IoT Design and Development Project

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Class: Introductory IoT

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Project Overview

In this activity, you will work in teams to design and develop an IoT solution using **MQTT**, **REST APIs**, or a combination of both. Each team will be assigned one of ten problems to solve. Your goal is to create a working prototype, document your solution, and present it to the class.

Tools and Technologies

You will use the following tools and technologies:

- **MQTT Broker**: For real-time communication (e.g., Mosquitto, HiveMQ, or EMQX).
- **REST API**: For managing data and devices (e.g., Flask in Python or Express in Node.js).
- **IoT Devices**: Simulate devices using Python scripts, Arduino, or Raspberry Pi (if available).
- **Optional**: Cloud platforms like AWS IoT, Google Cloud IoT, or ThingSpeak for advanced features.

Project Problems

Each team will be assigned one of the following problems.

1. Smart Home
2. Parking Spot Finder
3. Smart Irrigation System
4. Wearable Health Monitor
5. Smart Water Supply System

Deliverables

Each team must submit the following:

- Requirements analysis.
- **Working Prototype**: A functional solution (simulated or real) that demonstrates the use of MQTT and/or REST APIs.
- **Code and Documentation**: Well-structured code with a README file explaining how to set up and run the project.
- **Presentation**: A 2-3 minute presentation explaining your solution, challenges faced, and key learnings.

Bonus Challenge (Optional)

For advanced teams, consider adding one of the following features:

- Integrate a cloud platform (e.g., AWS IoT, Google Cloud IoT) for data storage and analytics.
- Create a dashboard to visualize real-time data.
- Add authentication or security features to your REST API.