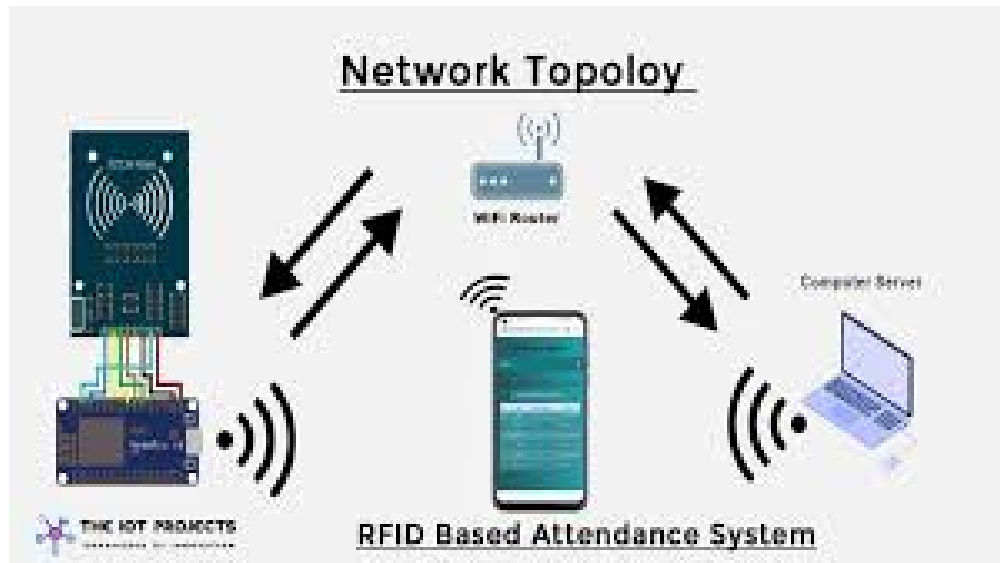# Project Documentation

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Overview
- Abstract
- Purpose and scope
- Project Plan
- Project model
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ABSTRACT

Our Campus is recently facing an issue of curfew extension. In order to frame a proper solution for this issue, the RFID system can be enforced. This system enables the college management to analyze and monitor the places and allocate checkpoints at which students(both boys and girls) gather frequently. This fact can help in increasing security and remove the reliability on curfews. This project deals with the implementation of RFID stickers in ID cards. This sticker is made as concise as possible. The data collected is stored in servers and analyzed. The challenges faced during the detection is discussed and rectified. Our intention is to introduce RFID in multiple places inside the premises for broader inspection.

PURPOSE AND SCOPE

The Paramount need for this system is to ensure the security of students within the campus as the college is located in a remote area. As all the academic buildings and classrooms within the campus are situated inside the forest region it is not so safe to ride alone on the cycle, especially during nighttime. This project helps to hold the records and logs of the students entering the campus and hostel. The ultimate scope of the project is to achieve the best monitoring system without leaving any possibility of proxy, ie.., to get rid of students carrying multiple cards.

PROJECT PLAN:

