

St. Francis Institute of Technology, Mumbai-400 103
Department of Information Technology

A.Y. 2024-2025

Class: TE-ITA/B, Semester: VI

Subject: **MAD & PWA LAB**

Experiment – 1a: Study of Dart programming language.

1. **Aim:** To study the basics of Dart programming language.
2. **Objectives:** After study of this experiment, the student will be able to
 - Learn the basics of Dart language.
 - Write and execute programs in Dart language.
3. **Outcomes:** After study of this experiment, the student will be able to
 - Develop programs in Dart language. (L604.1)
4. **Prerequisite:** None.
5. **Requirements:** Personal Computer, 8 GB RAM, Internet Connection, Web browser.
6. **Pre-Experiment Exercise:**

Brief Theory:

Dart

Dart is an open-source general-purpose programming language. It was originally developed by Google and later approved as a standard by ECMA. It is an object-oriented programming language that bears resemblance to C, Java and Javascript.

Dart language is widely used to develop Android applications, iOS applications, IoT applications and web applications, using the Flutter framework. It supports application development in both client side and server side. A popular example of Dart application is Gmail.

Dart supports essential programming concepts such as variables, loops, arrays (lists), and conditional statements. It provides control flow structures like for, while, if, and switch to manage program execution. Dart also allows developers to work with object-oriented principles like classes and inheritance, and it utilizes a strong, but flexible type system for safer, more readable code.

For asynchronous programming, Dart includes the `async` and `await` keywords, enabling non-blocking execution of tasks such as network requests and I/O operations. These features, along with its efficient memory management and optimized performance, make Dart an ideal choice for building scalable applications.

7. Laboratory Exercise

A. Procedure

- i. Execute the following programming constructs in Dart.
Statements and variables, data types and return types, decision making and loops, arrays/ lists, functions, classes and objects, inheritance.

B. Result/Observation

- i. Print out of program code and output.

8. Post-Experiments Exercise

A. Extended Theory:

1. None.

B. Questions:

1. Write and execute a basic gaming application using Dart programming language.

C. Conclusion:

1. Write what was performed in the experiment.
2. Mention a few applications of what was studied.
3. Write the significance of the topic studied in the experiment.

D. References:

1. <https://docs.flutter.dev/get-started/fundamentals/dart>.
2. <https://www.w3schools.io/languages/dart-tutorials/>
3. <https://www.javatpoint.com/flutter-dart-programming>.
4. <https://www.codeproject.com/Articles/754484/Game-development-using-Dart>

Laboratory Exercise

1. Statements and Variables

Code	Output
<pre>void main() { String name = "Vishal Mahajan"; int rollNo = 56; String className = "TE IT A"; int batch = 4; print("Name: \$name"); print("Roll No: \$rollNo"); print("Class: \$className"); print("Batch: \$batch"); }</pre>	<pre>Name: Vishal Mahajan Roll No: 56 Class: TE IT A Batch: 4</pre>

2. Data Types and Return Types

Code	Output
<pre>int square(int number) { return number * number; } void main() { int num = 5; print("The square of \$num is \${square(num)}"); }</pre>	<pre>The square of 5 is 25</pre>

3. Decision Making

Code	Output
<pre>void checkEligibility(int marks) { if (marks >= 50) { print("Congratulations Vishal, you passed!"); } else { print("Better luck next time, Vishal."); } } void main() { int marks = 68; checkEligibility(marks); }</pre>	<pre>Congratulations Vishal, you passed!</pre>

4. Loops

Code	<pre>void printRollNumbers() { for (int i = 1; i <= 5; i++) { print("Roll No: \$i"); } } void main() { printRollNumbers(); }</pre>
Output	<pre>Roll No: 1 Roll No: 2 Roll No: 3 Roll No: 4 Roll No: 5</pre>

5. Arrays / Lists

Code	<pre>void main() { List<String> subjects = ["Web Lab", "MAD PWA", "BI LAB"]; print("Subjects of Sem 6 are "); for (String subject in subjects) { print(subject); } }</pre>
Output	<pre>Subjects of Sem 6 are Web Lab MAD PWA BI LAB</pre>

6. Function

Code	<pre>double calculateAverage(List<int> marks) { int total = 0; for (int mark in marks) { total += mark; } return total / marks.length; } void main() { List<int> marks = [85, 90, 88, 95]; print("Average Marks of Vishal Mahajan: \${calculateAverage(marks)}"); }</pre>
Output	Average Marks of Vishal Mahajan: 85

7. Classes and Objects

Code	<pre>class Student { String name; int rollNo; String className; Student(this.name, this.rollNo, this.className); void displayInfo() { print("Student Name: \$name"); print("Roll No: \$rollNo"); print("Class: \$className"); } } void main() { Student student = Student("Vishal Mahajan", 56, "TE IT A"); student.displayInfo(); }</pre>
Output	Student Name: Vishal Mahajan Roll No: 56 Class: TE IT A

8. Inheritance

Code	<pre>class Person { String name; Person(this.name); void displayName() { print("Name: \$name"); } } class Student extends Person { int rollNo; String className; Student(String name, this.rollNo, this.className) : super(name); void displayStudentDetails() { displayName(); print("Roll No: \$rollNo"); print("Class: \$className"); } } void main() { Student student = Student("Vishal Mahajan", 56, "TE IT A"); student.displayStudentDetails(); }</pre>
Output	<pre>Name: Vishal Mahajan Roll No: 56 Class: TE IT A</pre>

Post Experiment Exercise

Q. Write and execute a basic gaming application using Dart programming language.

Code	<pre>import 'dart:math'; void main() { print("Guess the Number Game!"); int target = Random().nextInt(100) + 1; List<int> guesses = [30, 50, 70, 90, target]; for (int i = 0; i < guesses.length; i++) { int guess = guesses[i]; print("Your guess: \$guess"); if (guess < target) { print("Too low!"); } else if (guess > target) { print("Too high!"); } else { print("Correct! The number is \$target. Attempts: \${i + 1}"); break; } } print("Game Over. Thanks for playing!"); }</pre>
Output	<pre>Guess the Number Game! Your guess: 30 Too low! Your guess: 50 Too low! Your guess: 70 Too high! Your guess: 90 Too high! Your guess: 57 Correct! The number is 57. Attempts: 5 Game Over. Thanks for playing!</pre>