1. What is the abstract of your project work?

The main concept of my project work is to keep student attendance data secured and hassle free accessing of data. Each and every teacher and student are provided with a unique RFID tag identity card which is to be swiped or scanned by RFID scanner to record student's attendance as well which teacher is taking which class in which room.

2. What are the different technologies / concepts / theories used in your project? [Hints: IoT based or PLC based]

Ans: The complete system comprises and utilizes many other technologies, either hardware or software, and each technology is based on its own set(s) of principles. The technologies that are an integral part of this system are listed below:

 ● Radio Frequency IDentification (RFID).

● Use of microcontrollers for carrying out logical operations.

● LoRa module and LoRaWAN protocol.

● Database and Database Management System.

3. What kind of value addition will it do to the current technology /product? [Hints: real life applications of IoT or PLC]

Ans: (i) It enables administrators to quickly take real-time attendance. It provides robust, secure and automatic attendance management. It supplies a communication and interactive way from school to home.

(ii) It helps minimize human induced error(s). The data is stored in an organized manner which helps to resolve any conflict that may arise. The system is reliable and secure, hence protecting the date of any ID card holder.

(iii) It saves time as compared to the traditional method of attendance registering process. It's easy to operate and efficient.

(iv) The communication network and protocol used, LoRa, is very robust, immune to interference, secure, provides long battery life and suits the requirements for this process.

(v) Since the system is designed to be active only when required as well as it consists of a power saving communication system, the system maintenance required is very low and it is speculated to have a long lifetime.

4. Draw flow-chart / block-diagram / data flow (high level design) diagram for your project?
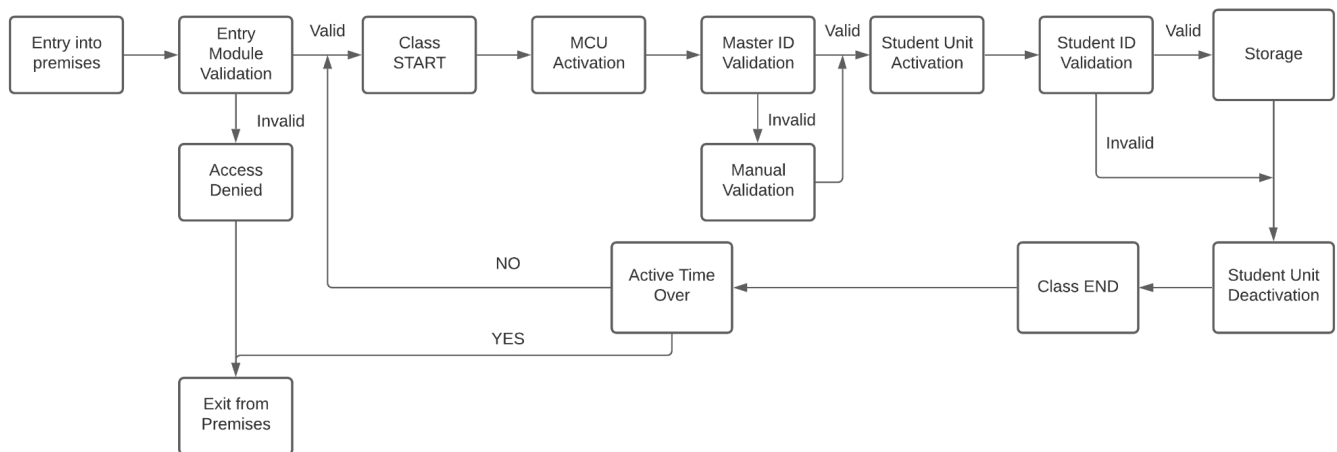
5. What are the methods you have used for requirement elicitation?

The methods that we have used for requirement elicitation/gathering are Brainstorming sessions, document analysis and observation.

6. Have you used any standard methodology to carry out your project work? Why?

We have used the Waterfall method to carry out our project work because phases have to be completed in a linear, sequential manner, and each stage of the project must be completed before the next begins.

7. Who are your clients?

The Primary client is Educational institutions / organisations.
By small modification(s), the idea can also be applied to various sectors like industry, health sector, etc.

8. Have you done cost estimation for your project? How?

Yes.
By taking into account market price of each required component for manufacturing a single unit (initial investment),
By estimating the service life of different components,
How frequently they are required to be altered (maintenance and repair), and
The time it takes to manufacture a single unit (labor).

9. Have you done the feasibility study for you project? What are those? Or Have done any

market survey for the work? [Hints: is the project reliable, user friendly, cost effective]

Yes, we have done the feasibility study for our project. In fact this is the most advantageous part of our project.

Here, the communication network and protocol used, LoRa, is very robust, immune to interference, secure, provides long battery life and suits the requirements for this process and it is cost effective.

RFID is also a very cost-effective technology and the greatest advantage of a passive tag is its low cost. The enhanced revenues achieved can be very quickly cover the cost of the initial outlay.