The plan begins with the installation of RFID gate readers at the entrance of the campus with antennas at a specified height and range appropriate for detection. Then the data collected is sent to the server where the student name record is stored and displayed. This process is even employed at the hostel entrance to track the student even if they are inside the campus but outside the hostel. The RFID tags and readers are chosen in such a way that the readers possess a minimum range of 5 meters. This feature can be utilized by using UHF(ultra high frequency) tags typically around 960MHz. This data that is been read by the reader is now processed at the backend and stored in database. It can be accessed by the authorized person right after getting stored at the server.
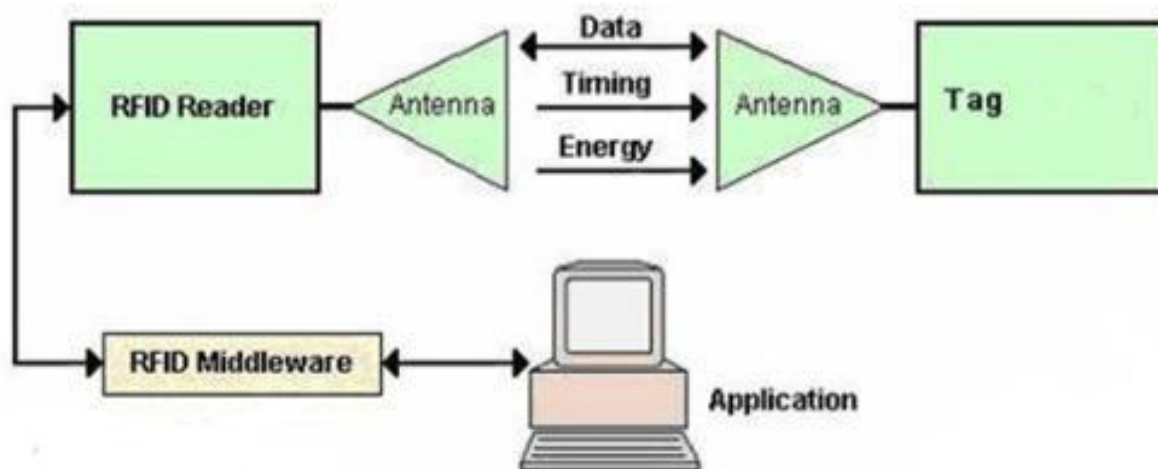
PROJECT MODEL:
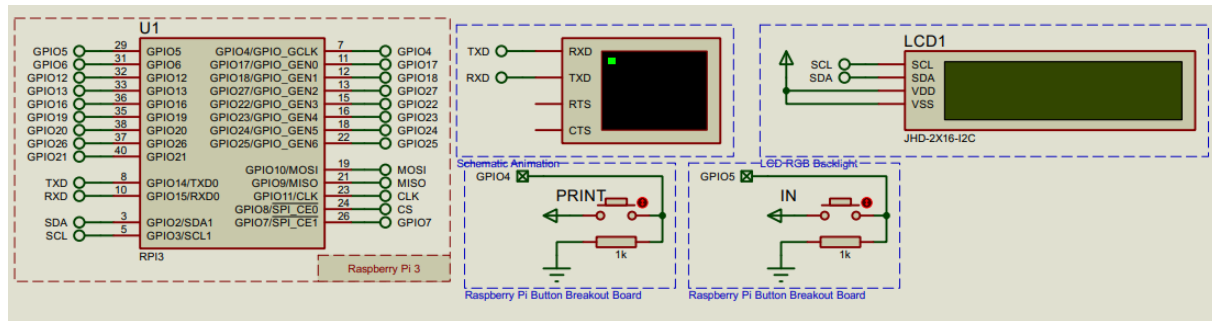
Flow chart:
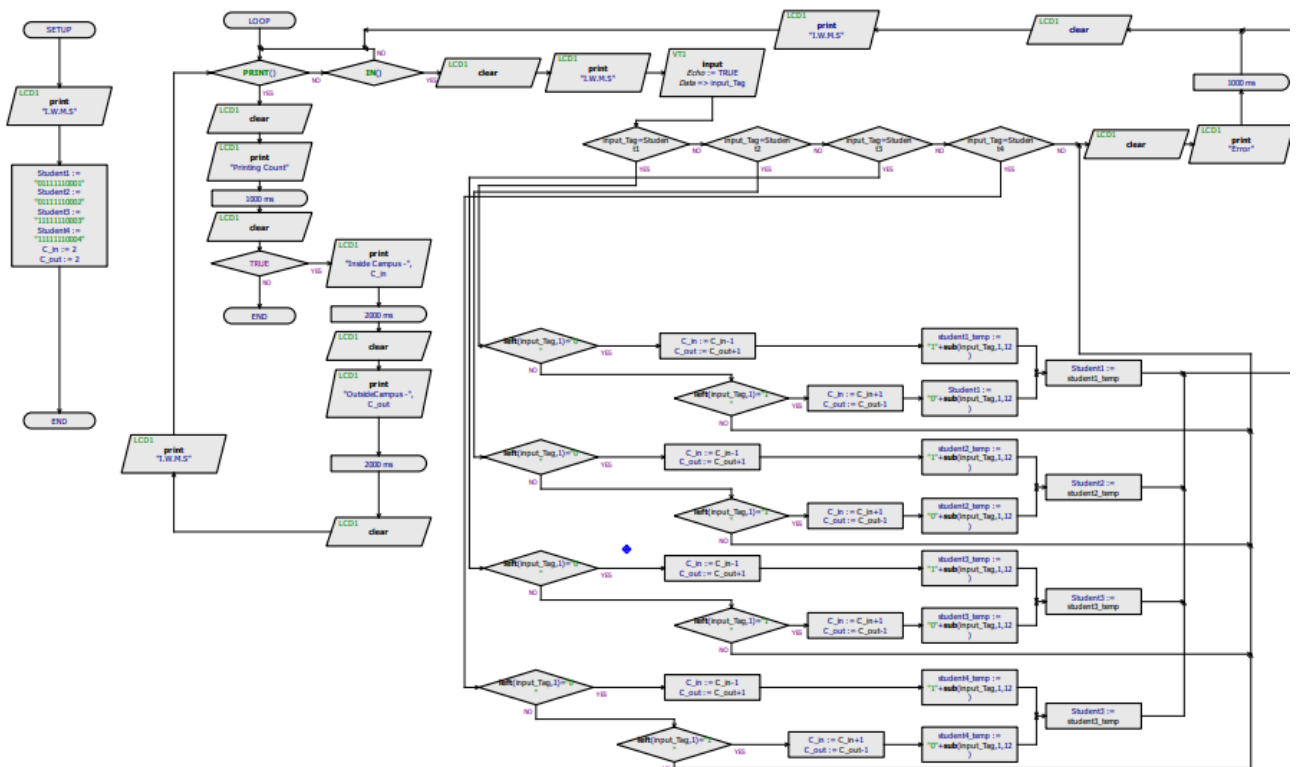
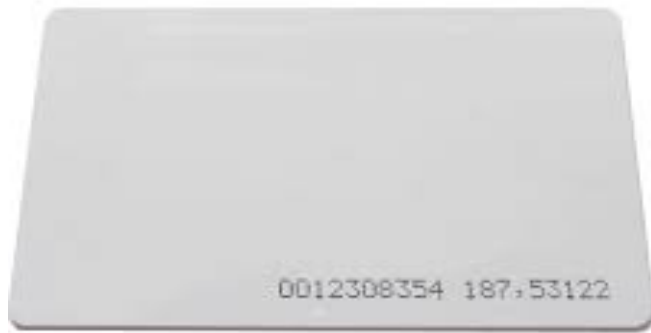# PROJECT REQUIREMENTS :

