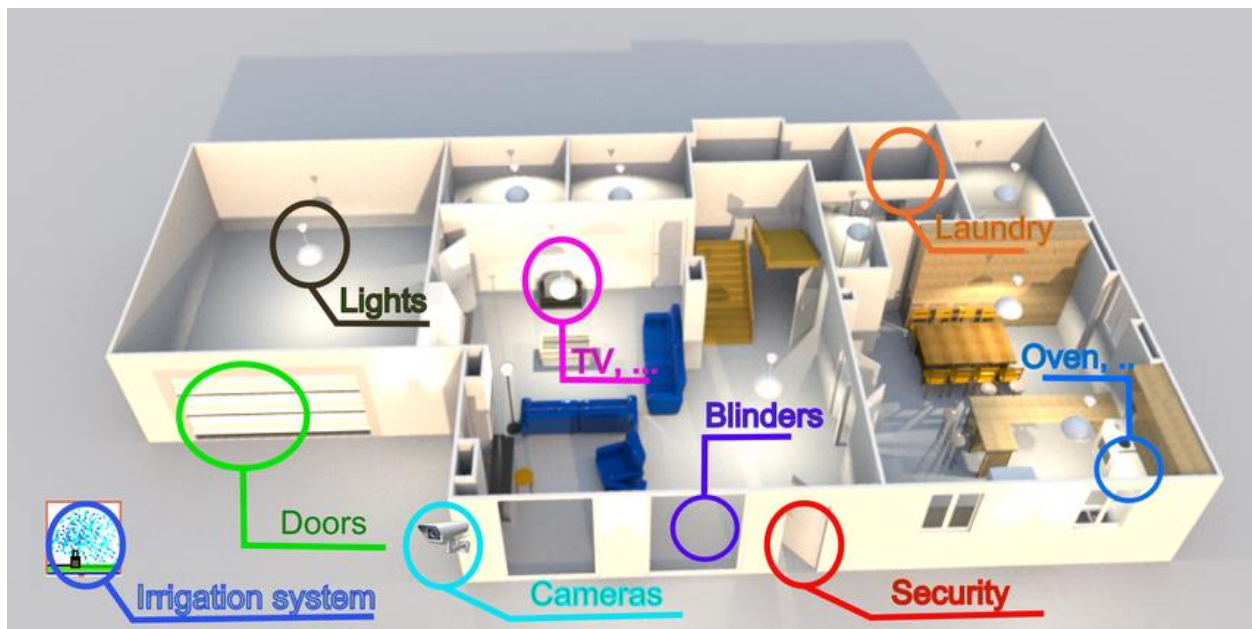# Activity No.2: CASE STUDY

Introduction:

Imagine you are part of a team working for a technology company that specializes in smart home automation systems. Your company is developing a new product, and you have been tasked with analyzing the embedded systems characteristics and challenges associated with this project.

Scenario:

The goal is to create a smart home automation system that integrates various devices and appliances within a household to enhance convenience, security, and energy efficiency. The system will allow homeowners to control lighting, heating/cooling, security cameras, and more from their smartphones or voice commands.

https://www.researchgate.net/figure/Overview-of-the-home-automation-system_fig2_263196998

Example of a Home Automation System

Tasks: Make a presentation with the following details of some characteristics need to build based on the given scenario of an embedded system.

Resource Constraints:

Identify the key resource constraints that embedded systems in a smart home automation system might face. Consider factors such as **processing power**, **memory**, and **energy consumption**.

- Specify the use of Microprocessor or Microcontroller used

Real-Time Operation:

Explain how real-time operation is essential for specific functions in a smart home, such as security monitoring and voice control. Discuss the implications of real-time constraints on embedded systems.

- Include diagrams, process or flowchart

Security Considerations:

Analyze the security aspects of embedded systems in a smart home. How can vulnerabilities be minimized to prevent unauthorized access or cyberattacks?

- Include steps or algorithm to implement security measures.

Long Lifecycle:

Discuss the importance of long-term support and updates for smart home devices. How can the company ensure that embedded systems remain secure and functional over time?

Dedicated Functionality:

Describe the dedicated functions of various devices within the smart home system. How does the design of embedded systems differ from general-purpose computers to meet these specific tasks?

