

Contactless Attendance System for the Prevention of Covid-19

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VEHARI – PAKISTAN**

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Contactless Attendance System for the Prevention of Covid-19

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A DISSERTATION SUBMITTED AS A PARTIAL FULFILLMENT OF THE
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DEPARTMENT OF COMPUTER SCIENCES

COMSATS UNIVESITY ISLAMABAD, VEHARI CAMPUS

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CERTIFICATE OF APPROVAL

It is to certify that the final year project of BS (CS) “**Contactless Attendance System for the Prevention of Covid-19**” was developed by **Mohsin Javed (CIIT/SP19-BCS/017)** and **Arslan Shafiq (CIIT/SP19-BCS/ 027)** under the supervision of “Dr. Rab Nawaz” and that in his opinion; it is fully adequate, in scope and quality for the degree of Bachelor of Science in Computer Sciences.

Supervisor

External Examiner

Head of Department
(Department of Computer Science)

DEDICATION

All thanks are due to Almighty Allah, who bestowed upon us a tiny bit of His infinite wisdom, allowing us to complete this difficult work. Furthermore, he assisted us in achieving our missions and aims simultaneously.

We are greatly indebted to our project supervisor, “Dr. Rab Nawaz.” Without his supervision, advice, and valuable guidance, the completion of this project would have been doubtful. We are grateful to him for his encouragement and ongoing assistance during this project. Moreover, we are also thankful to our parents and family, who have been a constant source of motivation for us and brought us the values of honesty & hard work. And finally, we are thankful to some of our friends who helped us whenever we were in between confusion and depression; without their assistance, we might not be able to cover all the short but main points and concepts of this system. So, a big thanks to all of them mentioned above.

ACKNOWLEDGEMENT

We thus affirm that this product has not been plagiarized from any source in its entirety or part. It is also stated that we built this program and accompanying report fully via our efforts. However, suppose any component of this project is taken from another source or to be a copy of another. We shall stand firm in the face of the repercussions. Furthermore, no part of the work presented has been submitted in support of any other degree or certification offered by this or any other university or institute of learning.

PROJECT BRIEF

PROJECT NAME	CONTACTLESS ATTENDANCE SYSTEM
ORGANIZATION NAME	COMSATS University Islamabad
OBJECTIVE	Prevention of Covid 19
UNDERTAKEN BY	Mohsin Javed & Arslan Shafiq
SUPERVISED BY	Dr. Rab Nawaz
	LECTURER
	DEPARTMENT OF COMPUTER SCIENCE
	COMSATS UNIVERSITY ISLAMABAD
STARTED ON	FEBRUARY,2022
COMPLETED ON	JUNUARY, 2023
COMPUTER USED	DELL LATITUDE E7440
SOURCE LANGUAGE	BASED C, C++
OPERATING SYSTEM	WINDOWS

ABSTRACT

This project is the prototype of an attendance system. The project aims to help people that are affected by the covid-19 and businesses around the globe also affected badly. Many companies and factories have attendance issues. Such type of businesses required to have a safe and contactless attendance management system which prevents the future spread of the coronavirus by not touching attendance machines. So, we purposed the project in which we have designed RFID Based Attendance Management System using Arduino and RFID. In this system each employee is issued an RFID card as their identity card and their attendance is marked when they scan their card with RFID reader.

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1 Introduction

1.1 System Introduction

In this project, we have designed RFID Based Attendance System using Arduino. EM-18 RFID Reader is a very simple yet effective module. It is an RFID module and is used for scanning RFID cards. It's a new technology and is expanding day by day. Nowadays it is extensively used in offices where employees are issued an RFID card and their attendance is marked when they touch their card to the RFID reader. We have seen it in many movies that when someone places one's card over some machine then the door opens or closes. In short, it's a new emerging technology which is quite useful. In this project, we have interfaced RFID EM-18 Module with Arduino, RTC Module DS3231, and 20*4 LCD display. During this pandemic everything were closed to COVID-19 and most of factories and businesses must follow Sop's that's why this type of attendance system helps us to keep away from COVID.