1. Raspberry Pi

2. ST25RU RFID Reader:

3. ID Cards with RFID Tags

SYSTEM ANALYSIS AND DESIGN :

RFID is merged with our Student ID card, and also each RFID has a unique Tag id, and with the help of this tag id we are going to

When a person goes through the gate, the RFID reader reads the ID card of the person in which the RFID is present, and it saves the tag_id of the card.

Through the Raspberry Pi, it is saved in the database. In the database details of all students will be present along with some additional info such as present inside the hostel or not, present inside the campus or not.

The data is saved from Raspberry Pi to local database through python and MariaDB. For checking the data continuously a python function is kept on running, if some person crosses the gate, the reader detects the tag id and with the help of that id, we save it in the MariaDB.

The reason why we have chosen to use MariaDB is that this software supports the Raspberry Pi hardware and this requires only less resources to run and they are comparatively fast as compared to databases like MySQL.

We below present our code with which data is saved in the database :

1) First the server file which detects for change and runs the program to save in the database -

```
 1 import mysql.connector as database
 2
 3 connection = database.connect(
 4     user = "Pi",
 5     password = "1234",
 6     host = "localhost",
 7     database = "hack"
 8 )
 9
10 cursor = connection.cursor()
11
12 f1 = open("hostel_out.txt", "r")
13 lines = f1.readlines()
14 for i in lines:
15     statement = "UPDATE students set Inside_Hostel = 'No' WHERE tag_id = " + i[:10]
16     cursor.execute(statement)
17 f1.close()
18
19 f2 = open("hostel_in.txt", "r")
20 lines = f2.readlines()
21 for i in lines:
22     statement = "UPDATE students set Inside_Hostel = 'Yes' WHERE tag_id = " + i[:10]
23     cursor.execute(statement)
24 f2.close()
25
26 f3 = open("campus_out.txt", "r")
27 lines = f3.readlines()
28 for i in lines:
29     statement = "UPDATE students set Inside_Campus = 'No' WHERE tag_id = " + i[:10]
30     cursor.execute(statement)
31 f3.close()
32
33 f4 = open("campus_in.txt", "r")
34 lines = f4.readlines()
35 for i in lines:
36     statement = "UPDATE students set Inside_Campus = 'Yes' WHERE tag_id = " + i[:10]
37     cursor.execute(statement)
38 f4.close()
39
40 connection.commit()
41
42
```

