Dart Loops Kya Hai and How it Works? | Flutter Dart Tutorial

Introduction

In this article, we will explore the concept of loops in Dart programming. Loops are a fundamental programming construct used to execute a block of code repeatedly, either a fixed number of times or until a certain condition is met. Understanding loops is essential when developing applications using Flutter since they help reduce redundancy and increase the efficiency of your code.

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1. What are Loops?

A loop is a control structure that repeats a block of code multiple times. Loops are particularly useful when you need to perform repetitive tasks without writing the same code multiple times.

How Loops Work

- **Initialization:** This sets the starting point of the loop.
- **Condition:** The loop continues to execute as long as this condition is true.
- **Increment/Decrement:** This updates the loop counter at each iteration.

2. Types of Loops in Dart

For Loop

A `for` loop is used when you know the exact number of times you want to execute a block of code. It consists of three parts:

1. **Initialization:** Sets the starting value of the loop counter.
2. **Condition:** The loop runs as long as this condition is true.
3. **Increment/Decrement:** Updates the loop counter after each iteration.

Syntax:

```
for(initialization; condition; increment/decrement) {
  // Code to be executed
}
```

While Loop

A `while` loop is used when the number of iterations is not known beforehand and is based on a condition. The loop runs as long as the condition is true.

Syntax:

```
while(condition) {
  // Code to be executed
}
```

Do-While Loop

A `do-while` loop is similar to a `while` loop, but it guarantees that the loop body is executed at least once, even if the condition is false.

Syntax:

```
do {
  // Code to be executed
} while(condition);
```

3. Implementing Loops in Dart

For Loop Example

Let's print "Hello World" 10 times using a `for` loop.

Code:

```
void main() {
  for (int i = 0; i < 10; i++) {
    print('Hello World');
  }
}
```

Explanation:

- **Initialization:** `int i = 0` starts the counter at 0.
- **Condition:** `i < 10` keeps the loop running as long as `i` is less than 10.
- **Increment:** `i++` increments the counter by 1 after each iteration.

While Loop Example

Now, let's use a `while` loop to print numbers from 1 to 5.

Code:

```
void main() {
  int i = 1;
  while (i <= 5) {
    print(i);
    i++;
  }
}
```

Explanation:

- **Initialization:** `int i = 1` starts the counter at 1.
- **Condition:** `i <= 5` runs the loop as long as `i` is less than or equal to 5.
- **Increment:** `i++` increases the value of `i` by 1 after each loop iteration.

Do-While Loop Example

Finally, let's see how a `do-while` loop works by printing a number and incrementing it until it is less than 5.

Code:

```
void main() {
  int i = 6;
  do {
    print(i);
    i++;
  } while (i < 5);
}
```

Explanation:

- **Initialization:** `int i = 6` starts the counter at 6.
- **Execution:** The code block inside `do` executes once regardless of the condition.
- **Condition:** `i < 5` checks after the first execution, but since `i` starts at 6, the loop stops.

4. Practical Use Cases

- **Iterating Over a Collection:** Use a loop to process each item in a list.
- **Repetitive Tasks:** When you need to perform the same operation multiple times, such as printing a message or computing a value.
- **Conditional Operations:** Use loops to continue executing a block of code until a specific condition is met.

5. Conclusion

Loops are powerful tools in programming, helping to eliminate redundancy and making code more manageable. By understanding and utilizing `for`, `while`, and `do-while` loops in Dart, you can build efficient and concise Flutter applications.