1.2 Background of the System

Radio Frequency Identification (RFID) is an automatic identification technology used for retrieving from or storing data on to RFID Tags without any physical contact. An RFID system primarily comprises of RFID Tags, RFID Reader, Middle ware, and a Backend database. RFID Tags are uniquely and universally identified by an identification sequence, governed by the rubrics of EPC global Tag Data Standard. A tag can either be passively

activated by an RFID reader or it can actively transmit RF signals to the reader. The RFID reader, through its antenna, reads the information stored on these tags when it's in its vicinity. The reader, whose effective range is based on its operational frequency, is designed to operate at a certain frequency. The operational frequency of the reader is 13.56 MHz's The RFID system is interdependent on its core components to achieve maximum efficiency and optimum performance of the application. Due to its high degree of flexibility, the system can be easily adopted for an array of applications ranging from small scale inventory cabinets to multifarious and highly agile supply chain management systems. Although, the cost of incorporating this technology has restricted its outreach, the technology promises to have untapped potential.

1.3 Objectives of the System

The main aim of this project is to overcome the drawbacks of the manual system of taking attendance by recording the attendance of students using RFID tags and cards. Each student is provided with his/her authorized and unique tag or card to swipe over the reader to record their attendance which will be written to a micro-SD card. Thus, the objectives of this project are as follows:

- To design and construct a Radio Frequency based attendance system which will overcome the drawbacks of the manual attendance system.
- To analyze how the system operates using the Radio Frequency Identification techniques.
- To test the system on a few sets of tags and cards and observe its limitations.

1.4 Significance of the System

This project can be used in various software companies, production industries and many other industries to take the attendance of employees. Presently many of these companies have attendance register or muster which is a traditional and old way of maintaining attendance. We can replace it with an automated system for taking the attendance of employees. It can be used in colleges, various educational institutes as well as university campus for taking the attendance of students. Education institutes have roll-call muster or teachers take attendance and note it down manually on paper. We can replace it by our automated attendance system using RFID. It can be used in shops, shopping malls for the attendance of employees and workers. We can also use it to note down the in and out time of vehicles. With little bit modification, this project can be used in vehicle/car parking systems. If parking charges are charged on hourly basis, we can use this project to note the exact in and out time of car to find out the total and exact parking charges of that vehicle.

2 Overall Description

2.1 Product Perspective

A well-designed system guarantees that your employees and business faced no issue about attendance and not touching the attendance machines. This system helps us to follow the SOPS and mark the attendance of employees in this pandemic. Every employee has an identity card which is basically a tag, and it becomes easy for employees to follow SOPS.

