

CS698T: Introduction to IoT and its Industrial Applications

Autumn 2021

Due Date: August 23, 2021 (11:59 PM)

Instructions:

- This is a group assignment with TWO members in a team. (You can also submit the assignment individually; however, it is advisable to form a group.)
- Only electronic submissions in PDF format will be accepted. Your PDF write-up must be typeset in LaTeX. We have provided a LaTeX template file Assignment1sol.tex to help typeset your PDF write up. Use it to complete the assignment.
- The PDF write-up containing your solution has to be submitted via the mookit (Hello IITK) platform.
- Your submission file should be named as Member1RollNumber_Member2RollNumber.pdf
- Your solutions must appear in proper order in the PDF file i.e., the solution to a question must be complete in the PDF file (including any tables) before you present a solution to next question.
- Late submission penalty (10%): We will be accepting late submissions up to 24 hours after the deadline. We won't be able to accept submissions after that.
- Only one person from the group should submit the assignment.

Question 1 (40 Marks)

Comparative Study of IoT Development Boards: Perform a detailed comparative study of at least six different development boards used in the current IoT applications. Your study should at least cover the following aspects relevant to the boards:

- Hardware details
- On board storage
- Power consumption
- Supported Operating systems
- Supported communication protocols
- GPIO

- Cost of the board
- Supported sensors
- Any limitations

You are encouraged to explore any other relevant aspects that you feel are important that should be covered.

Don't choose all the boards from the same family or manufacturer. Try to select development boards that are as diverse as possible.

In the end, write a summary of the insights you have gained from this comparative study, like the major design choices and their advantages and disadvantages. Mention all the sources that you use to perform this comparative study under references.

Deliverables for Question 1:

- Table of Comparison (20-marks)
- Comparison Summary (15-marks)
- References (5-marks)

Question 2 (30 Marks)

(Study on Popular IoT Simulators)

Discuss different popular simulators that simulate IoT systems. Write about what development boards, communication protocols, sensors, and any other relevant aspects of IoT systems they support.

Make a comparison summary between these simulators and mention the positives and negatives you have found about them. Mention all the sources that you use under references.

Deliverables for Question 2:

- Table of Comparison (10-marks)
- Comparison Summary (15-marks)
- References (5-marks)

Question 3 (30 Marks)

(Application Survey)

Write about different IoT applications in which the development boards you studied in question 1 are used. Mention why that particular board was chosen for that application. Write at least one application for each IoT development board you have studied in Question 1. Mention all the sources that you use to under references.

Deliverables for Question 3:

- Survey (25-marks)
- References (5-marks)

Additional Instructions

You are free to refer to any content available online; however, you must mention all the references you used for solving this assignment. [1], [2] are some of the resources you can refer to start.

References

- [1] A. Raza, A. A. Ikram, A. Amin, and A. J. Ikram, “A review of low cost and power efficient development boards for iot applications,” in *2016 Future Technologies Conference (FTC)*, pp. 786–790, 2016.
- [2] N. Tewari, N. Deepak, M. Joshi, and J. S. bhatt, “Comparative study of iot development boards in 2021: Choosing right hardware for iot projects,” in *2021 2nd International Conference on Intelligent Engineering and Management (ICIEM)*, pp. 357–361, 2021.