Java Basics - Part II

Course on Programming Basics

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Java Basics - II

Topics in Today's class

1. Loops
   - for loops
   - while loops
   - do...while loops
2. Arrays & Matrix
3. Methods

Types of Loops

In computer programming, loops are used to repeat a block of code.

In Java, there are three types of loops.
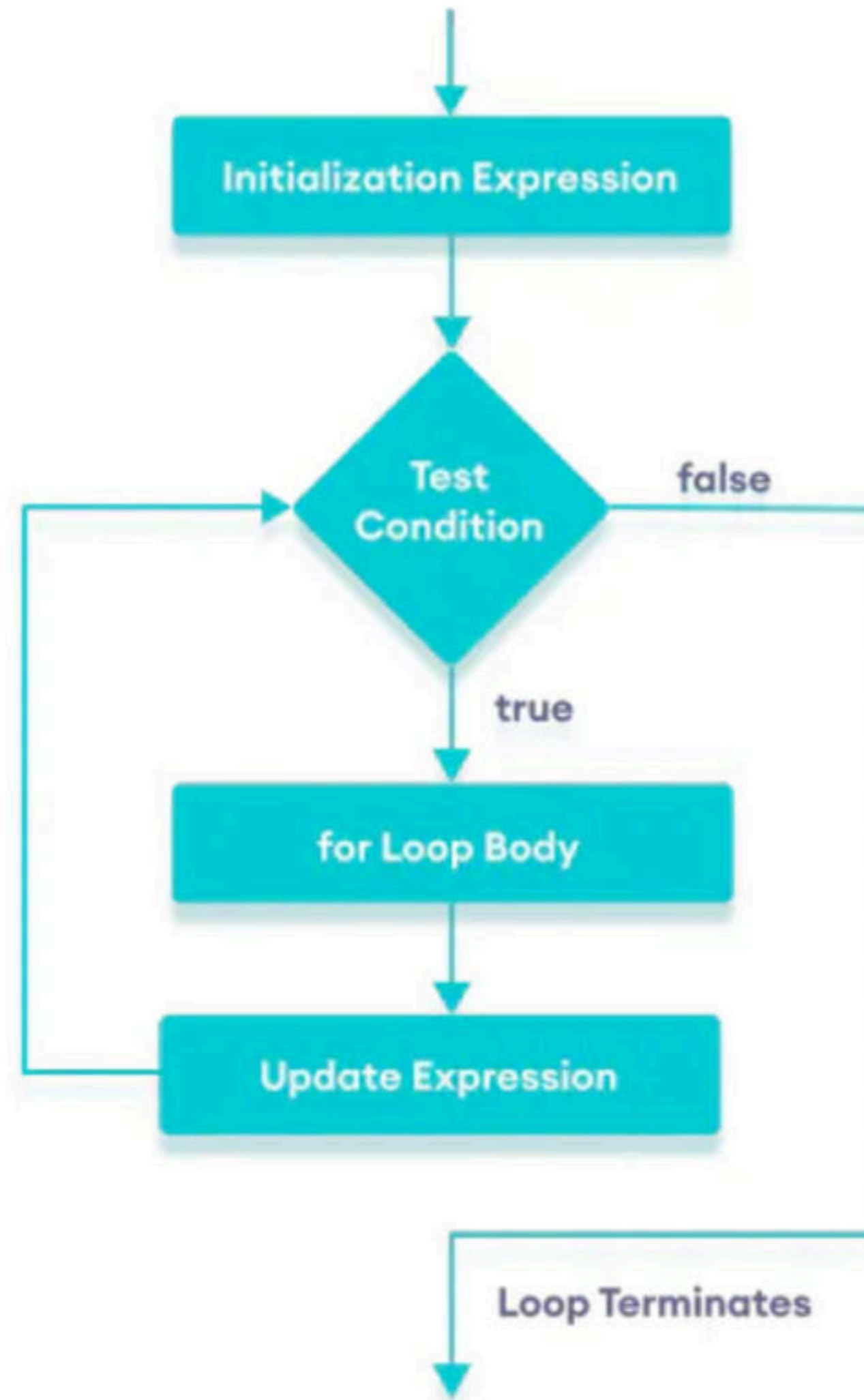
- for loop
- while loop
- do...while loop

