Group 10

Dart programming lab 1

PART 1. FUNCTIONS

Q1. A function is a reusable block of code designed to perform a specific task within a program.
the general reason for using functions is to organize code into logical sections, reduce repetition, and improve readability and maintenance.

functions allow developer to write code once and reuse it whenever needed.

So In this case welcome message function is created to display a welcome message for the school system. Instead of rewriting the same welcome message in multiple places, the function handles it in one location, making the program cleaner and easier to update in the future.

Q2. Named parameter allow function arguments to be passed by explicitly stating the parameter name. the general reason for using named parameters is to improve clarity, reduce errors, and make functions easier to understand, especially when multiple values are involved.

In this case using named parameters for student name and age makes the function call more readable and prevents mistakes such as mixing up the student's age and name when creating student records.

Q3. optional parameters allow a function to work even when some arguments are not provided. the general reason optional parameters are used is to increase flexibility and allow functions to handle incomplete or optional information without failing.

Here a teacher may not yet be assigned a subject. the optional subject parameter allows the program to still create a teacher profile while clearly indicating that the subject is not assigned.

PART 2. CONSTRUCTORS AND classes

Q4. A constructor is a special method that initializes an object when it is created. the general reason constructors are important is to ensure objects begin with valid and well-defined data, maintaining consistency and correctness in the program,

In this case, the constructor ensures that every student object is created with name and age, preventing incomplete student records in in the school system.

Q5.
An object is a real instance of a class that holds actual data. the general reason for creating objects is to represent real-world entities in a program and allow interaction with their data and behavior.

- creating a student object allows the system to store and display individual student details such as name and age, just like real students in a school.

Part 3: INHERITANCE

Q6. A class is a blueprint that defines properties and behaviors shared by objects.
the general reason classes are used is to structure programs in an organized way and model real-world concept logically.

- The person class represents common human attributes, which can later be reused by other roles like students or teachers.

Q7. Inheritance allows one class to acquire properties and methods from another class. the general reason inheritance is used to promote code reuse, reduce duplication, and create logical relationships between classes.

- Student inherits from person so that it automatically has a name and introduction behavior, reflecting the real-world fact that every student is a person.

PART 4: INTERFACES

Q8. An interface defines a contract that specifies what methods a class must implement. the general reason interfaces are used is to enforce consistency and ensure certain behaviors exist across different classes.

- Registrable interface ensures that any class capable of registering courses must implement the registration functionality.

Q9. implementing an interface means providing concrete implementations of its methods. the general reason for implementing interface is to guarantee that a class follows required rules and behaviors.

- the student class must implement course registration, ensuring all students can be registered consistently within the system.

PART 5: MIXINS

Q10. A mixin is a reusable set of methods and properties that can be added to a class. The general reason mixins are used is to share behavior across classes without creating inheritance chains.

- Attendance mixin provides attendance tracking functionality that can be reused by multiple classes such as student or teacher.

Q11. Applying a mixin adds extra behavior to a class. The general reason mixins are applied is to extend functionality without altering the class's main structure.

- The student gains attendance tracking capability without changing its inheritance from person.

PART 6: Collections

Q12. List is an ordered collection that stores multiple items. The general reason lists are used is to manage groups of related data efficiently.

- A list stores multiple student objects, allowing easy management of class members.

Q13. Map stores data as key value pairs. The general reason maps are used is to allow fast and organized data access using unique keys.

- Student IDs are used as keys to quickly retrieve specific student information.

PART 7: Anonymous and Arrow functions

Q14. Anonymous functions are functions without names. The general reason anonymous functions are used is to perform short, one-time operations efficiently.

- An anonymous function is used to print student names while looping through a list.

Q15. Arrow function provide a concise syntax for simple functions. The general reason arrow functions are used is to reduce code verbosity and improve readability.

- An arrow function prints greeting messages for students in a simple and clear way.

PART 8: Asynchronous programming

Q16. Async functions handles operations that take time to Complete. the general reason async programming is used is to keep applications responsive while waiting for data.

- loading student data simulates fetching information from a database or server.

Q17.

the await keyword pauses execution until an async task completes. the general reason await is used to ensure correct program flow and data availability.

- the system waits for Student data before counting and display it.

PART 9: INTEgration challenge

Q18

Inheritance shares Structure, while mixins share behavior. the general reason mixins are useful is their flexibility in adding functionality without strict relationships.

- Attendance or notifications can be added to many classes without redesigning class hierarchies.

Q19

NotificationMixin adds notification behavior. the general reason for using this mixin is to extend functionality without modifying existing logic.

- Students receive notifications when registering for courses.

Q20.

Dart is the programming language used by flutter. the general reason learning Dart helps with flutter is that flutter relies on Dart syntax and concepts.

- understanding Dart makes it easier to build widgets, manage state, and handle asynchronous operations in Flutter apps.