1. You are developing a ***welcome message system*** for a digital platform that supports ***three types of users*** such as administrators, guests, and students. Every user on the platform has a name, a specific role, and optionally an email address.

When a user logs in, the system should greet them differently depending on their role. If the user is an administrator, the message should say, “Welcome Admin <username>!”. For guests, it should display “Welcome Guest!”, and for students, the message should be “Welcome <username>!”.

In addition to this, if the user's email address is available, the message should also include the line “Your email is <EMAIL>”, with the email converted to ***uppercase***.

Design a function that takes in a user’s details and returns this customized welcome message. Then, test the function by creating two users: one with an email address and one without, and print the welcome message for each.

(15 Marks)

2. You are creating a system to manage a ***student’s academic performance*** by tracking their marks in different subjects. Each student has a name and a collection of subject-wise marks. When the marks are modified—such as when a new subject is added or an existing score is updated—the system should print a message indicating that the student's grades have been updated.

To evaluate the student's performance, calculate the average of all their marks using a ***computed property.*** If the student has ***no marks*** yet, the average should be shown as ***zero***.

Finally, write a function that prints the student’s name along with their average marks. Test this system by creating a student, updating their marks, and generating their report.

(15 Marks)

3. You are building a **basic control system** for **smart home devices** that can handle various types of equipment such as smart lights and smart thermostats. Every device

in the system has a name, which helps identify it within the home. To organize this setup, start by creating a general class (***Smart Device***) that stores the common property — the device name.

Next, define specific types of devices that inherit from the general class. For a smart light, add a method that turns on the light and prints a message like “Light Living Room is now ON”. For a smart thermostat, add a method that sets the temperature to a given value and prints a message such as “Thermostat Hall is set to 22°C”.

Now write a function that accepts ***Smart Device*** and determines what kind of device it is. If it's a light, it should call the method to turn it on. If it's a thermostat, it should call the method to set the temperature. Finally, create a list of devices and loop through them, passing each to the function to perform its specific action.

(20 Marks)