Java for loop

Java **for** loop is used to run a block of code for a certain number of times. The syntax of for loop is:

```
for (initialExpression; testExpression; updateExpression) {
    // body of the loop
}
```

Flowchart of Java for loop

Nested Loops

Write a Program to Print a Pattern like this:
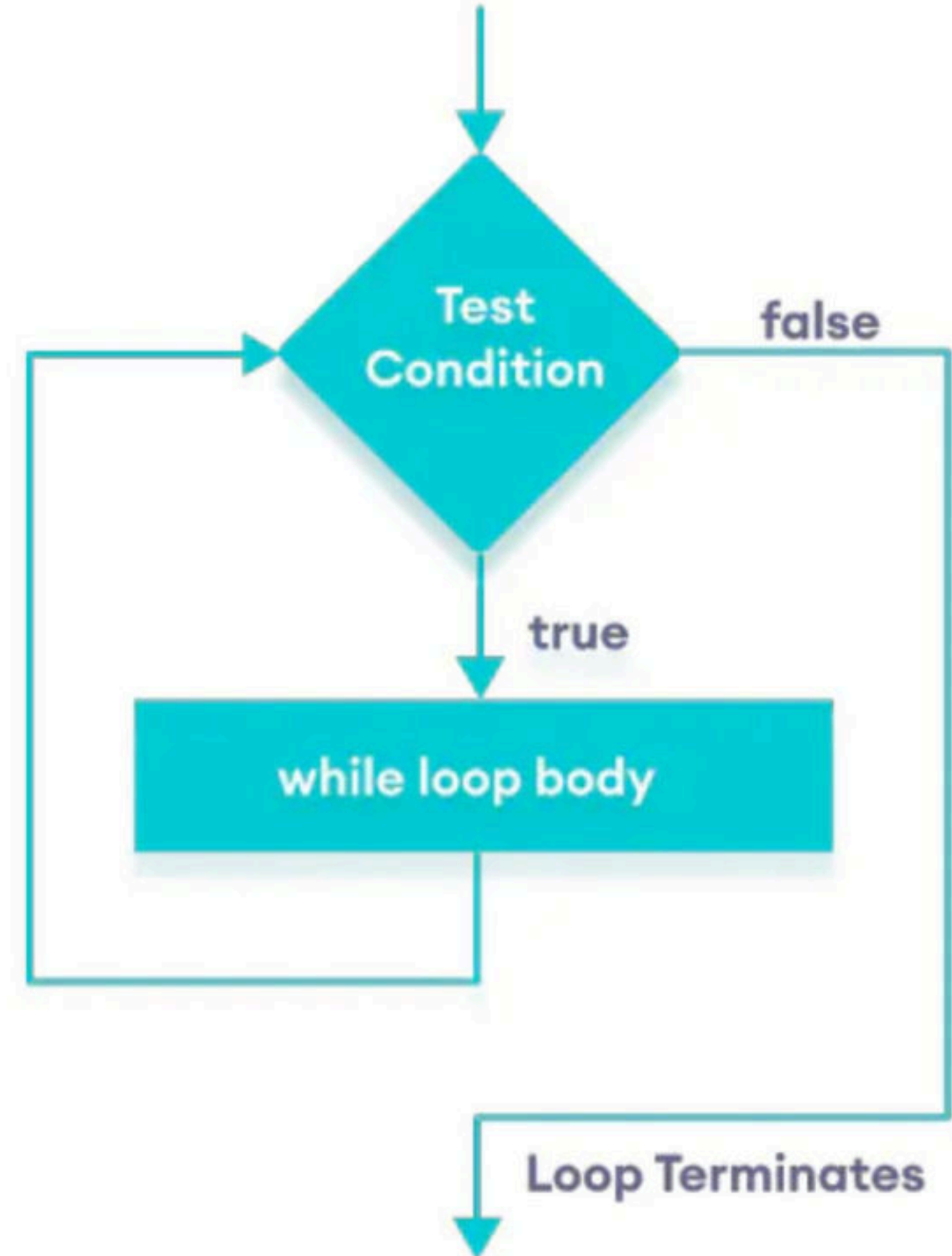
```
*
** 
***
****
```

