TRIMEX COLLEGES Formerly Trimex Institute of Science and Technology	Course Code	**CC3**
	Description	**Intermediate Programming**
	Pre-Requisites	
Department: College of Computer Studies	Week	**6**
Java - Loop Control / for loop		

LEARNING OUTCOMES

At the end of this module, the student will be able to:

- Explain the loop control and for loop.
- Demonstrate the example program of for loop.

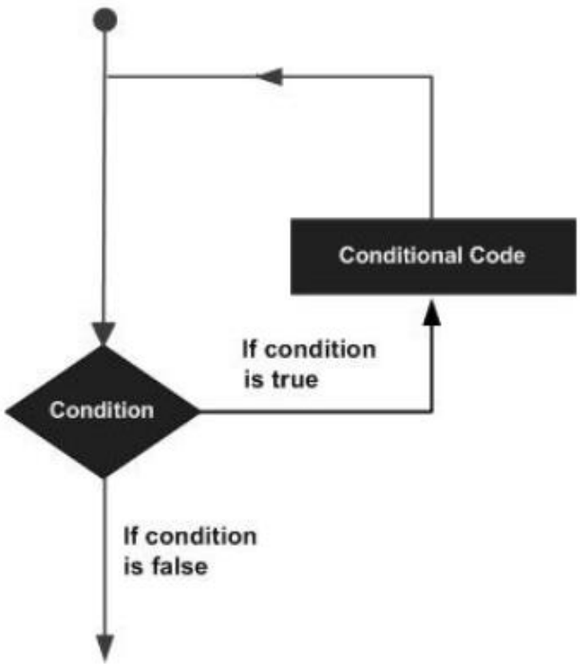
INTRODUCTION

There may be a situation when you need to execute a block of code several number of times. In general, statements are executed sequentially: The first statement in a function is executed first, followed by the second, and so on.
Programming languages provide various control structures that allow for more complicated execution paths.

COURSE CONTENT

A loop statement allows us to execute a statement or group of statements multiple times and following is the general form of a loop statement in most of the programming languages.

Flowchart



Java programming language provides the following types of loop to handle looping requirements.

1. for loop
2. while loop
3. do while loop

for loop

Execute a sequence of statements multiple times and abbreviates the code that manages the loop variable.

while loop

Repeats a statement or group of statements while a given condition is true. It tests the condition before executing the loop body.

do while loop

Like a while statement, except that it tests the condition at the end of the loop body.

Loop Control Statements

Loop control statements change execution from its normal sequence. When execution leaves a scope, all automatic objects that were created in that scope are destroyed.

- break statement
  Terminates the loop or switch statement and transfers execution to the statement immediately following the loop or switch.

- continue statement
  Causes the loop to skip the remainder of its body and immediately retest its condition prior to reiterating.

Enhanced for loop in Java

The enhanced for loop was introduced in Java 5 as a simpler way to iterate through all the elements of a Collection. This is mainly used to traverse collection of elements including arrays**.**

Syntax

Following is the syntax of enhanced for loop –

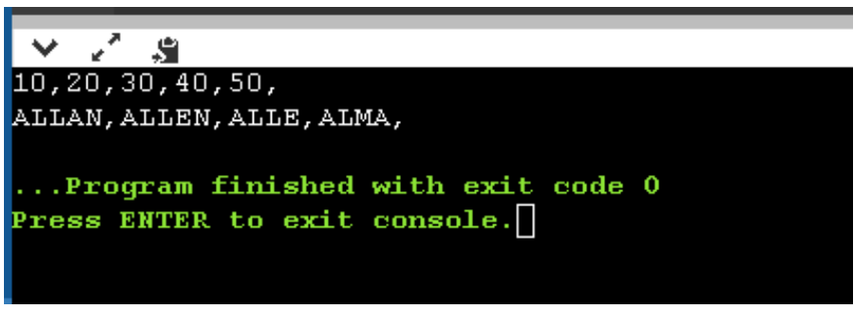
```
for(declaration : expression) {
   // Statements
}
```

- Declaration – The newly declared block variable, is of a type compatible with the elements of the array you are accessing. The variable will be available within the for block and its value would be the same as the current array element.
- Expression – This evaluates to the array you need to loop through. The expression can be an array variable or method call that returns an array.

