# CQI TASK FOR SOFTWARE CONSTRUCTION

## GROUP MEMBERS:

| Name | Enrollment No. |
|---|---|
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Develop project definition, vision statement, FR & NFR, 4 Uml diagrams, 2 low fidelity, and 2 high fidelity prototypes of the ADVANCED HOME SYSTEM. on the slides. A GitHub repository is to be made containing all the individual solutions to these tasks and a formal report containing all the tasks solutions. This can be done in a group of maximum 4 students.

**SOLUTION**

**Advanced Home System Project Definition:**

This project aims to develop a

Watt Sense is an IoT-based device that measures and tracks the users' energy in real time. It provides the users with an estimate of their bills. The purpose of this device is to enable its users to manage the consumption of electricity quite effectively, achieve cost saving, and reduce the wastage of energy. It employs IoT technology to track real-time consumption, advanced analytics, and alerts for atypical usage patterns. With these qualities, Watt Sense enables a user to gain an accurate understanding of energy consumption for better decision-making.

**Vision Statement:**

**For** homeowners struggling with fragmented smart device control, **who** need a centralized way to manage their devices, **the** Smart Home Automation System **is a** mobile application **that** integrates and controls various smart devices from a single, user-friendly interface. **Unlike** the current, disparate control methods, **our product** provides seamless experience, unifying device management and enhancing overall home automation.

## Functional and Non-Functional Requirements

### Functional Requirements (FR)

- REQ-1: The system shall print the real-time data of power consumption.
- REQ-2: The system shall notify the user if updating the data is delayed more than a certain threshold specified.
- REQ-3: The system should provide the Watt Sense device with an ability to be turned off through a digital on/off button for one level of added user control.
- REQ-1: The system must feature self-setting of an individual's specific consumption limits by intervals of time, like establishing a monthly limit.
- REQ-2: The system must be featured with alerting or notifying the user once the set energy consumption threshold has crossed.
- REQ-3: The system should contain details of the notification about the current consumption along with the time when the alert was issued.
- NEW REQ-4: The system must allow users to select how they receive alerts (e.g., email, app notifications). **SMS functionality is not included in the project scope**.

### Non-Functional Requirements (NFR)

**Performance Requirements**

- ❖ It should also deal with various requests simultaneously from the different devices with minimal latency.
- ❖ It should load within 3 seconds under normal network conditions.
- ❖ The system must support up to 1000 concurrent users, and there should be no degradation of performance.

**Safety Requirements**

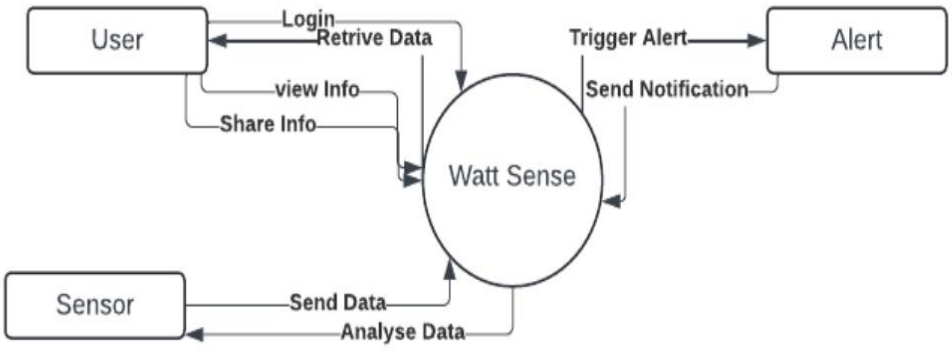
- ❖ An IoT must entirely comply with every electrical safety standard to avoid overheating or overloading as well as other electrical hazards.
- ❖ Provisions for proper insulation and fail-safe must also be there to prevent any type of electrical damage.
- ❖ The system must automatically turn off or provide warnings if it sees unsafe conditions such as a power surge.