10. Why have you selected this topic?

The previous system of attendance monitoring is a manual system which can lead to data redundancy and as the system is carried out in hand written registers it is much time consuming and beside this retrieval of the data from that hand written registers is very time consuming and tough to maintain. So, to overcome this drawback this topic is selected to reduce human effort and time as much as possible.

Also it incorporates emerging technologies like IoT, LoRa and is based on real-life applications.

11. Questions on technologies/concepts/ theories used. [Project specific knowledge in detail about IOT]

The design of an RFID based attendance monitoring system which uniquely identifies each student based on their RFID tag which is attached to their ID card. This makes the mechanism of recording the attendance effortless, quicker, protected as compared to conventional methods. The proposed system consist of both hardware and software components based on IOT technology. The hardware component consists of RFID card reader, LoRa module, biometrics , and RFID cards. The software component consists of the proteus, DBMS and Arduino IDE. Data is stored in a database server .The student just need to place their RFID card on the reader and their attendance will be recorded.

12. How is your project-work going to help society? Or What are the social implications of the project? Or What is the scope of the project?

As I said earlier, it reduces much time and human effort compared to the existing system.

Also, it minimizes human induced error.

By this system we can minimize the proxy and other kinds of malpractices.

Also, the data is stored in an organized manner which helps a lot while retrieving or solving any conflict that may arise. Beside this this system is reliable, secure and trustworthy.

13. What are your own contributions in the project?

In every stage, we have worked jointly as a team but my prominent contributions were during the requirements stage, the design stage and the construction stage of our project work.

14. How have you broken down the project modules and distributes among your team members?

The project work was divided into several stages and each stage was further distributed into different modules to complete within the time limit.

The stages and its modules are listed here:

I. **Requirement stage**
   A. Problem Definition.
   B. Comparison of different available methods.
   C. surveys.
II. **Analysis stage**
   A. Feasibility study.
   B. Availability of component survey.
   C. Market survey.
III. **Design stage**
   A. Step by step modelling of different modules.
   B. Fault finding and correction.
   C. Finalising.
IV. **Construction**
   A. Component selection.
   B. Value calculations.
   C. Schematics.
   D. Data formats.
V. **Testing**
   A. Unit testing.
   B. Integrity testing.

15. Overall knowledge of the chip / microprocessor / microcontroller / tool / kits used to implement the project or what are the different components used to implement the project?

RFID based attendance monitoring system comprising three basic units such as -

i) Entry Level Module.

ii) Master Control Unit (MCU).

iii) Student Control Unit.

Entry Level Module- This module basically looks like a credit card swipe machine having a LCD display panel at the top along with a keypad over its body. At the top part a RFID scanner is present along with a camera for facial recognition.

Master Control Unit- This Unit consists of a RFID reader on the side, a display panel at the top along with a keypad below the display where teachers have to enter their authorized key for activating all student units inside the classroom.

Student Control Unit- This unit consist of three layers and an outer covering:

Upper Layer – This layer contains a RFID reader which is used to read the data sent from the Identity card. This data is then processed by the control unit.

Middle layer- In this layer a gap is made where students have to insert their RFID tag for attendance which basically contains an unique ID and other relevant data like student name, roll, dept, class/semester, etc.

Bottom Layer- This layer contains a battery unit which provides power to the CAT unit and the reader to read data from the RFID tag. It also contains a Control and

Transmission Unit (CAT Unit). This unit retrieves the data from the RFID reader and sends this data to the MCU through LoRa.

Casing- The casing is the outer cover of the student unit which holds all the three layers together and contains two indicative LEDs (one red and one Green LED) on topside.

16. Have you used any database for your project? What?

Ans: Yes, we have used database management system (DBMS) in our project to operate large amount of information (relevant data like teacher's name, student's name, roll no, department, semester etc.) by storing, retrieving and managing data. It is an integral part of our project but it can be any database management system available in market for storing data according to the customer's choice.

17. Limitation / constraints of your project? How can you overcome such limitations?

      1.   It is not as false-proof as biometric, the system is prone to manipulation.

To overcome this type of limitation, to spend more money and use a biometric system or use a display to make the proper RFID based attendance system.

18. What is your future plan with the project?

ANS: To implement the project in all academic institutions , in service sectors where the attendance system is not so updated and time consuming.

19. Any literature survey you have done for your project? Which literature has helped you the most?

Ans : Yes I have done surveys over lora, RFID concepts.

In that case , Wikipedia has helped the most.

20.What are the methodologies you are going to use to test your project? [comparison with theoretical result]

Ans: The mode of communication is wireless using Radio frequency module and LoRa module . The primary purpose of an RFID system in this application is to detect the presence and absence of the student data is to be transmitted wirelessly which is read by an RFID reader.

