Dart Basic Concepts

🚀 Dart Basic Concepts

Dart is an **object-oriented**, **statically typed**, and **garbage-collected** language used for Flutter development. This guide covers all **basic concepts** step by step.

📌 1. Dart Basics

✅ Hello World Program

```
dart
CopyEdit
void main() {
  print(”Hello, Dart!”);
}
```

- `void main()` → The entry point of a Dart program.
- `print(”text”)` → Prints output to the console.

📌 2. Variables & Data Types

✅ Declaring Variables

```
dart
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void main() {
  int age = 25;
  double price = 99.99;
  String name = ”Flutter”;
  bool isFlutterAwesome = true;

  print(”Name: $name, Age: $age, Price: $price, Awesome: $isFlutterAwesome”);
}
```

✅ Data Types in Dart

Data Type	Example
`int`	`int age = 30;`

`double`	`double pi = 3.14;`
`String`	`String name = "Dart";`
`bool`	`bool isTrue = false;`
`var`	`var city = "London";` (Type inferred automatically)
`dynamic`	`dynamic x = "Hello"; x = 5;` (Can change type)

📌 3. Operators

✅ Arithmetic Operators

```
dart
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int sum = 5 + 3;      // 8
int diff = 10 - 4;    // 6
int product = 4 * 3;  // 12
double quotient = 10 / 2; // 5.0
int remainder = 10 % 3;   // 1
```

✅ Comparison Operators

```
dart
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bool isEqual = (5 == 5);  // true
bool isGreater = (10 > 5); // true
bool isSmaller = (5 < 10); // true
```

✅ Logical Operators

```
dart
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bool a = true;
bool b = false;

print(a && b);  // false (AND)
print(a || b);  // true  (OR)
print(!a);      // false (NOT)
```

📌 4. Control Flow Statements

✅ If-Else

```
dart
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void main() {
  int number = 10;

  if (number > 0) {
    print("Positive");
  } else if (number < 0) {
    print("Negative");
  } else {
    print("Zero");
  }
}
```

✅ Switch-Case

```
dart
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void main() {
  String grade = "A";

  switch (grade) {
    case "A":
      print("Excellent");
      break;
    case "B":
      print("Good");
      break;
    default:
      print("Invalid Grade");
  }
}
```

📌 5. Loops

✅ For Loop

```
dart
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void main() {
  for (int i = 1; i <= 5; i++) {
    print("Count: $i");
  }
}
```

✅ While Loop

```
dart
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void main() {
  int i = 1;
  while (i <= 5) {
    print("While loop: $i");
    i++;
  }
}
```

✅ Do-While Loop

```
dart
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void main() {
  int i = 1;
  do {
    print("Do-while loop: $i");
    i++;
  } while (i <= 5);
}
```

📌 6. Functions

✅ Basic Function

```
dart
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void greet() {
  print("Hello, Dart!");
}

void main() {
  greet();
}
```

✅ Function with Parameters

```
dart
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void greet(String name) {
  print("Hello, $name!");
}

void main() {
  greet("Flutter");
}
```

✅ Function with Return Value

```
dart
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int add(int a, int b) {
  return a + b;
}

void main() {
  int result = add(5, 3);
  print("Sum: $result");
}
```

✅ Arrow Function (Short Syntax)

```
dart
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int multiply(int a, int b) => a * b;

void main() {
  print(multiply(3, 4)); // Output: 12
}
```

📌 7. Lists (Arrays)

✅ Creating a List

```
dart
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void main() {
  List<String> fruits = ["Apple", "Banana", "Cherry"];
  print(fruits);
}
```

✅ List Operations

```
dart
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void main() {
  List<int> numbers = [10, 20, 30];

  numbers.add(40);        // Add item
  numbers.remove(20);     // Remove item
  print(numbers.length);  // Get length
}
```

✅ Loop Through List

```
dart
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void main() {
  List<String> names = ["Alice", "Bob", "Charlie"];

  for (String name in names) {
    print(name);
  }
}
```

📌 8. Maps (Key-Value Pairs)

✅ Creating a Map

```
dart
CopyEdit
void main() {
  Map<String, int> ages = {"Alice": 25, "Bob": 30};
  print(ages);
}
```

✅ Accessing & Modifying Maps

```
dart
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void main() {
  Map<String, String> user = {"name": "John", "city": "New York"};

  user["age"] = "30";      // Add new key-value
  user.remove("city");     // Remove key-value
  print(user);
}
```

📌 9. Classes & Objects

✅ Defining a Class

```
dart
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class Car {
  String brand;
  int year;

  Car(this.brand, this.year);

  void display() {
```

```
    print("$brand was made in $year");
  }
}

void main() {
  var myCar = Car("Tesla", 2023);
  myCar.display();
}
```

✅ Inheritance

```
dart
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class Animal {
  void sound() {
    print("Animals make sound");
  }
}

class Dog extends Animal {
  void bark() {
    print("Dog barks");
  }
}

void main() {
  var dog = Dog();
  dog.sound();
  dog.bark();
}
```

📌 10. Exception Handling

✅ Try-Catch

```
dart
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void main() {
  try {
    int result = 10 ~/ 0; // Division by zero error
    print(result);
  } catch (e) {
    print("Error: $e");
  }
}
```

- `~/` → Integer division

- `catch (e)` → Catches errors

📌 11. Async & Await

✅ Future & Delay

```
dart
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Future<String> fetchData() {
  return Future.delayed(Duration(seconds: 2), () => "Data Loaded");
}

void main() async {
  print("Fetching...");
  String data = await fetchData();
  print(data);
}
```

🎯 Next Steps

- Learn **Collections & Iterators**
- Implement **Streams & JSON Parsing**
- Work with **Flutter Widgets**