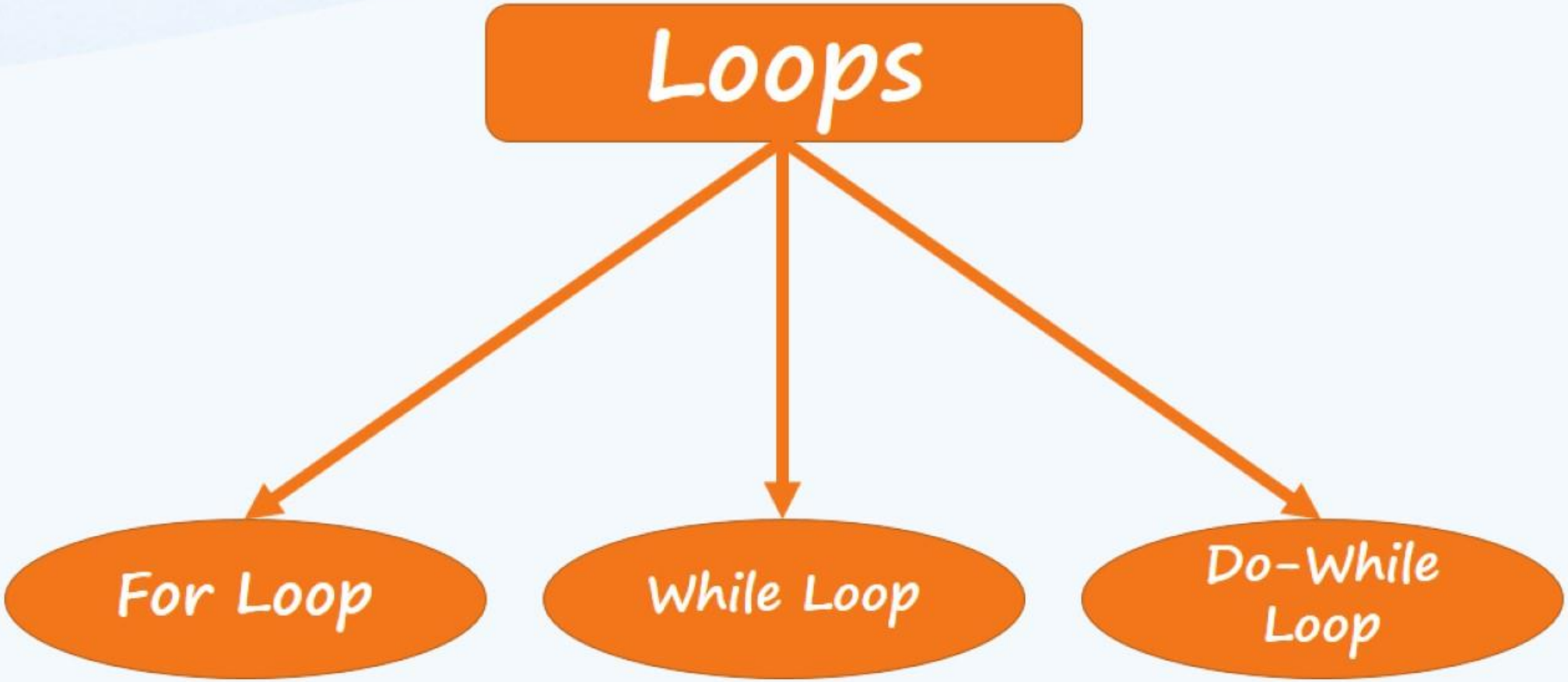
Loops

Loops

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


Loops
For Loop
While Loop
Do-While Loop

For Loop

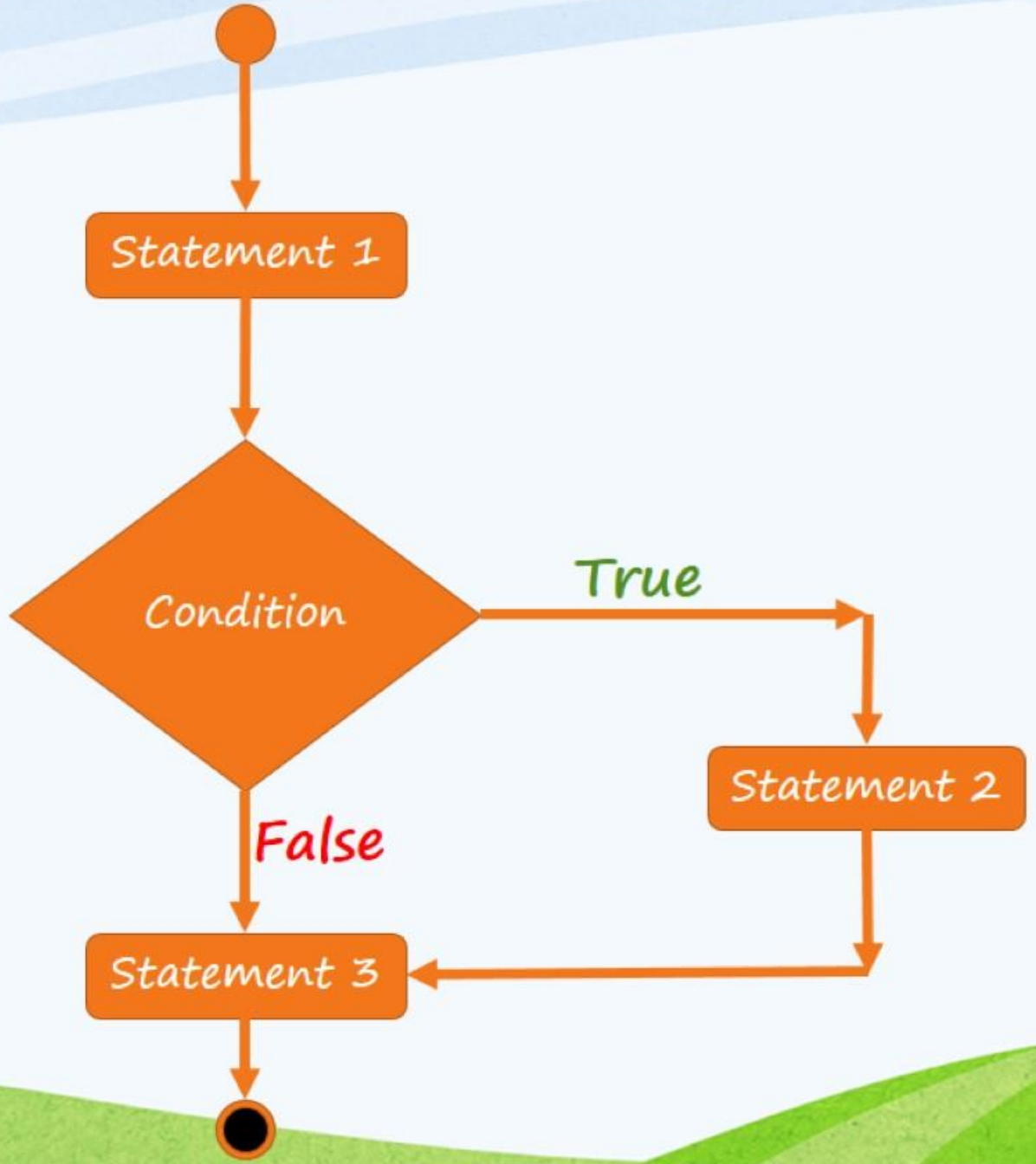
For Loop Syntax

```
for ( initialization; condition; increment/decrement )
  {
     //statement
  }
```

How For Loop Works

- The initialization step is executed first, and only once. This step allows you to declare and initialize any loop control variables and this step ends with a semi colon (;).
- Next, the condition executed. If it is true, the body of the loop is executed. If it is false, the body of the loop will not be executed and control jumps to the next statement.
- After the body of the for loop gets executed, the control jumps back up to the increment/decrement statement. This statement allows you to update any loop control variables.

