ATTENDANCE MONTIORING SYSTEM USING RFID

by

AKARSH SHRIVASTAVA	22BPS1182
AYUSH RANA	22BPS1196
YASHVI SAXENA	22BPS1174
MANAV AGARWAL	22BPS1064

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Dr. Abraham Sudharson Ponraj

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Chennai – 600127

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BONAFIDE CERTIFICATE

Certified that this project report entitled "**ATTENDANCE MONITORING SYSTEM USING R-FID"** is a bonafide work of **AKARSH SHRIVASTAVA – 22BPS1182, AYUSH RANA-22BPS1196, YASHVI SAXENA-22BPS1174, MANAV AGARWAL-22BPS1064 who** carried out the Project work under my supervision and guidance for **BECE204L – MICROPROCESSORS AND MICROCONTROLLERS.**

Dr. Abraham Sudharson Ponraj
Associate Professor
School of Electronics Engineering (SENSE),
VIT, Chennai
Chennai – 600 127.

ABSTRACT

The project's goal is to build a gadget that gathers data from a user's device and saves it to a laptop's CSV file. An administrator can then retrieve, read, edit, and analyze this data.

To determine whether a user is a member of the organization, our device will connect to their phone and match the MAC address of the device with a CSV file that has been pre-stored with all of the users' information. If the user is legitimate, the gadget will use the NFC (near field communication) technology that is integrated into most contemporary smartphones to get the necessary data from the user's phone. Another CSV file will include the gathered data. After that, the administrator can use their device to extract this CSV file.

Organizations can use this device to monitor when individuals enter and leave their facilities. Additionally, it has the ability to gather particular phone data for a variety of uses.

ACKNOWLEDGMENT

We wish to express our sincere thanks and deep sense of gratitude to our project guide, **Dr. Abraham Sudharson Ponraj,** Associate Professor, School of Electronics Engineering, for her consistent encouragement and valuable guidance offered tous in a pleasant manner throughout the course of the project work.

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AKARSH SHRIVASTAVA

AYUSH RANA

YASHVI SAXENA

MANAV AGARWAL

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INTRODUCTION

The goal of our project is to effectively track everybody's in/out time and attendance within the organization. Through the utilization of an RFID scanner, we can precisely scan each device and compare its MAC address with data that has been pre-stored. After that, this data is easily saved on the storage device in a CSV file along with the exact time that was obtained using a real-time clock. An admin device can quickly and securely establish a connection with our cutting-edge monitoring device to retrieve this important data.

1.1 OBJECTIVES

Using an RFID RC522 chip, the attendance system uses Arduino to retrieve data from a user's device and store it so that the admin device can access it later. This uses technology to simplify the process of tracking attendance at various locations. With the potential to completely redefine accuracy and efficiency in attendance management, the RFID-based attendance system is a great option for establishments and businesses looking to adopt 21st-century technology. The objective of this project is to demonstrate the use and advantages of this cutting-edge system, advancing the development of attendance tracking techniques.

1.2 BENEFITS

This project improves security and data integrity while doing away with the human labor and errors that come with using conventional attendance systems. The automated and streamlined process provided by the RFID-based attendance system eases the administrative load on schools and organizations. Furthermore, it offers insightful data analytics, enabling well-informed decision-making for improved resource management.

1.2 FEATURES

- RFID reading and storage of the current time.

- Compiling the MAC address in order to look for the user.

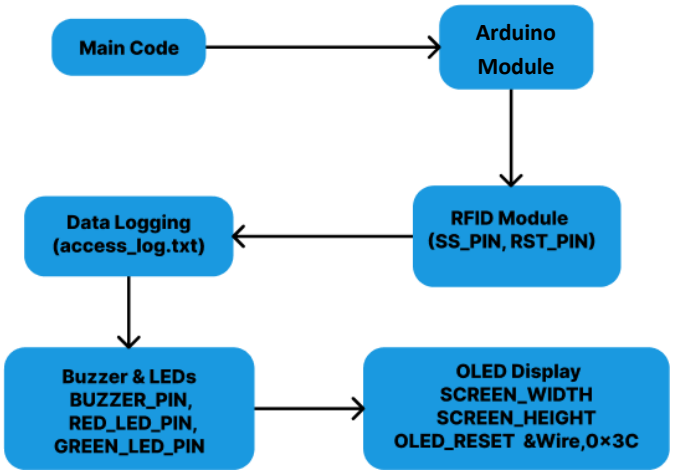
- The administrator always has access to the data stored on the storage device.

