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Dart programming Lab 1.

Question 1: Welcome Message Function

Welcome Message Function is a simple Function that display a welcome message on the screen. It uses a print() statement to show text output. Each Dart program can not run without main() which is the starting point of every Dart program.

What we have learned: We learned how to start a Dart program, how to create Function and how to print message on the screen.

What Real world Application: they are used when systems or applications start to greet users.

Question 2: Named parameters Function.

Void createStudent({required String name, required int age}) {} Allow us to clearly see which value is being passed to which parameter.

It use required keyword which ensure that important value like name and age must be provided.

What we learned: We learned how Named parameters work and why they make Function calls clear.

Real world application: Used in form and APIs where user

Information must be clearly provided.

Question 3: optional parameters Function.

optional parameters are useful when some information is not always available. this problem help us to understand port mal safetey. null safety prevent errors that happens when a value is missing.

What we learned: We learned how safety handle missing data using optional parameters.

Real world application: it is used in user profile where some details are optional.

Question 4: Class Student With Constructor.

A class is a blue print for creating object. the Student class has properties such as Name and Age. Constructor is used to initialize those properties when student object is initialized.

the this key word refers to the current object. It Helps to distinguish between class Variable and Constructor parameters.

What we have learned: - We learned how to create classes and uses constructor to initialize object

Real world application: they are used when creating record such as students, users or product.

Question 5: object Creation and Usage.

Object is An Instance of class. It allows to access and use the class properties and method object store data and represent real world item.

What we have learned: We learned how to create object and access their data.

Real world application: they are used in all object oriented system.

Part 3: Inheritance

Question 6: personal class

this problem introduce a base class class called person. A base class contains common properties and methods that can be shared by other class. It helps to reduce code duplications.

What we learned: We learned how base class work and why they are useful.

Real world application: they are used as parent classes in many application.

Question 7: Inheritance in Dart

Inheritance allows one class to reuse properties and methods of another class. Ex: the student class extends the person class. this means student inherits the properties and methods of personal class.

Super keyword is used to call the parent class constructor or methods.

What we Learned: We learned how inheritance create relationship between classes.

Real world application: they are used in systems which share features.

Part 4: Interfaces

Question 8: Abstract class as Interface.

Interface: defines rules that a class must follow It ensure consistency across difference classes.

this problem Explains Abstract classes. An abstract class can not be used to create objects. It only defines Methods that other class must Implement.

Abstract class act As a rule or Contract. this ensure that there is consistency in large Program.

What We learned: We learned How abstract classes enforce structure.

Real world application: they are used in big syst em to define Common behavior.

Question 9: Implement imp interface.

A class Implement an interface using the Impl ement keyword. When a class implements an Interface, it must define all the method declared in the interface. this ensures that class Follow specific rules.

What we have learnt: We learned How interfa Control behavior.

Real world application: they are used in APIs and plugin system.

Part 5: Mixins

Question no: Attendance Mixin

Mixin: is a way to reuse code without in her tance. this attendance Mixin adds attendan tracking Functionality.

Mixin allow adding Features to many classes.

What We learned: We learned how mixin help reuse code

Real world application: they are used to trackk & and Logging.

Question 11: Applying mixin

This problem applies the Attendance Mixin to the Student class using the keyword. This gives the Student class new behavior without changing Inheritance. Multiple mixins can be used in one class.

What we have learned: We learned to apply mixin in classes.

Real world application: They are used to add features easily.

Part 6: Collection in Dart

Question 12. list of student

list is store of multiple values of the same types and allows ordered access.

This problem use list to store multiple student objects list helps to manage many items together. We can loop through the list of access each student.

list keep data organized.

What we learned: we learned how to store and loop through Collections.

Real world application: they are used to manage the group of data.

Question 13: Map of Students

A map store key-value pairs and is useful for fast lookup using unique IDs.

This problem uses a map to store Student IDs

As keys and student object as values. Map allow fast access to data using key.

Maps are more useful when data needs quick look up.

What we learned: We learned How Map store key-value pairs.

Real World application: they are used in database and configurations.

Part 7: Anonymous and Arrow Functions

Question 14: Anonymous Function

Anonymous Functions have no name and are used for short, one-time task.

this problem uses anonymous function. Hesey are commonly used with lists.

Anonymous Functions make code shorter.

What We learned: We learned how to use Unnamed Function.

Real-world application: they used in callbacks and list operation.

Question 15. Arrow Function

this problem explains Introduce arrow Functions

Arrow Function syntax allows writting Functions in one line. It is useful for simple logic. this improves readability.

What We learned: We learned how to write short Function.

Real world application: they are used in Functional programming

Part 8: Asynchronous programming

Question 16: Async Function

This problem Explains asynchronous programming. the async and wait keywords are used for task that take time, like loading data. Async programming keeps apps responsive.

What we learned: We learned how async task work

Real world application: they are used in Network requests.

Question 17: Using Async / Wait.

This problem uses Async Function inside the main program. the program waits for results before Continuing. this make async code easy to read

What We learned: We learned how to manage async flow.

Real world application: they are used in Flutter apps.

Part 9: Integration Challenge.

Question 18: Mixins Vs Inheritance

This problem Compare mixins and Inheritance. Inheritance shows an "is-a" relationship while mixins add extra behavior. Understanding the difference helps in good design.

What We learned: We learned when to use mixins or Inheritance

What Real world apps: they are used in Clean software design.

Question 19: Notification mixin

This problem adds Notification feature using another mixin. Multiple mixins can be used together to add more behavior. This keeps code organized.

What we learned: We learned how to combine mixins

Real world application: they are used for alerts and Notification.

Question 20: Dart and Flutter Connection.

This problem Explains how dart is used in Flutter Flutter apps are written in Dart, so learning Dart make Flutter easier. Understanding Dart basics is important before learning Flutter.

What We learned: We learned the Connection between Dart and Flutter.

Real World application: they are used to build Mobile and cross-platform application.

Conclusion.

This lap helped me understand Dart programming step by step. We learned about Functions, Classes, Inheritance, mixins, Collection and Asynchronous programming. These Concepts are important for building Real-World Dart and Flutter applications.