**Security Requirements**

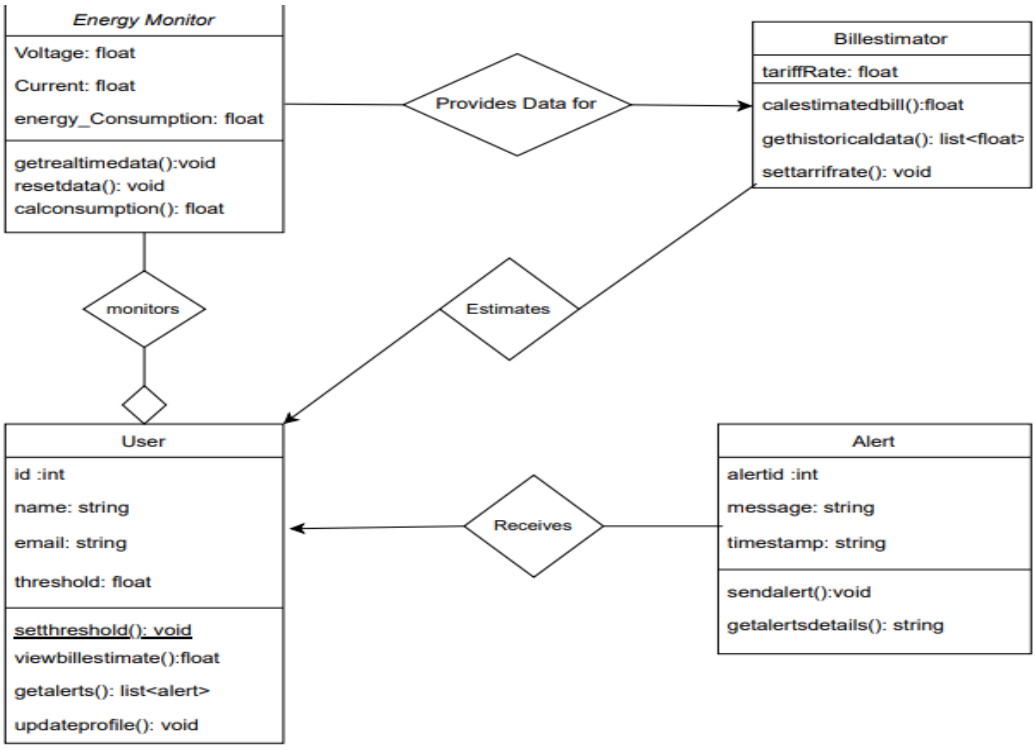
- ❖ User's data should be encrypted in motion and in rest to respect user's privacy.
- ❖ Two-factor authentication should be applied on sensitive user operations, such as configuration of thresholds and views for historical data.
- ❖ It must also adhere to data protection laws.

## Diagrams:

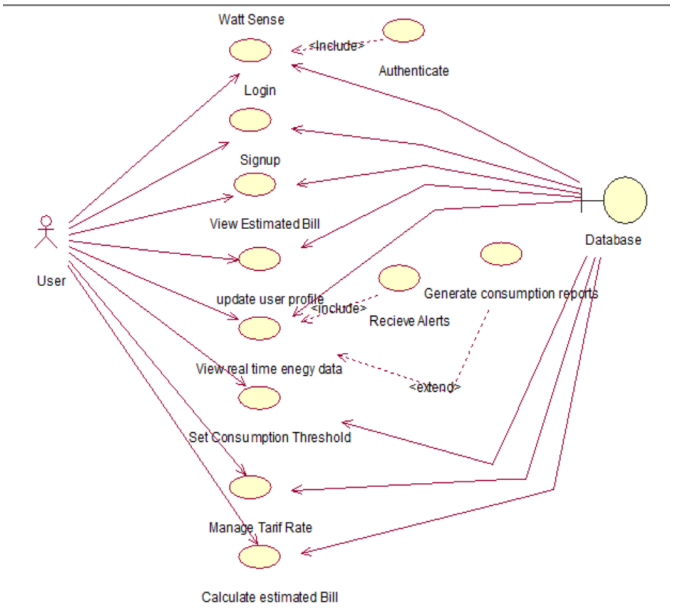
**Context Diagram**:



