

Repetition

Types of Loops

- Counting loop
 - Know how many times to loop
- Sentinel-controlled loop
 - Expect specific input value to end loop
- Endfile-controlled loop
 - End of data file is end of loop
- Input validation loop
 - Valid input ends loop
- General conditional loop
 - Repeat until condition is met

while

```
while(condition)
{
    statements
}
```

while

```
int i = 0; //initialization of control variable
while(i < end_value) //condition
{
    System.out.println("Number " + i);
    i++; //update – DO NOT FORGET THIS!
}
```

for

```
for(int i = 0; i < end_value; i++)  
{  
    System.out.println("Number " + i);  
}
```

Sentinel-controlled

```
import java.util.Scanner;

public class Loops {
    public static void main(String[] args) {
        int input;
        Scanner s = new Scanner(System.in);
        System.out.println("Enter number - 0 to quit: ");
        input = s.nextInt();
        while(input != 0) {
            System.out.println("Your number is " + input);
            System.out.println("Enter number - 0 to quit: ");
            input = s.nextInt();
        }
    }
}
```

Input Validation

```
import java.util.Scanner;

public class Loops {
    public static void main(String[] args) {
        int input;
        Scanner s = new Scanner(System.in);
        System.out.println("Enter number - 0 to 100: ");
        input = s.nextInt();
        while(input < 0 || input > 100) {
            System.out.println("Your number is out of range");
            System.out.println("Enter number - 0 to 100: ");
            input = s.nextInt();
        }
    }
}
```

do-while

```
import java.util.Scanner;

public class Loops {

    public static void main(String[] args) {
        int input;
        Scanner s = new Scanner(System.in);
        do { //loop will always execute at least once!
            System.out.println("Enter number - 0 to 100: ");
            input = s.nextInt();
        } while(input < 0 || input > 100);
    }
}
```


Exercises

1. Ex5.14 – Write a while loop that verifies that the user enters a positive integer value.
2. Ex5.15 – Write a do loop that verifies the user enters an even integer value.
3. Ex5.17 – Write a for loop to print the multiples of 3 from 300 down to 3.
4. PP5.15 – Design and implement an application that reads a string from the user, then determines and prints how many of each lower-case vowel (a, e, i, o, u) appear in the entire string. Have a separate counter for each vowel. Also count and print the number of nonvowel characters.