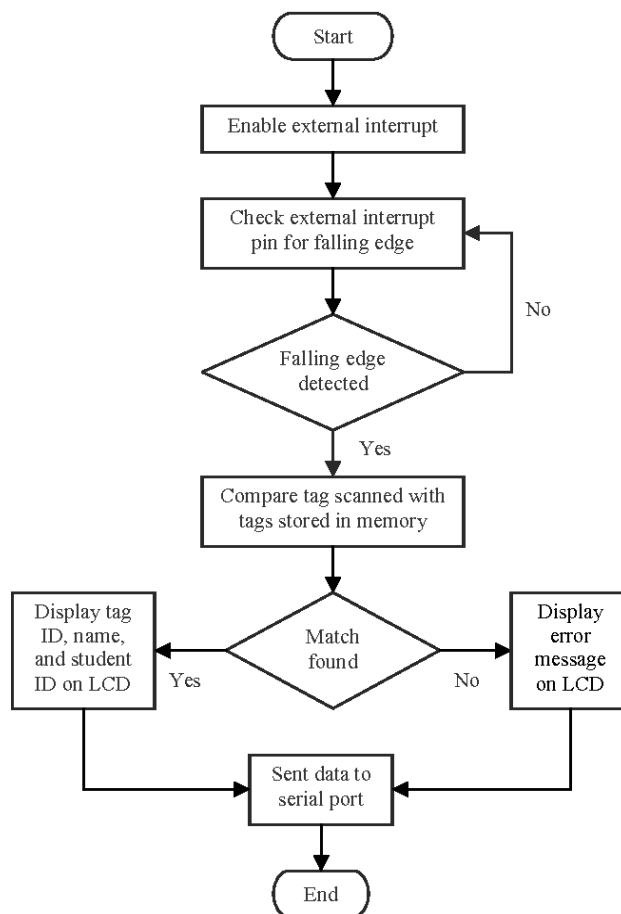


Figure 1

1.2 Product Scope

This project also includes most of the schools and colleges are using a paper-based attendance system. It is also time-consuming and sometimes so, sometimes this procedure causes mistakes. RFID technologies are used to remind each student entering the classroom and to analyze the time in the class. Every student is selected by RFID Tag. The attendance procedure can be performed by inserting the card next to the RFID reader.

2.1 Product Functionality

The functionality of the system is to perform the following tasks. Everything can be controlled using an android custom app.

- Check attendance check-in/check-out
- Confirmation Beep on success.
- Display Name on LCD.
- Enter and Exit Indication

2.2 Users and Characteristics

RFID Based Attendance System will be having 2 different kinds of users with varying access levels.

Admin: Admin will connect the SD card to the system to get the detail Stored by RFID Reader.

User: Operator will also have access level next to Admin, Operator will operate the system as per Admin requirement.

2.3 Operating Environment

2.3.1 Software

Software	Specification
MS-Office	For reports
Arduino IDE	Code Editor & Compiler
Note Pad	View Report

2.3.2 Hardware

S.N.	COMPONENTS NAME	DESCRIPTION
1	Arduino Board	Arduino UNO
2	RFID Module	RFID RC522 SPI Module
3	LCD Display	JHD162A 16x2 LCD Display
4	Potentiometer	10K
5	RFID Cards	13.56Mhz RFID Cards
6	SD Card	Micro SD Card 8GB/16GB
7	Card Reader	Micro SD Card Reader
8	RTC Module	DS3231/DS1307 RTC Module
9	Buzzer	5V Active Buzzer
10	LED	5mm LED Any Color

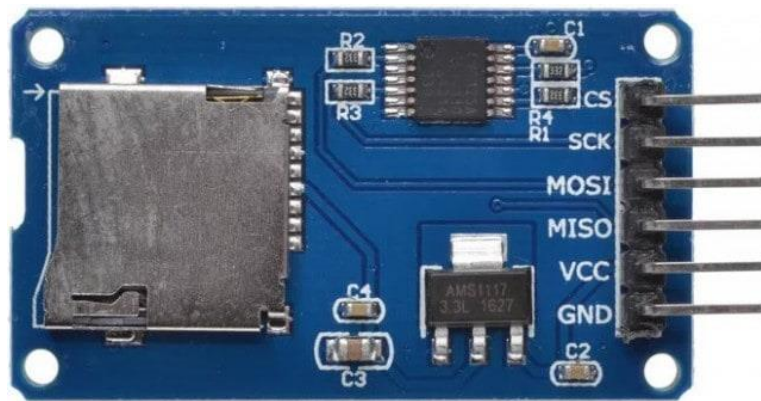
11	Connecting Wires	Jumper Wires
12	Breadboard	

2.3.2.1 RFID MFRC522 Module

RC522 – RFID Reader / Writer 13.56MHz with Cards Kit includes a 13.56MHz RF reader cum writer module that uses an RC522 IC and two S50 RFID cards. The MF RC522 is a highly integrated transmission module for contactless communication at 13.56 MHz's RC522 supports ISO 14443A/MIFARE mode. This module uses SPI to communicate with microcontrollers. The open-hardware community already has a lot of projects exploiting the RC522 – RFID Communication, using Arduino.

2.3.2.2 SD Card Module

The micro- SD Card Module is a simple solution for transferring data to and from a standard SD card. The pin out is directly compatible with Arduino but can also be used with other microcontrollers. It allows you to add mass storage and data logging to your project.



This module has an SPI interface which is compatible with any Sd card, and

it uses 5V or 3.3V power supply which is compatible with Arduino UNO/Mega. SD module has various applications such as data logger, audio, video, graphics. This module will greatly expand the capability an Arduino can do with their poor limited memory.