Java while loop

Java while loop is used to run a specific code until a certain condition is met. The syntax of the while loop is:

```
while (testExpression) {
    // body of loop
}
```
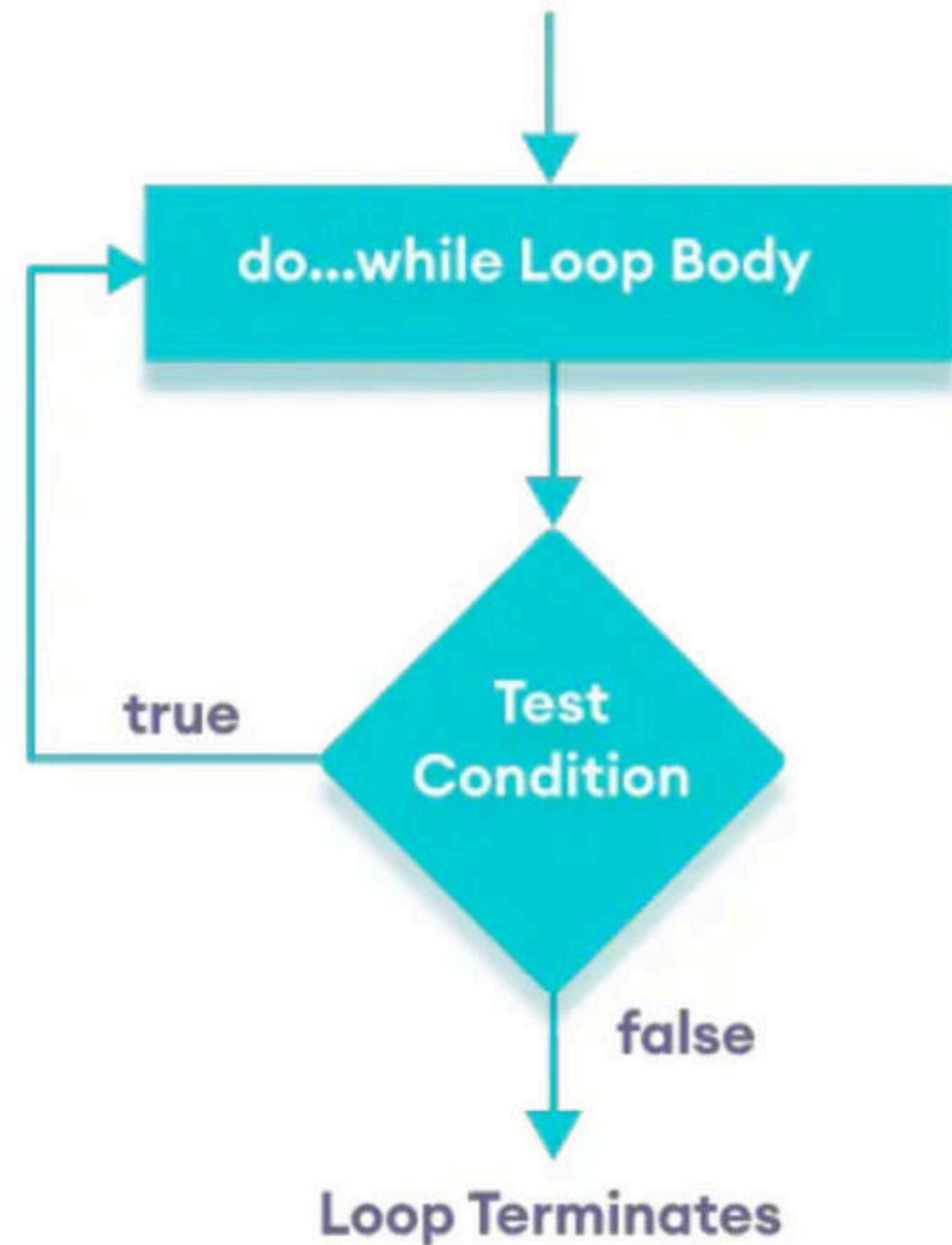
Flowchart of Java while loop

Java do-while loop

The do...while loop is similar to while loop. However, the body of do...while loop is executed once before the test expression is checked.

```java
do {
    // body of loop
} while(textExpression);
```

Flowchart of Java do...while loop

do...while Loop Body

Test Condition

true

false

Loop Terminates

Arrays in Java

An array is a collection of similar types of data.

