DAY 11 : LOOPS IN JAVA (THEORY ONLY)

A loop in Java is used to execute a block of statements repeatedly until a given condition is satisfied. Loops help reduce code repetition, improve readability, and make programs efficient.

1. FOR LOOP

Definition: A for loop is used when the number of iterations is known in advance.

Syntax:
for(initialization; condition; increment/decrement)

How it works: Initialization executes once, the condition is checked before every iteration, and increment or decrement updates the loop variable.

Why we use it: It is best suited for fixed-count repetition like printing numbers or traversing arrays.

2. WHILE LOOP

Definition: A while loop executes statements as long as a condition remains true.

Syntax:
while(condition)

How it works: The condition is checked first. If it is true, the loop body executes. If false, the loop terminates.

Why we use it: It is used when the number of iterations is not known beforehand.

3. DO-WHILE LOOP

Definition: A do-while loop executes the loop body at least once, regardless of the condition.

Syntax:
do { } while(condition);

How it works: The loop body executes first, then the condition is checked.

Why we use it: It is useful in menu-driven programs where execution is required at least once.

4. FOR-EACH LOOP

Definition: A for-each loop is used to traverse elements of arrays or collections.

Syntax:
for(dataType variable : collection)

How it works: Each element is accessed one by one without using an index.

Why we use it: It simplifies iteration and improves readability when index is not required.

Conclusion: Java provides different loops to handle repetitive tasks efficiently. Choosing the correct loop depends on the requirement of execution and condition checking.