- Include design of the system

Conclusion

Summarize the main characteristics and challenges of embedded systems in smart home automation. Discuss the relevance of these insights in the broader context of the Internet of Things (IoT) and the future of embedded systems.
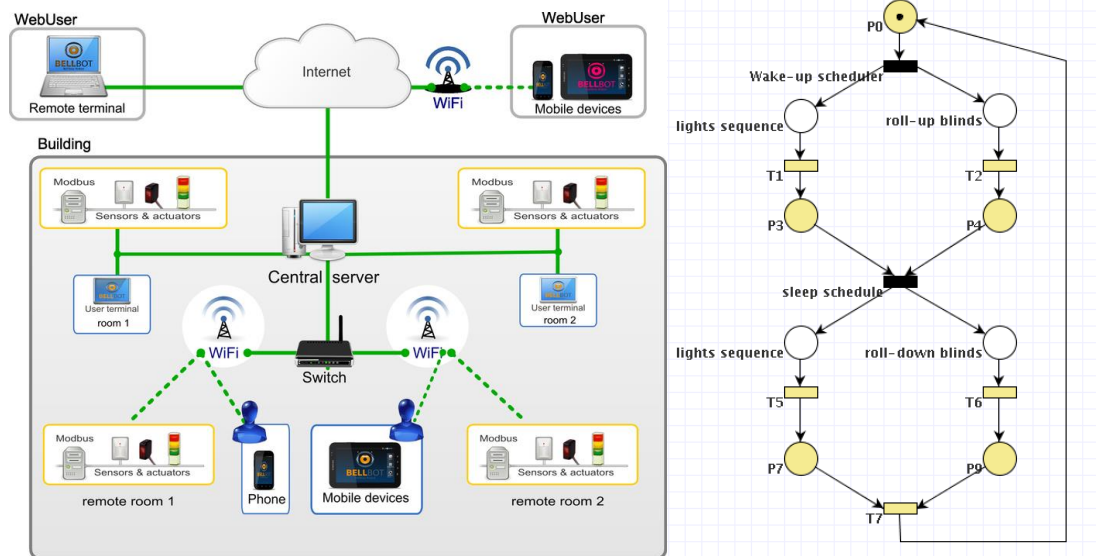
References

List all the sources, references, and citations used in the report. Follow a consistent citation style (e.g., APA, IEEE)

Note: You will present this report on the assigned lecture hours.

Some examples of supporting details:

Overview of the Designed Home Automation System and Process flow of some devices

RUBRICS

CPE412: EMBEDDED SYSTEM

Criteria	EXCELLENT 5	ADVANCED 4	PROFICIENT 3	BASIC 2	POOR 1
Content (Understanding of Embedded System)	Exhibits an exceptional understanding of embedded systems. Provides a comprehensive, accurate, and highly detailed analysis. Addresses advanced concepts and demonstrates a profound knowledge of the subject.	Displays an in-depth understanding of embedded systems. Provides accurate, detailed, and relevant information. Addresses advanced topics and concepts in depth.	Demonstrates a solid understanding of embedded systems. Provides accurate and relevant information. Covers essential components and concepts comprehensively.	Shows a limited understanding of embedded systems. Contains some inaccuracies or gaps in information. Only covers basic components and concepts.	Demonstrates a lack of understanding of embedded systems. Contains inaccurate or irrelevant information. Fails to address key components and concepts.
Organization and Structure	The report's organization is flawless and enhances the content. Information is presented with exceptional clarity and coherence. Introduction, body, and conclusion are masterfully executed.	The report is exceptionally well-structured and cohesive. Information is presented logically with seamless transitions. Introduction, body, and conclusion are insightful and well-crafted.	The report is well-organized and flows logically. Information is structured with clear transitions. Introduction, body, and conclusion are well-developed.	The report has some organization but lacks coherence. Information is somewhat structured, but transitions are weak. Introduction, body, and conclusion are present but not well-developed.	The report lacks a clear structure and organization. Information is presented in a chaotic and confusing manner. No clear introduction, body, or conclusion.
Technical Accuracy	The report is technically flawless. Demonstrates exceptional expertise in	The report is highly technically accurate. Demonstrates an in-depth understanding	The report is technically accurate for the most part. Demonstrates a solid understanding	The report has some technical inaccuracies. Demonstrates a limited understanding	The report contains numerous technical inaccuracies. Fails to demonstrate a

	technical details. Provides precise, accurate, and highly detailed technical information.	of technical details. Provides precise and accurate technical information.	of technical details. Provides accurate technical information.	of technical details. Some information provided is correct, but significant errors exist.	grasp of technical details. Information provided is mostly incorrect.
Teamwork	Exceptional teamwork and collaboration. All team members actively and synergistically contribute. A cohesive and harmonious team with no interpersonal conflicts.	Highly effective collaboration among team members. All team members contribute actively and constructively. No interpersonal conflicts observed or quickly resolved.	Effective collaboration among team members. Most team members contribute actively. Minimal interpersonal conflicts, effectively resolved.	Limited collaboration among team members. Uneven contributions from team members. Some interpersonal conflicts.	The team shows a complete lack of collaboration. Little to no contribution from team members. Interpersonal conflicts disrupt the project.
Overall Assessment	The report/teamwork is outstanding, showcasing exceptional work.	The report/teamwork is excellent, demonstrating above-average performance.	The report/teamwork is good and meets expectations.	The report/teamwork is below average but shows some potential.	The report/teamwork requires significant improvements in multiple areas.