For example, if we want to store the names of 100 people then we can create an array of the string type that can store 100 names.

```
String[] array = new String[100];
```

Here, the above array cannot store more than 100 names. The number of values in a Java array is always fixed.

Declaring the Arrays

In Java, here is how we can declare an array.

dataType[] arrayName;

Here's how we can declare the array with size, this array of double datatype can hold 10 double values.

double[] data = new double[10];

Initialising the Arrays

In Java, here is how we can initialise an array.

int age[] = {23, 12, 65, 3, 4};

We can access these values using

age[index]

The value of index can range from (0 to size of array-1)

Java Multidimensional Arrays

A multidimensional array is an array of arrays. Each element of a multidimensional array is an array itself. For example,

```java
int[][] a = new int[3][4];
```

	Column 1	Column 2	Column 3	Column 4
Row 1	a[0][0]	a[0][1]	a[0][2]	a[0][3]
Row 2	a[1][0]	a[1][1]	a[1][2]	a[1][3]
Row 3	a[2][0]	a[2][1]	a[2][2]	a[2][3]

```
for (i   ) {
    for (j   ) {
        a[i][j] = SC.nextInt()
    }
}
```

Java Methods

A method is a block of code that performs a specific task.

Dividing a complex problem into smaller chunks makes your program easy to understand and reusable. This is the structure of a method.

```