2.3.2.3 DS3231 RTC Module

RTC means Real-Time Clock. RTC modules are simply TIME and DATE remembering systems that have battery setup which in the absence of external power keeps the module running. This keeps the TIME and DATE up to date. So, we can have accurate TIME and DATE from the RTC module whenever we want.



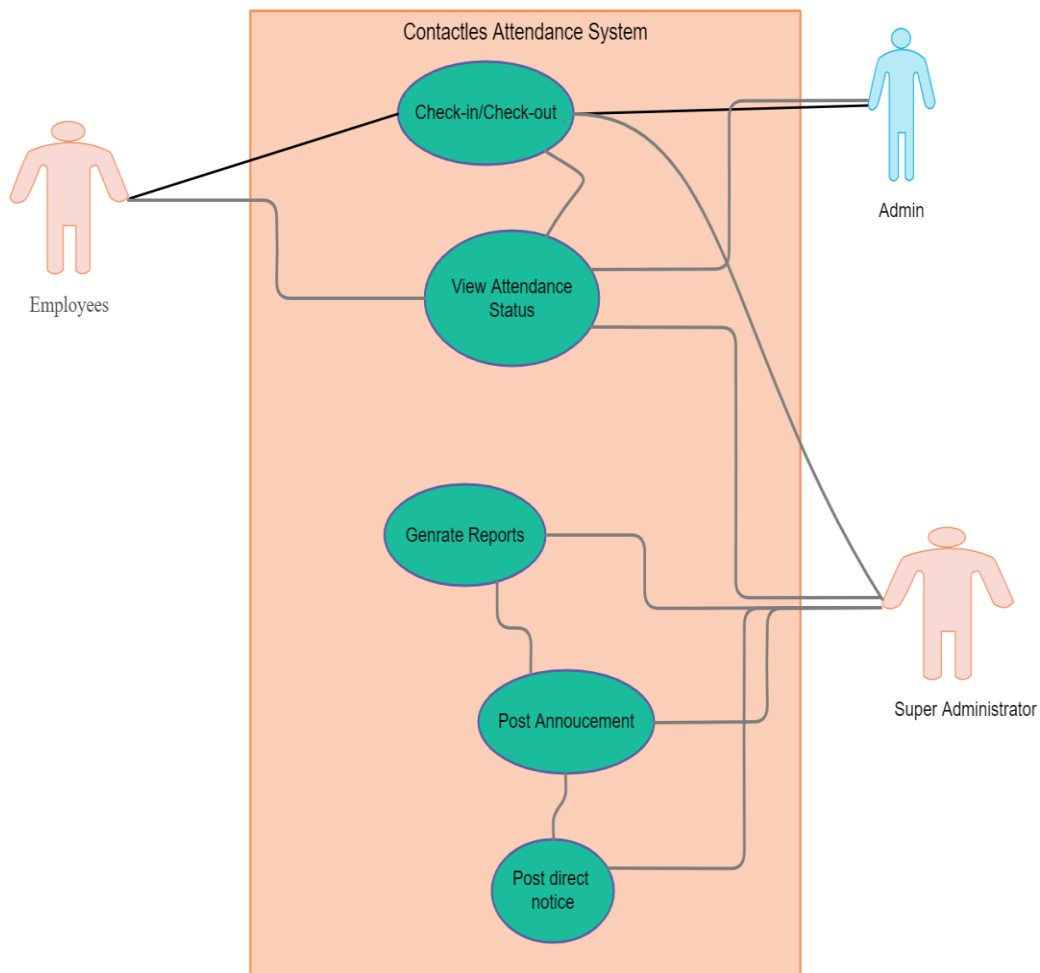
DS3231 is a six-terminal device, out of the two pins are not compulsory to use. It works on I2C Communication Protocols with SDA and SCL pins.

3 Specific Requirements

3.1 Functional Requirements

- Attendance
- Conformation Beep on Success.
- Display Name on LCD.
- Monthly attendance Report.