- Easy-to-use, portable RFID scanner that is movable to different locations.

CHAPTER-2

RFID ATTENDANCE MANAGEMENT SYSTEM – DESIGN

2.1 BLOCK DIAGRAM OF SYSTEM DESIGN



2.2 HARDWARE SPECCIFICATIONS

- Arduino Board
- Breadboard
- Jumper wires
- Green & Red Leds.
- Connecting Cables

2.2.1 RFID Scanner

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The RFID RC522 module is widely embraced for facilitating contactless communication through radio-frequency identification (RFID). Operating at 13.56 MHz and adhering to the ISO 14443A/B communication standard, this module facilitates seamless wireless data exchange between RFID tags and readers. Its core components include an integrated circuit (IC), an antenna, and other integral parts.

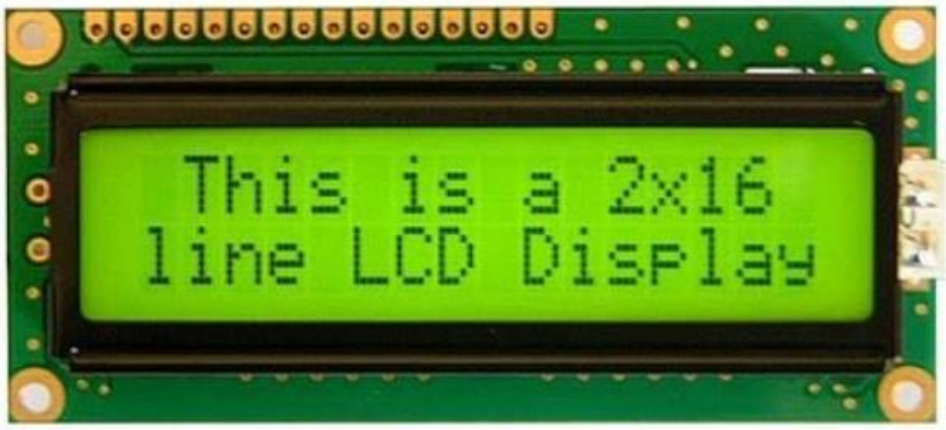
The versatility of the RFID RC522 finds application in diverse projects, ranging from inventory monitoring and electronic payment systems to access control solutions. Its effectiveness in wirelessly transmitting data makes it a pivotal component in RFID-enabled applications across various industries.

What sets the RFID RC522 apart is its user-friendly design, cost-effectiveness, and compatibility with popular microcontrollers like Arduino. This compatibility opens up a realm of possibilities for developers and hobbyists, empowering them to create RFID-based solutions with ease. As a result, the RFID RC522 stands as a preferred choice for those embarking on projects that demand efficient and affordable RFID communication in a variety of industries.


RFID-RC522

2.2.2. Liquid Crystal Display (LCD)

An Organic Light-Emitting Diode (OLED) is a display technology that uses organic compounds to emit light when an electric current is applied. OLEDs are known for their vibrant colors, high contrast ratios, and wide viewing angles. Unlike traditional displays, OLEDs don't require a backlight, enabling thinner and more flexible screens. This technology is prevalent in smartphones, TVs, and wearable devices due to its energy efficiency and superior image quality. Each pixel in an OLED screen can emit its light, providing deeper blacks and more precise control over individual pixels, resulting in a visually stunning and responsive display experience.