TESTING METHODOLOGIES:

1. Integrity testing

2. Unit testing

21. How have you scheduled your time? What are the progresses? [Hints: time duration to complete different stages of your project. Present status report]

For each stage of our project work, we have specified a duration for completion. These are as follows:
    I.   Requirement stage - 1 weeks

II. Analysis stage - 2 weeks
III. Design stage - 6 weeks
IV. Construction - 4 weeks (includes construction(s) made after testing, if required)
V. Testing - 2 weeks
VI. Deployment - after testing and construction are successfully carried out.
VII. Documentation - 2 days after completion of every stage.

Progress Report: The requirement stage, the analysis stage and the design stages have been successfully completed within the stipulated time period.

The construction phase is in order as of now.

Component selection,which is the first phase of this stage, is in progress.

22.What are the safety and security measures you have taken ? [precautions]

Ans:

1.RFID is very advanced therefore it gives data security.

2.The performance factor of RFID is fast .

3.LoRa has a very wide coverage range about 10 km and it consumes less power and hence battery life will last for a longer duration.

4.We can use RFID in a densely populated area and here we are confining it in a room so the data security is higher .

23. In what way knowledge related to your project work is going to benefit our company? [Hints: advanced technologies like IoT/PLC used by various companies]

We have gained practical knowledge about technologies like IoT, Wireless Communications and PLC. The knowledge about these advanced technologies are used by various companies.

24. Who decided your project title? [Hints: area of interest with modern technology in discussion with project guide]

Ans: In the past few years, we found that the utmost attractive aspect in technology is problem solving. This curiosity made us choose a technical field for gaining in-depth knowledge and cracking the challenging problems.

One of the technologies that is getting a lot of attention recently is LoRa (or LoRaWAN). And in reality, RFID technology is nothing short of amazing. So, our team had decided to work with these two technologies.

And we've jointly decided to solve the problems of the existing system of attendance monitoring, which is a manual system and can lead to data redundancy. And we have been consulting with our project guide to ensure the problems and to consider what action we should take.

25. What are the objectives of your current studies?

Ans: To design an updated and advanced RFID based attendance monitoring system for fast and efficient attendance monitoring.

26. What is the basic concept of your project work?

The main concept of my project work is to keep student attendance data secured and hassle free accessing of data. Each and every teacher and student are provided with a unique RFID tag identity card which is to be swiped or scanned by RFID scanner to record student's attendance as well which teacher is taking which class in which room.

27. Overall knowledge of the instruments used in project work.

Ans:

1. **Arduino :** The most important unit of this project is the Arduino microcontroller. The controller is responsible for detection and polling of the peripherals status. It is responsible for making decisions for the connected devices. It is the major part of the system which controls all the operation of the

circuit such as LCD interfacing, square wave generation. It also decides the messages to be displayed on the LCD along with the time duration for which they should be displayed on the LCD (in the master control unit).

2. **RFID tag reader :** RFID tags utilize radio waves for tracking and identification and these tags utilize scanning reader, transceiver and decoder to send and receive information. In the CAT unit, RFID reader retrieves the data (like student name, roll, dept, class/semester, etc.) and sends this data to the MCU through LoRa.

3. **LoRa Module :** LoRaWAN is ideal for long range using low power but also low bandwidth communication. Here , we have used LoRa as a communication protocol. In the CAT unit , RFID reader retrieves the data and it is then transmitted via LoRa module to the receiver present in the backend i.e master control unit.

28. Explain the experimental set-up in detail if it is an experiment-oriented project work.

In this experimental setup, there are three modules and two different sets of RFID cards. The three modules are named as:
(i) Entry Level Module
(ii) Master Control Unit
(iii) Student Unit.

The two set of ID cards are named as:
(i) Master ID
(ii) Student ID

Step 1: Both sets of ID card holders must authenticate themselves upon entering the premises of the institution/organisation.
Step 2: Inside the class, the Master ID card is validated first and upon successful validation all Student units within the class boundaries are activated.
Step 3: Student ID cards are validated after the Student units are activated. Upon Successful validation, a status indicator indicates the same.
Step 4: The attendance has been successfully recorded and stored in the database.

29. What are some of the things that you and your supervisor disagreed about?

Ans : Firstly we had designed a model where we cannot counter proxy . Then we worked properly over the matter and designed this model but with this model also we can not reduce the proxy problem 100 %.

30. What are the software(s) that you have to learn to do the project?

Arduino IDE and Proteus are the softwares that I had to learn to do this project.

31. Is there any long term scope of work there in your project? [large scale applications of the project]

Ans: Yes there is long term scope of work.

Apart from educational field ,there is a large scale applications in the following fields:

1.Logistics and supply

2.Manufacturing

3.Agricultural Management

4.Health care and medicine

5.Transportation

6.Payment transactions

   Other applications in many walks of life business and it will provide a huge work opportunities for people.

32. Name some of the journals important to your project work. From where do you collect those journals?

1. T. Sanjay, "Attendance Management system".

2. https://en.wikipedia.org/wiki/Radio-frequency_identification

33. Are you planning to communicate any paper to any journal or conference related to your project work?

Ans: Yes I will surely contact after my completion of the whole project.