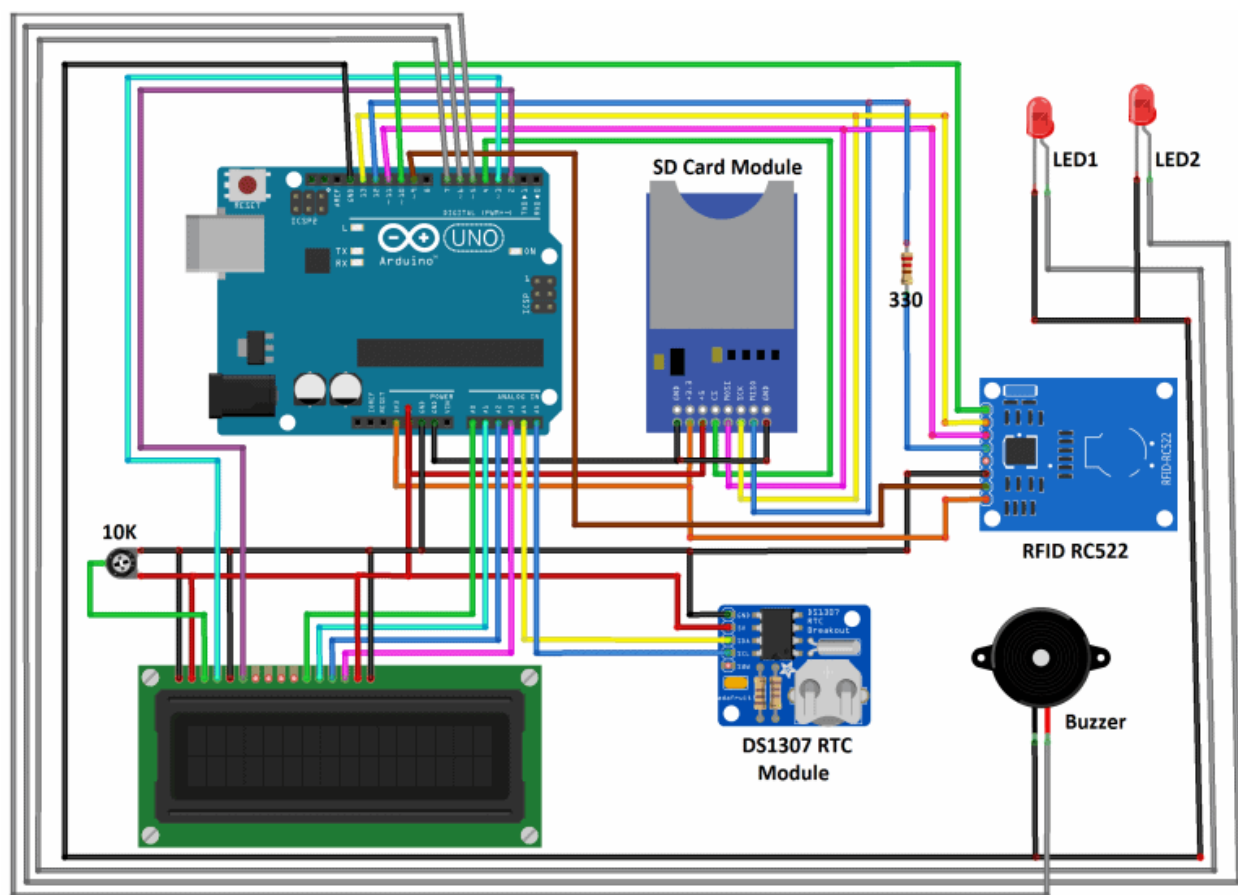
3.1.1 Use Case Diagram



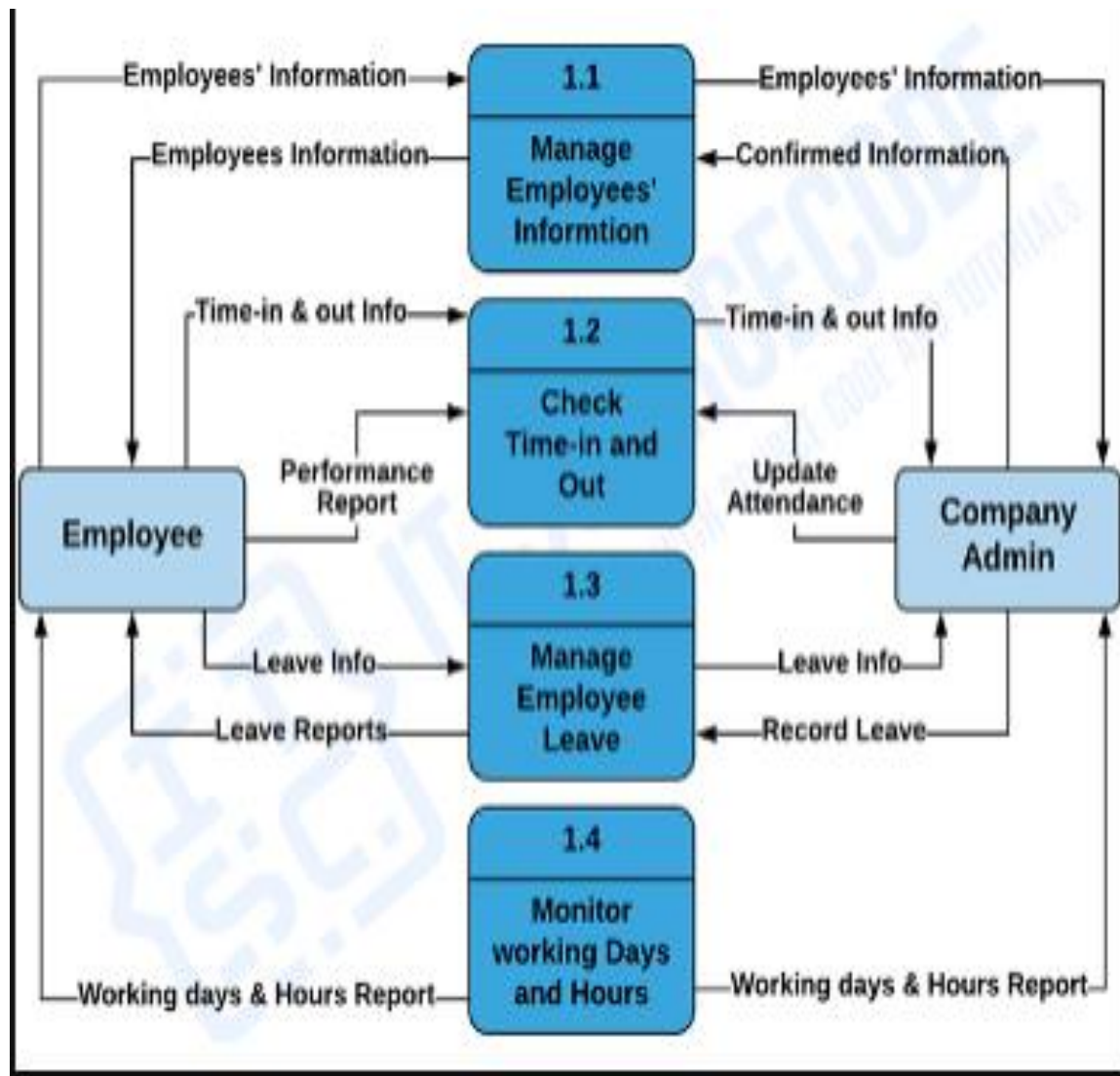
3.1.2 Use Case Descriptions

User can do different tasks like he can check the status of the attendance and get monthly report of attendance. User can check the attendance enter and exit indication.

3.1.3 Circuit Diagram



3.1.4 Data Flow Diagram



3.2 External Interface Requirements

3.2.1 Hardware Interfaces

We are sensors. These sensors will help us to measure the range and catch radio waves then come to database and check the tag data and allows employees to enter whether it will not allow and beep. We are using Arduino for the connections. It will allow us to connect all sensors and connect with Wi-Fi. There we use an LCD which shows success or failure on Screen.

