' Statement is opposite to the break Statement. When Continue Statement is invoked, the control goes back to check the condition of the loop by ignoring rest statements of the loop.

For	while	do-while
<pre>i = 1; for(i=1; i<=10; i++) { if(i==5) continue; S = S + i; }</pre>	<pre>i = 1; while (i <= 10) { S = S + i; if (i == 5) continue; i++; }</pre>	<pre>i = 1; do { S = S + i; if (i == 5) continue; i++; } while (i <= 10);</pre>

Index conversion of the loops

A loop can be converted from one form to other. Example of conversion of For loop to while loop



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Finite loop: A loop that has natural termination is known as finite loop. example

`for(i=1; i<=5; i++)` shows the definite end. Hence, it is finite loop.

Infinite loop: A loop that repeats for infinite number is known as infinite loop also called endless loop. example

`for(i=1; i>=5; i++)` shows the infinite end.

Empty loop / Null loop: The loop in which body part is missing like no statement is in its body is called empty loop or null loop. In other words it is a loop that contains null statements. example

`i=1;`

`while(i<=10)`

`{ — no statement in curly brackets.`
`}`

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Prog 1. WAP to find the sum of the Series given below, taking the values of 'a' and 'n' from user.

$$S = \frac{a}{2} + \frac{a}{3} + \frac{a}{4} + \dots + \frac{a}{n}$$

Q2. Rewrite the program by using while loop:

```
int a, b = 0, c;  
System.out.println("The number  
are:");  
for(a = 1; a <= 10; a++)  
{  
    c = b * b;  
    System.out.print(c)  
    b = b + 1;  
}
```

Q3. Differentiate between a Null loop and an Infinite loop.