Flow Chart



```
for(int i=0; i<5; i++)
  {
    System.out.println(i);
  }
```

Output:
0
1
2
3
4

```
for(int i=0; i<5;)
  {
    System.out.println(i);
    i++;
  }
```

Output:

```
0
1
2
3
4
```

While Loop

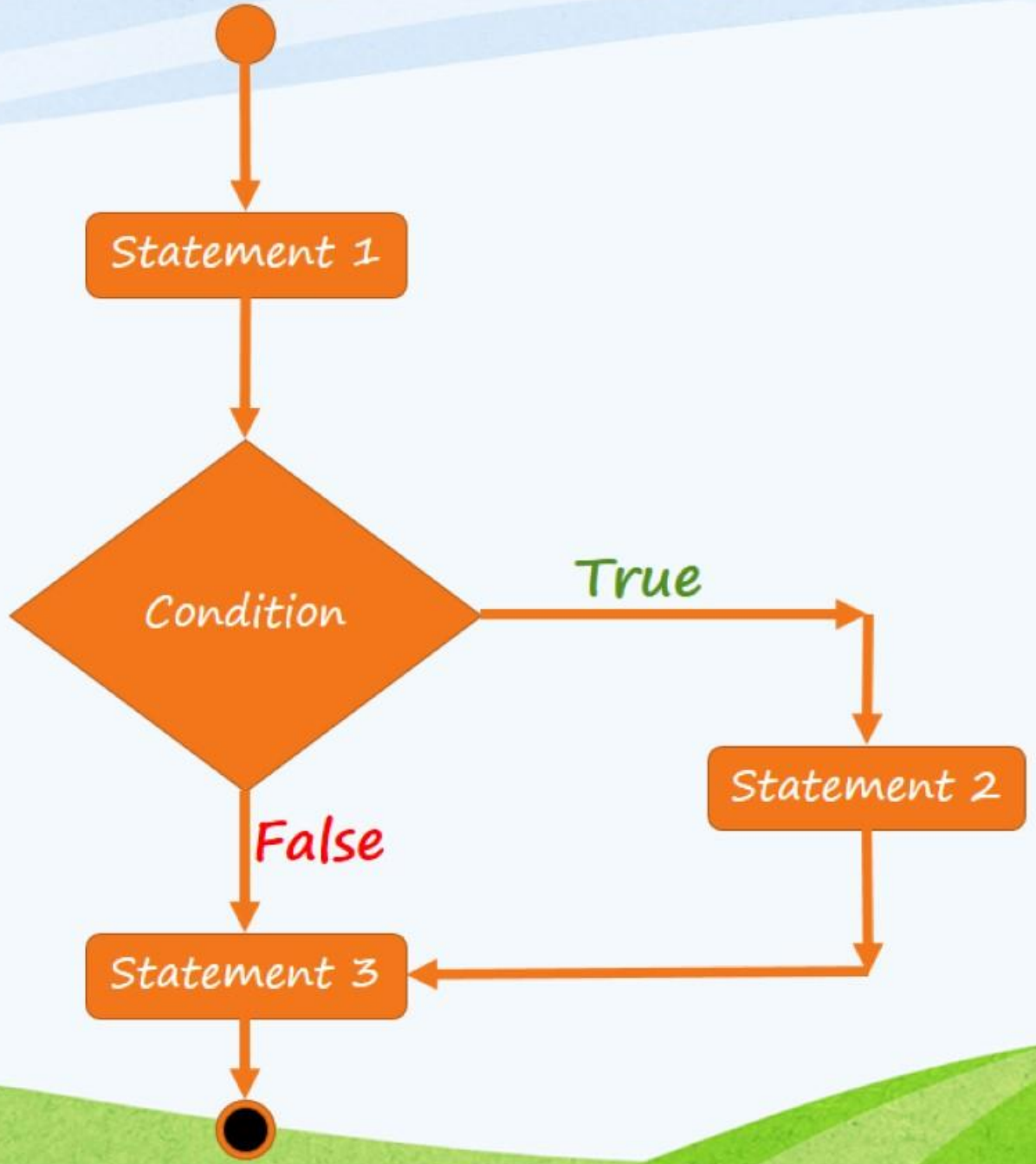
While Loop Syntax

```
//initialization
while ( condition )
  {
     //statement
     //increment/decrement
  }
```

How While Loop Works

- When executing, if the condition result is true, then the actions inside the loop will be executed. This will continue as long as the expression result is true.
- When the condition becomes false, program control passes to the line immediately following the loop.