3.2.2 Communications Interfaces

To communicate hardware and software, we use an LCD Display, Buzzer & LED. This LCD is used to display message of the administrative. Buzzer will beep when your attendance successful. Also, this software is user-friendly, but it's in the English language. So, the user needs to know some essential words of English so he can use them efficiently. But it's okay if the user does not learn English because this app uses icons that will clearly define what it wants to say.

4 Non-Functional Requirements

4.1 Performance Requirements

- The system shall function in real time.
- The system no needs any type of connection on running time.
- Data is stored in an .txt file.
- Fast

4.2 System Quality Attributes

Following are the software quality attributes.

4.2.1 Maintainability

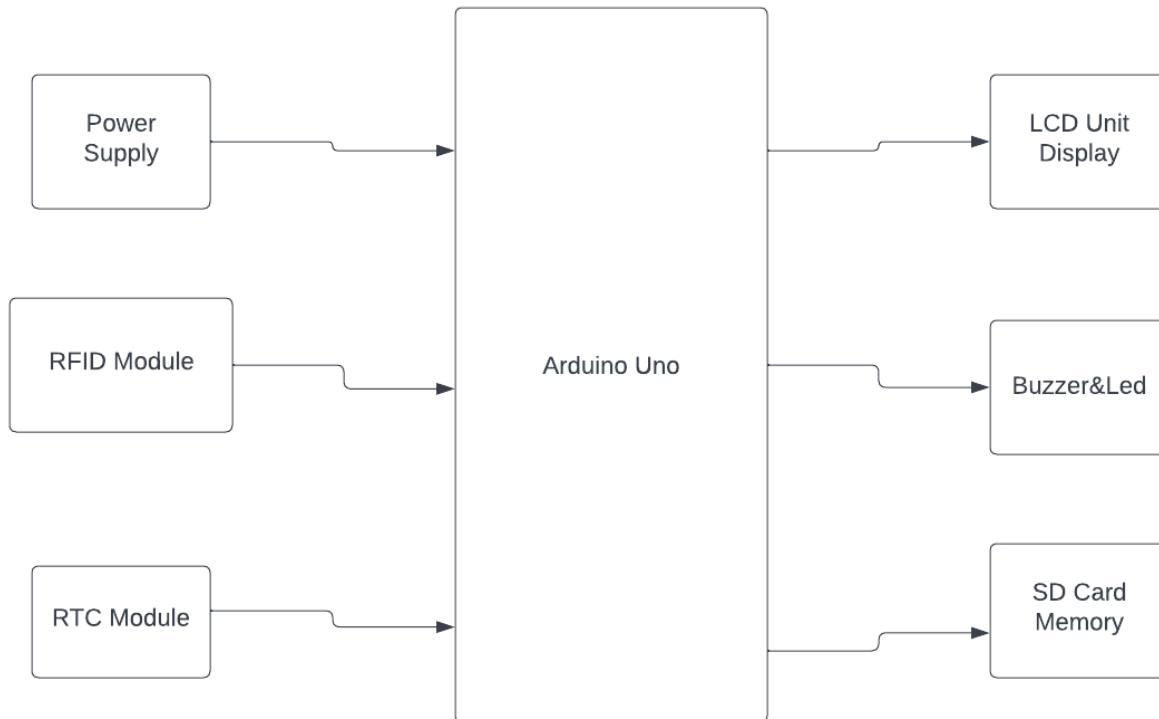
The system should be easily maintained by the administrator other programmer shall be capable of easily modifying and updating code by using the documentation provided with the system.

4.2.2 Testability

- The system shall be tested with different types of users using it.
- The system shall be accessible at any time with the help of internet.
- The system shall be user friendly i.e., should be easy to use.

5 Design Description

5.1 Composite Viewpoint



5.2 Information Viewpoint

Information will be provided in the form of message as well as in the form, so lights provided by LED as well as in the form of beep. It makes a better connection between the software and the System. For admin the information is stored in the form of .TXT file in the form of RFID CARD Number and Date & Time

5.3 Interaction Viewpoint