Example

```
import java.util.Scanner;

public class Main {

  public static void main(String args[]) {

    int [] numbers = {10, 20, 30, 40, 50};

    for(int x : numbers ) {

      System.out.print( x );

      System.out.print(",");

    }
```

```
    System.out.print("\n");

    String [] names = {"ALLAN", "ALLEN", "ALLE", "ALMA"};

    for( String name : names ) {

      System.out.print( name );

      System.out.print(",");

    }

  }

}
```



For Loop

What is for loop?

Execute a sequence of statements multiple times and abbreviates the code that manages the loop variable.

Syntax

```
for (statement 1; statement 2; statement 3) {
  // code block to be executed
}
```

- Statement 1 or Initialization is executed (one time) before the execution of the code block.

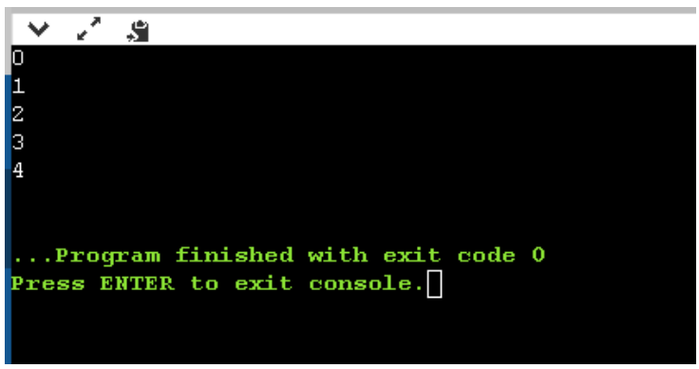
- Statement 2 or Condition defines the condition for executing the code block.

- Statement 3 or Increment/decrement is executed (every time) after the code block has been executed.

The example below will print the numbers 0 to 4:

```
import java.util.Scanner;
public class Main
{

     public static void main(String args[])
    {
      int x;
         for(x=0;x<5;x++)
          {
          System.out.println(x);
         }
    }
}
```

Output:



Explanation:

- Statement 1: sets a variable before the loop starts (x = 0).
- Statement 2: defines the condition for the loop to run (x must be less than 5). If the condition is true, the loop will start over again, if it is false, the loop will end.
- Statement 3: increases a value (x++) each time the

code block in the loop has been executed.

Another way to solve the Problem using the Transition Table

Sample Program:

```
import java.util.Scanner;
public class Main
{

     public static void main(String args[])
    {
      int x;
         for(x=0;x<5;x++)
          {
          System.out.println(x);
         }
    }
}
```

Transition Table

x=0(Initialization)	x<5(Condition)	Print x (OUTPUT)	x++(Increment/Iteration)
0	0<5	0	0+1
1	1<5	1	1+1
2	2<5	2	2+1
3	3<5	3	3+1
4	4<5	4	4+1 (stop the process)

Output:

```
0
1
2
3
4
```

FOCUS QUESTIONS

1. What do you mean loop statement?
2. What is for loop?
3. What are the three looping statements?

Practice Quiz/Laboratory Activity

Create the Transition Table:

Program Code:

```
import java.util.Scanner;
public class Main {

  public static void main(String args[]) {
    int x;
    for (x = 0; x <= 10; x = x + 2)
    {
       System.out.println(x);
    }
  }
}
```

Answer:

Transition Table

x=0(Initialization)	x<=10(Condition)	PRINT x(OUTPUT)	x=x+2(Increment/Iteration)
0	0<=10	0	0=0+2
2	2<=10	2	2=2+2
4	4<=10	4	4=4+2
6	6<=10	6	6=6+2
8	8<=10	8	8=8+2
10	10<=10	10	10=10+2 (end of the process)

Output:

```
0
2
4
6
8
10
```

LEARNING ACTIVITIES
A. Discussion Direction: The instructor will discuss the loop control and for loop. B. Demonstration Direction: The instructor will demonstrate on how to create a program using for loop statement. C. Individual Activity. Explore and execute what you have learned from the Instructors demonstration.
ASSESSMENT
Recitation Direction: Question and Answer from instructor to student to evaluate the learning's.
ASSIGNMENT
Read Module 7 found the Learning Paths
RELATED READINGS / REFERENCES
READINGS: https://www.javatpoint.com/java-data-types https://www.javatpoint.com/java-variable https://www.geeksforgeeks.org/

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