**Modularisation Through Decomposition**

**Scenario: Developing a Smart Home System**

**Introduction**

You are part of a software engineering team tasked with designing a **Smart Home System**. This system will allow users to control various home devices, such as lighting, security, thermostat, and entertainment, through a mobile app.

Your goal is to break down this complex system into smaller, manageable modules using the **modularisation approach of decomposition**.

**Step 1: Identify Major Subsystems**

1. A Smart Home System consists of multiple components. Based on the given scenario, list at least **four major subsystems** that your system should include:



1. Explain why it is important to break a large system into subsystems.



**Step 2: Decomposing Subsystems**

Each subsystem consists of smaller modules. Choose **one** of the subsystems from Step 1 and break it down into at least **three functional modules**.

* **Subsystem Chosen:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* **Functional Modules:**

1. Define the role of each module and explain how they interact with each other:

**Step 3: Assigning Teams and Responsibilities**

Imagine you are working with a team to develop your chosen subsystem. Answer the following:

1. What role would each team member play in developing the modules? (E.g., developer, tester, designer, project manager, etc.)
   * **Role 1:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   * **Role 2:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   * **Role 3:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   * **Role 4:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Why is it important for teams to work on separate modules instead of the entire system at once?



**Step 4: Testing and Integration**

1. How would you test each module separately before integrating them into the full system?
2. What challenges might arise when integrating the modules into one complete system?
3. Suggest a strategy to ensure smooth integration of all modules.

**Step 5: Reflection**

1. How does decomposition make a project more manageable?
2. What are some real-world examples where modularisation is used outside of software development?