Flow Chart



```
int i = 0;
while(i<5)
  {

     System.out.println(i);
     i++;
  }
```

Output:

```
0
1
2
3
4
```

Do While Loop

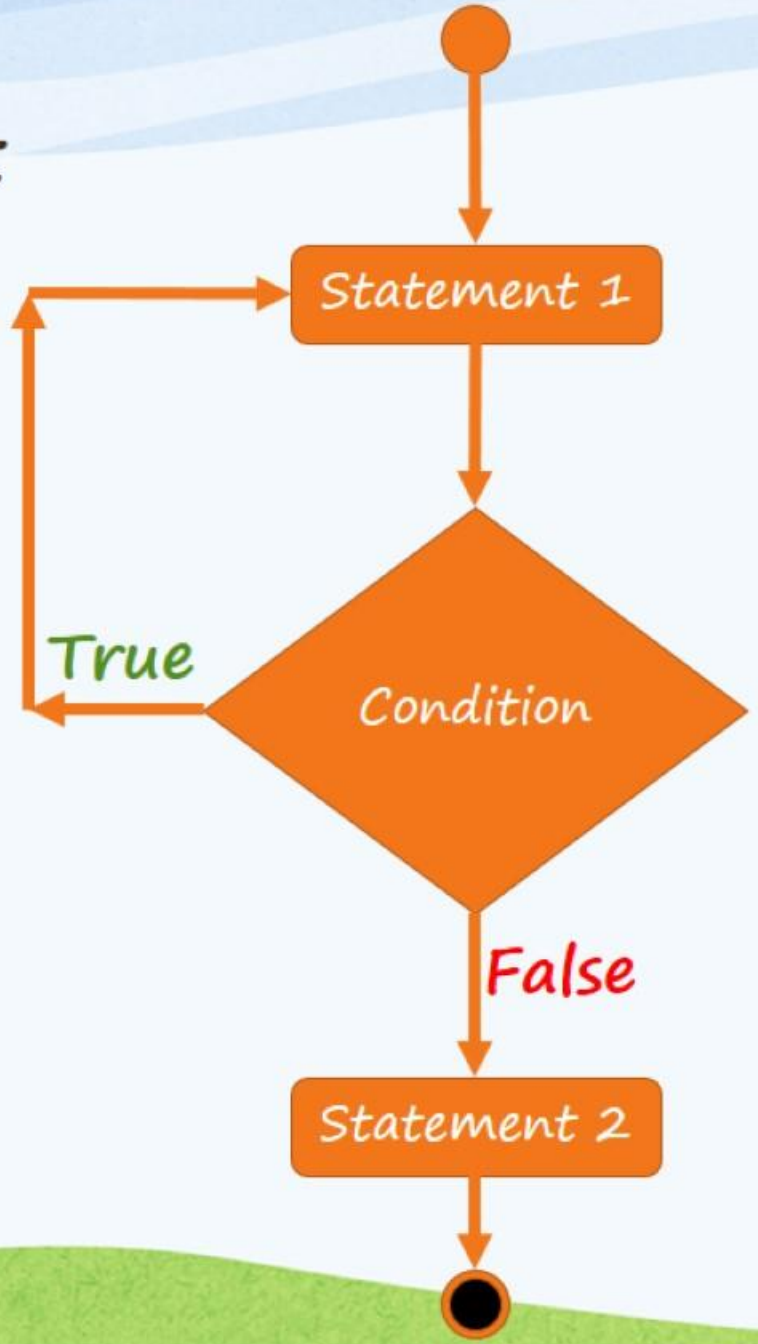
Do While Syntax

```
//initialization
  do{
      //statement
      //increment/decrement
    } while ( condition );
```

How Do While Loop Works

- The statements in the loop at least execute once before the Condition is tested.
- If the Condition is true, the control jumps back up to do statement, and the statements in the loop execute again. This process repeats until the Condition is false.

Flow Chart



```
int i = 0;
do{
    System.out.println(i);
    i++;
  }while(i<5);
```

Output:

```
0
1
2
3
4
```

```
int i = 0;
do{
      System.out.println(i);
      i++;
   }while(i>5);
```

Output: 0