2.2.3. Arduino UNO

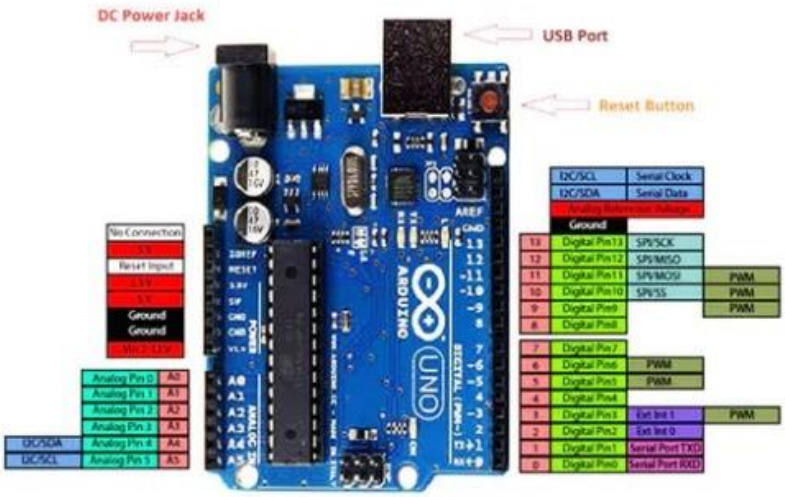
The Arduino Uno stands out as a prominent open-source microcontroller board renowned for its seamless prototyping and interfacing with the physical realm. This versatile board centers around the ATmega328P microcontroller, boasting an array of digital and analog input/output pins that facilitate easy connection to an assortment of sensors, actuators, and other electronic components. The incorporation of a USB interface not only simplifies programming but also enhances communication capabilities.

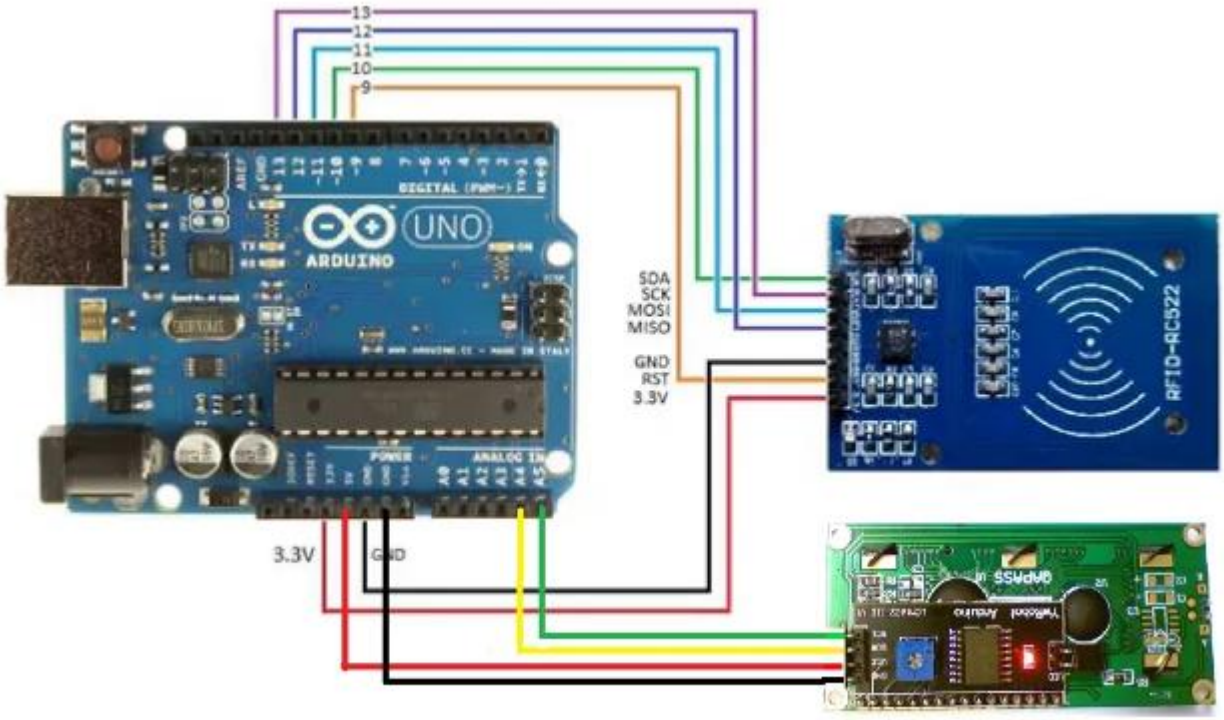
At its core, the Arduino Uno relies on the ATmega328P microcontroller, a key detail in understanding its capabilities. This microcontroller operates with a crystal frequency of 16 MHz, contributing to its efficiency and responsiveness in handling various tasks. The utilization of this microprocessor, coupled with the board's user-friendly design, positions the Arduino Uno as an excellent entry point for beginners, making it accessible in educational environments, the maker community, and for hobbyist projects.