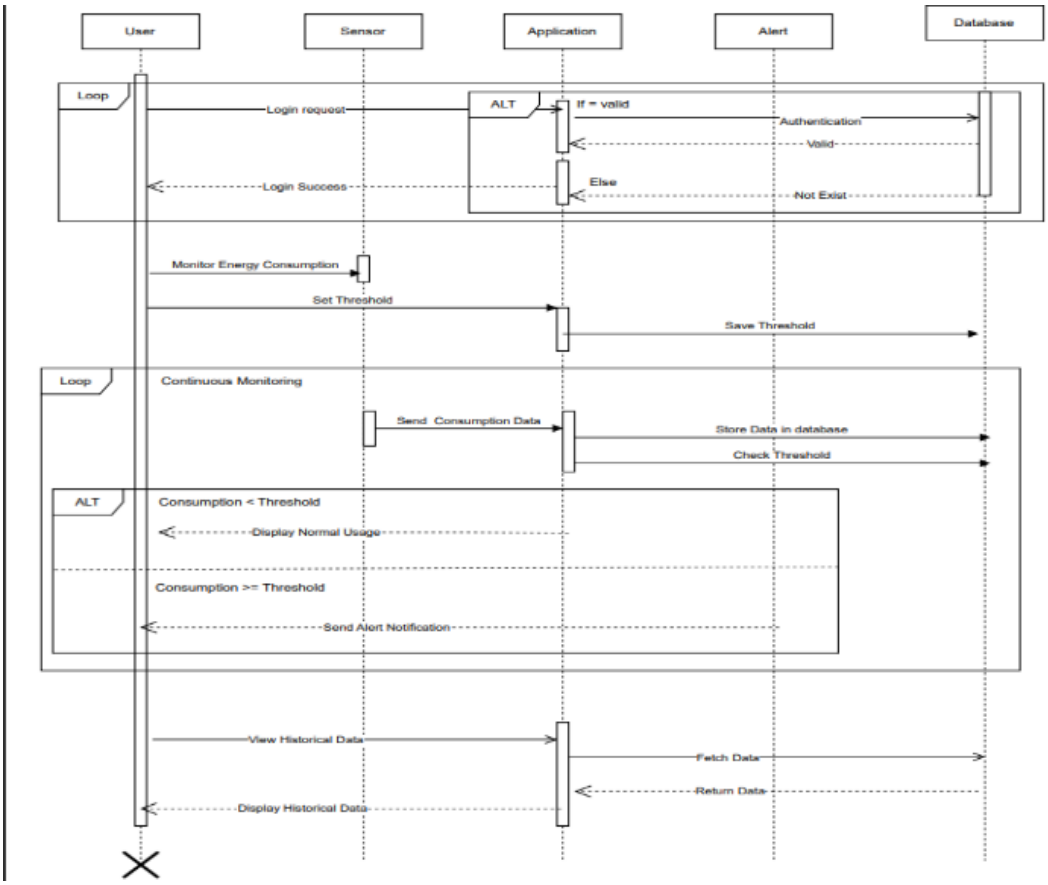

**Class Diagram:**



## Use Case Diagram:




Sequence diagram

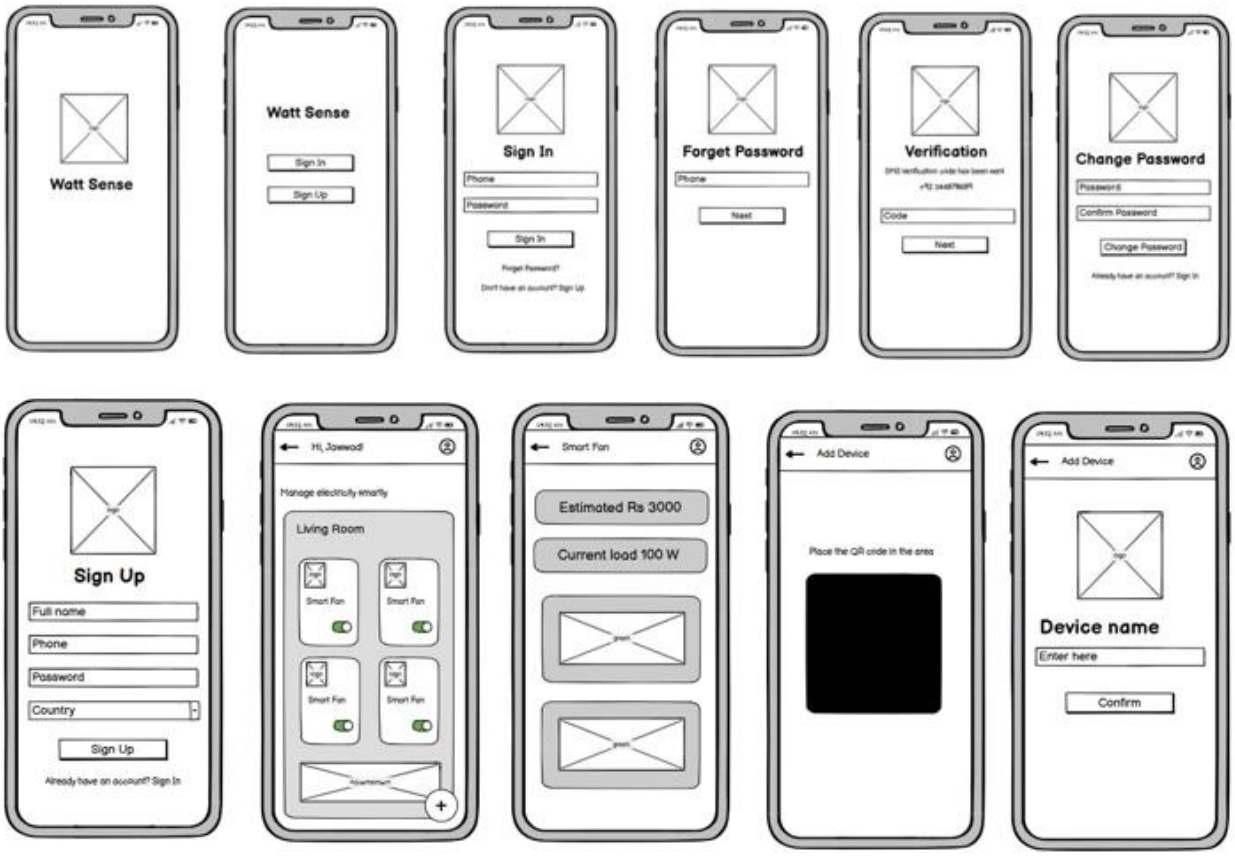


## Prototyping: Bringing Ideas to Life

Prototyping is a crucial stage in software development, acting as an iterative method to visualize the product. Early-stage prototypes help gather feedback from users, allowing developers to refine the interface and functionality before launching into full-scale development. In the context of our Smart Home Automation System, prototypes can be either low-fidelity or high-fidelity.

### Low-Fidelity Prototypes

Low-fidelity prototypes are simple representations of the user interface that focus on layout and functionality, not aesthetics. They are quick to create and ideal for gathering early feedback.



## High-Fidelity Prototypes

High-fidelity prototypes are more detailed and interactive, closely resembling the final product. They are used to test the user experience with realistic visuals and interactions.