2) And the next programs is to save the changes to the database -

```python
from time import sleep
import os
from watchdog.observers import Observer
from watchdog.events import FileSystemEventHandler

class Handler(FileSystemEventHandler):
    def on_modified(self, event):
        if(event.src_path == "./hostel_in.txt"):
            os.system("python3 hack.py")
        if(event.src_path == "./hostel_out.txt"):
            os.system("python3 hack.py")
        if(event.src_path == "./campus_out.txt"):
            os.system("python3 hack.py")
        if(event.src_path == "./campus_in.txt"):
            os.system("python3 hack.py")

observer = Observer()
observer.schedule(Handler(), ".")
observer.start()

try:
    while True:
        sleep(1)
except KeyboardInterrupt:
    observer.stop()

observer.join()
```

Plan is to have RFID Gate readers in 5 areas :

1. At the Main Gate of NITT - If a person goes out of the campus, it is recorded in the database.

2. At Opal Hostel entrance - This records the data on whether the girl is present inside the hostel or not.

3. Hostel Office Checkpoint

4. Golden Jubliee Checkpoint

5. Hospital Checkpoint

Checkpoint Station of RFID Scanners In Campus
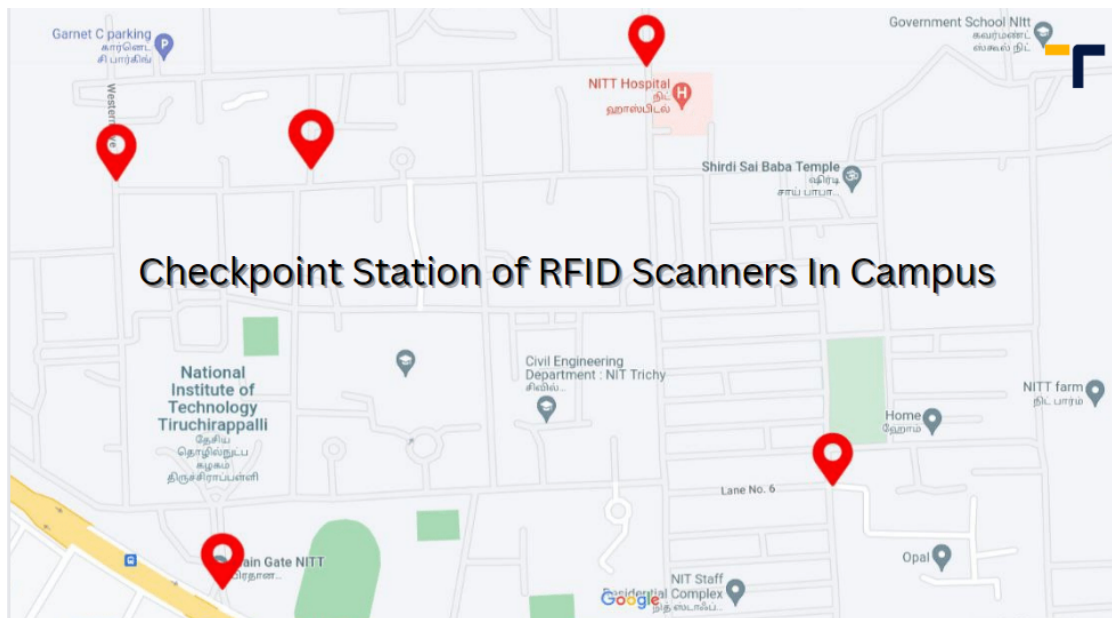
Challenges Management:

- The first and the foremost challenge is the problem of for detecting multiple entries simultaneously. This acts as an advantage for students' proxy entries. In order to avoid these problems, multiple sensor technology method is adopted at the gates that intentionally filters out the other entries, by accepting the first entry.

- RFID tags have problem of movement: They are difficult to move as Some cards are small (half a millimeter square and can be size and paper), some of the last to be secreted into the product where consumers can see it. New technology has allowed for the RFID cards to be printed on the product and may be subject to scroll.

- Data corruption:Most anti-RFID cards to write. This feature may be secured (The card write it once and are read by many devices) or to remain effective, depending on the application and by the sensitivity of security. In the library of many of the cards remain unlocked for freedom in the re-use this card to other books or to believe in order to verify the tracking study.

REFERENCES:

- https://youtu.be/4uidQ7C6Y5E

- https://sites.google.com/a/cas.edu.om/rfid-tc/problems-with-rfid

- https://youtu.be/Ukfpq71BoMo

- https://mariadb.com/kb/en/documentation/

- https://www.labcenter.com/

- https://youtu.be/DyRdBql_R2o

FUTURE ASPECTS:

- To introduce IR-based RFID systems to filter out unexpected non-human entries.

- To extend the rfid tags as "one for all" applications like attendance, hostel entry, Mess, library etc

- Creating a mobile application for Attendance management of students which is linked with RFID system which provides the info for students as well as faculties.