Furthermore, the Arduino Uno's compatibility with a diverse range of sensors and shields significantly broadens its scope for projects, allowing users to explore and experiment with an extensive array of components. This adaptability not only fosters creativity but also contributes to its widespread popularity among enthusiasts.

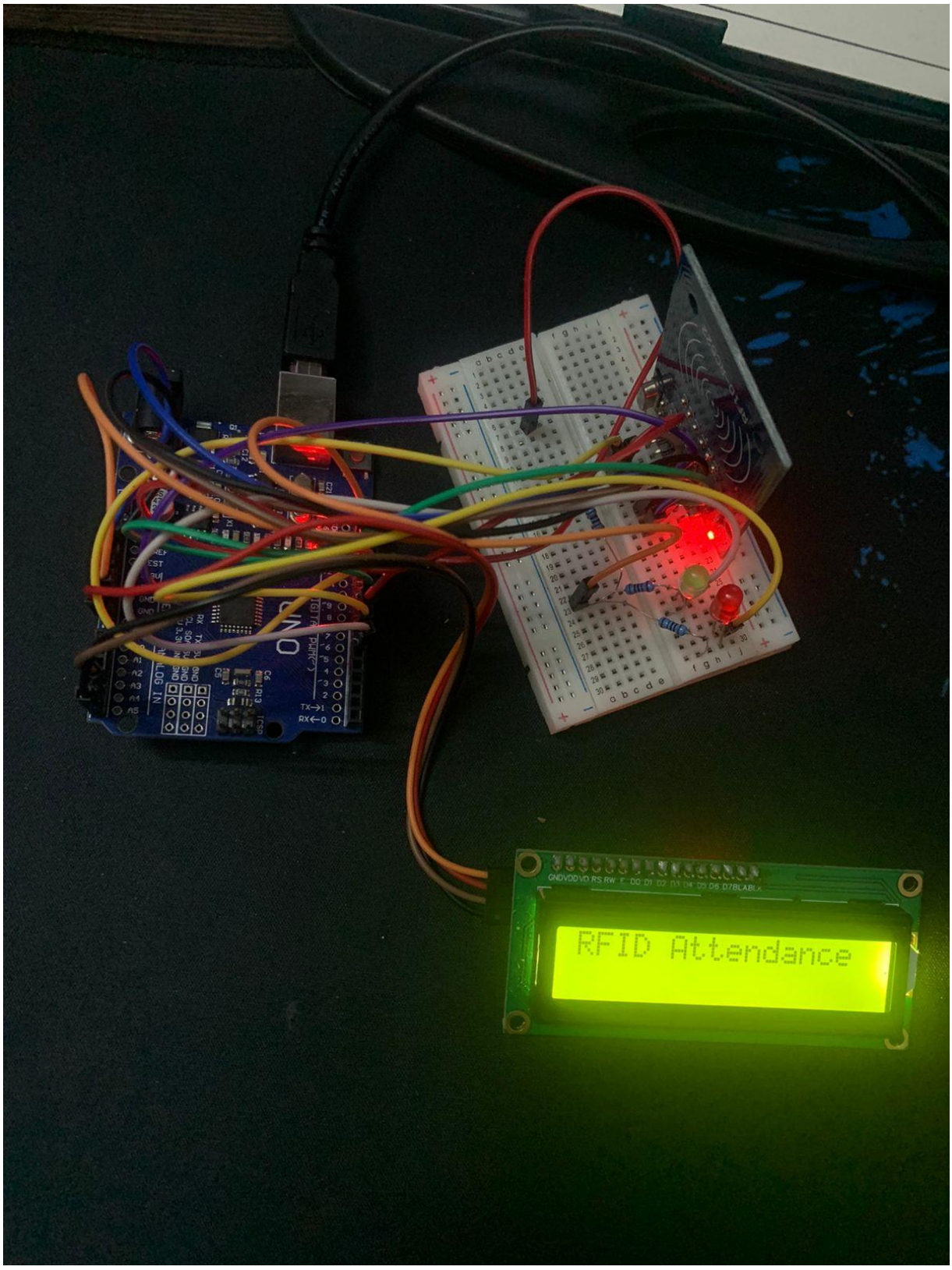
In summary, the Arduino Uno is not just a microcontroller board; it is an accessible and adaptable platform designed for learning and creating interactive electronic prototypes. Its foundation on the ATmega328P microcontroller, crystal frequency of 16 MHz, and comprehensive range of input/output pins underscore its versatility and make it a staple in the world of electronics prototyping.

