**Chapter-5**

**What is loop? How many kinds of loops are there in Java?**

*Loops* are constructs that control repeated executions of a block of statements. The concept of looping is fundamental to programming. Java provides three types of loop statements: **while** loops, **do**-**while** loops, and **for** loops.

**What is While loop?**

*A* **while** *loop executes statements repeatedly while the condition is true.* The part of the loop that contains the statements to be repeated is called the *loop body.* A one-time execution of a loop body is referred to as an *iteration (*or *repetition) of the loop.* Each loop contains a *loop-continuation-condition* The syntax for the **while** loop is:

**while** (loop-continuation-condition) {

// Loop body

Statement(s);

}

N.B. The **while** loop repeatedly executes the statements in the loop body when the **loop-continuation-condition** evaluates to **true**.

**What is the loop Design Strategies?**

Consider three steps when writing a loop.

**Step 1:** Identify the statements that need to be repeated.

**Step 2:** Wrap these statements in a loop like this:

**while** (**true**) {

Statements;

}

**Step 3:** Code the **loop-continuation-condition** and add appropriate statements for controlling the loop.

**while** (loop-continuation-condition) {

Statements;

Additional statements for controlling the loop;

}

**What is sentinel value?**

In programming, **sentinel value** is a special **value** that is used to terminate a loop. A loop that uses a sentinel value to control its execution is called a *Sentinel-controlled loop.*

**What is do-while-loop?**

A do-while loop is the same as a while loop except that it executes the loop body first and then checks the loop continuation condition. The do-while loop executes the loop body first, then checks the loop continuation- condition to determine whether to continue or terminate the loop. The do-while loop is a variation of the while loop. Its syntax is:

do {

// Loop body;

Statement(s);

}

**The for Loop**

A for loop has a concise syntax for writing loops. The for loop statement starts with the keyword for, A for loop can be used to simplify the preceding loop as:

for (initial-action; loop-continuation-condition;

action-after-each-iteration) {

// Loop body;

Statement(s);

}

N.B. The while loop and for loop are called pretest loops because the continuation condition is checked before the loop body is executed. The do-while loop is called a posttest loop because the condition is checked after the loop body is executed.

**Nested Loop:**

A loop can be nested inside another loop. Nested loops consist of an outer loop and one or more inner loops. Each time the outer loop is repeated, the inner loops are reentered, and started anew.

**Keywords break and continue:**

The break and continue keywords provide additional controls in a loop. Continue breaks out of iteration while the break keyword breaks out of a loop. The continue statement is always inside a loop. Too many break and continue statements will produce a loop with many exit points and make the program difficult to read.

**CHAPTER SUMMARY**

1. There are three types of repetition statements: the while loop, the do-while loop, and the for loop.

2. The part of the loop that contains the statements to be repeated is called the loop body.

3. A one-time execution of a loop body is referred to as an iteration of the loop.

4. An infinite loop is a loop statement that executes infinitely.

5. In designing loops, you need to consider both the loop control structure and the loop body.

6. The while loop checks the loop-continuation-condition first. If the condition is true, the loop body is executed; if it is false, the loop terminates.

7. The do-while loop is similar to the while loop, except that the do-while loop executes the loop body first and then checks the loop-continuation-condition to decide whether to continue or to terminate.

8. The while loop and the do-while loop often are used when the number of repetitions is not predetermined.

9. A sentinel value is a special value that signifies the end of the loop.

10. The for loop generally is used to execute a loop body a fixed number of times.

11. The for loop control has three parts. The first part is an initial action that often initializes a control variable. The second part, the loop-continuation-condition, determines whether the loop body is to be executed. The third part is executed after each iteration and is often used to adjust the control variable. Usually, the loop control variables are initialized and changed in the control structure.

12. The while loop and for loop are called pretest loops because the continuation condition is checked before the loop body is executed.

13. The do-while loop is called a posttest loop because the condition is checked after the loop body is executed.

14. Two keywords break and continue, can be used in a loop.

15. The break keyword immediately ends the innermost loop, which contains the break.

16. The continue keyword only ends the current iteration.