returnType methodName() {
    // method body
}
```
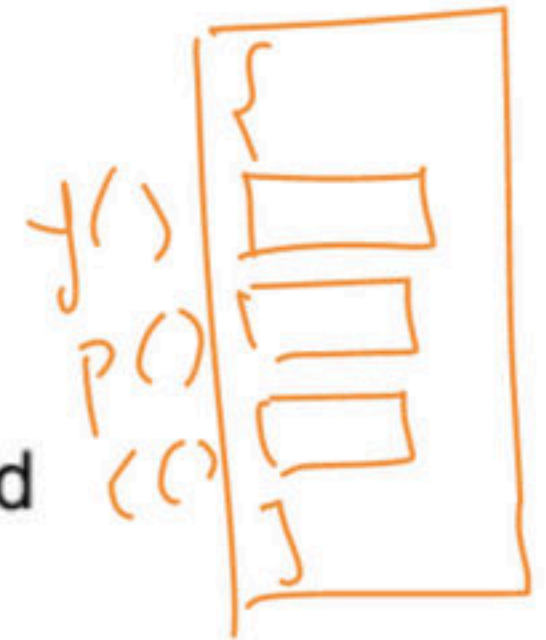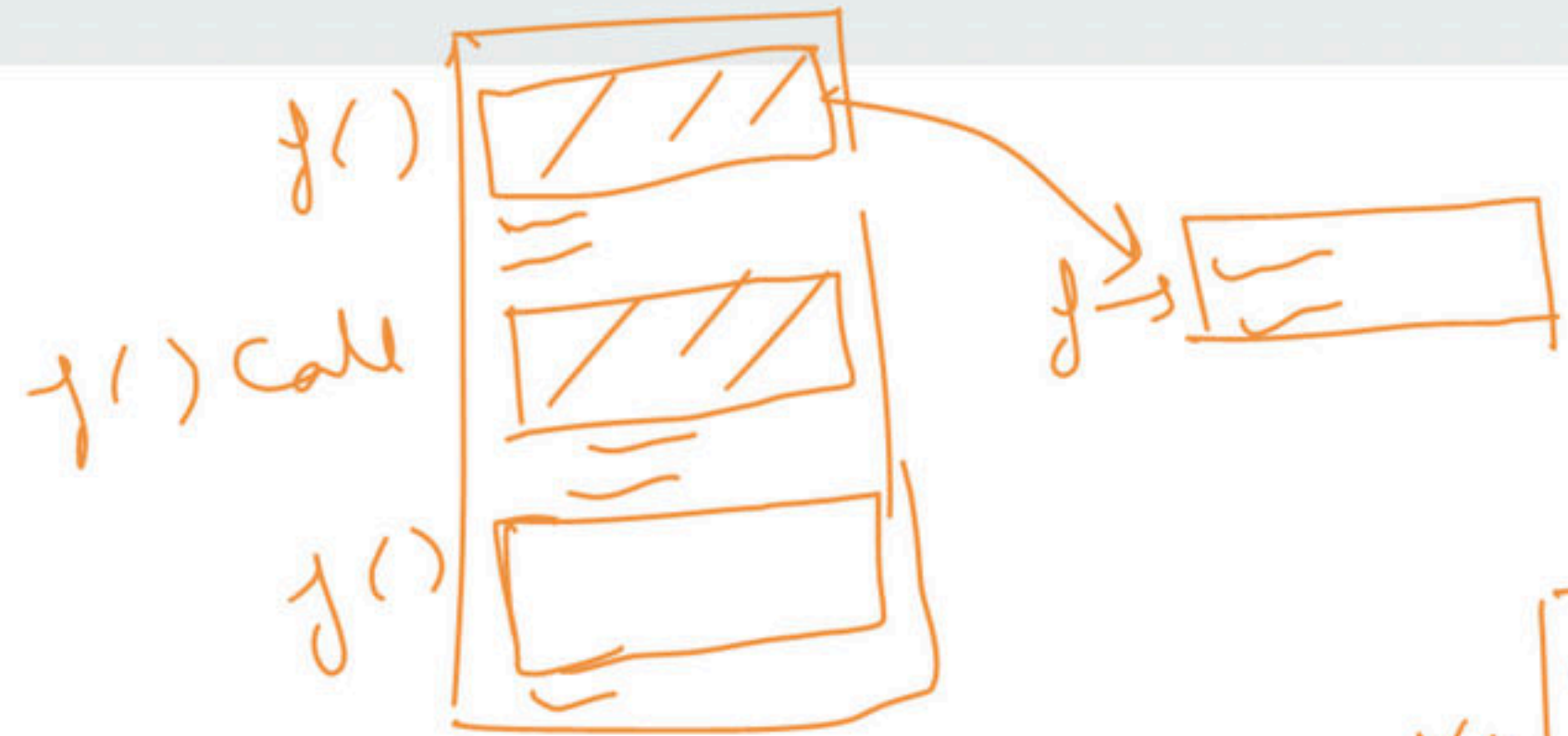
Complete structure of a method

input → → [ ] → *output*

Public int sum(int a, int b){
   int sum = a+b;
   return sum;
}

Public
Private
Protected

void

```
modifier static returnType nameOfMethod (parameter1, parameter2, ...) {
    // method body
}
```

void greeting ( ) {
  print ("Hello")
}

int c = sumOf(3, 4)

```
Complen ( int (a) , int (b) ) {
    int c =   simple ( a, b) ;
    int res =   a + b + c ;
    return res;
}
```

Complen (2, 4)

```
simple ( int a, int b) {

}
```

```
Complen ( char a, int b) {

}
```

Practice Problems

1. Write a Java program to find the numbers greater than the average of the numbers of a given array.
2. Write a Java program that takes a number as input and prints its multiplication table upto 10.
3. Write a Java program to sum values of an array.
4. Write a Java program to find the maximum and minimum value of an array.
5. Write a Java program to separate 0s on left side and 1s on right side of an array of 0s and 1s in random order.
6. Write a Java method to find the smallest number among three numbers.
7. Write a Java method to print Fibonacci series of n terms where n is argument passed by user.
8. Write a program to find the factorial value of any number entered through the keyboard.