Arduino UNO
Pinout





2.3 Circuit Diagram



Chapter-3

3.1 Code

```
#include <SPI.h>
#include <MFRC522.h>
#include <Wire.h>
#include <LiquidCrystal_I2C.h>

#define SS_PIN 10
#define RST_PIN 9
#define BUZZER_PIN 8
MFRC522 mfrc522(SS_PIN, RST_PIN);

void setup() {
  pinMode(7, OUTPUT);
  Serial.begin(9600);
  SPI.begin();
  mfrc522.PCD_Init();
  Serial.println("Approximate your card to the reader...");
  Serial.println();
  lcd.init();
  lcd.backlight();
  lcd.setCursor(0,0);
  lcd.print("RFID Attendance System");
}

void loop() {
  if (!mfrc522.PICC_IsNewCardPresent()) {
    return;
  }

  if (!mfrc522.PICC_ReadCardSerial()) {
    return;
  }

  Serial.print("UID tag :");
  String content = "";
  byte letter;
  for (byte i = 0; i < mfrc522.uid.size; i++) {
    Serial.print(mfrc522.uid.uidByte[i] < 0x10 ? " 0" : "
  ");
    Serial.print(mfrc522.uid.uidByte[i], HEX);
```

```
    content.concat(String(mfrc522.uid.uidByte[i] < 0x10 ? " 0" : " "));
    content.concat(String(mfrc522.uid.uidByte[i], HEX));
  }
  Serial.println();
  Serial.print("Message : ");
  content.toUpperCase();
  if (content.substring(1) == "93 08 97 DD" || content.substring(1) == "43 B9 81 F6" ||  content.substring(1) == "F3 28 88 04" || content.substring(1) == "C3 62 14 01" || content.substring(1) == "41 4E E2 EF" ) {
    Serial.println("Marked Present");
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("Marked Present");
    digitalWrite(6, HIGH);
    delay(200);
    digitalWrite(6, LOW);
    delay(200);
    digitalWrite(6, HIGH);
    delay(200);
    digitalWrite(6, LOW);
    delay(200);
    digitalWrite(6, HIGH);
    delay(200);
    digitalWrite(6, LOW);
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("Thank You");
    delay(1000);
  } else {
    Serial.println(" Access denied");
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("Anomaly Detected");
    digitalWrite(7, HIGH);
    delay(200);
    digitalWrite(7, LOW);
    delay(200);
    digitalWrite(7, HIGH);
    digitalWrite(BUZZER_PIN, HIGH);
    delay(200);
    digitalWrite(7, LOW);
```

```
81      digitalWrite(BUZZER_PIN, HIGH);
82      delay(200);
83      digitalWrite(7, HIGH);
84      digitalWrite(BUZZER_PIN, HIGH);
85      delay(200);
86      digitalWrite(7, LOW);
87      digitalWrite(BUZZER_PIN, LOW);
88      lcd.clear();
89      lcd.setCursor(0,0);
90      lcd.print("Sorry");
91      delay(1000);
92    }
93 }
```

93.1 Result & Inference

The Arduino Uno chip stores the user's details together with time and date details when the user brings his phone close to the device. The Arduino Uno chip verifies the user's details using the user's pre-existing data.

After that, by putting an admin device close to it, this data can be extracted. The device is recognized as an admin device, and data is transferred to it before being removed to optimize storage space.

CHAPTER-4

CONCLUSION AND FUTURE WORK

4.1 CONCLUSION

In conclusion, the RFID-based attendance system provides an efficient and streamlined way of tracking attendance across different locations. By leveraging RFID technology along with Arduino, user details can be quicklyverified against a database and attendance logs created in real-time.

The system removes the need for manual paper-based tracking and the errors associated with it. The use of LED lights and a buzzer provides instant visual and audio feedback to the user regarding their check-in status.Storing the attendance data on an SD card enables convenient transfer and access by administrators.

Over the course of this project, we successfully demonstrated a working prototype of the system using off-the-shelf components like the Arduino UNO, RFID RC522 module, and peripherals. The system can identify bothregistered and unregistered users and create attendance logs only for pre- enrolled individuals, fulfilling the core requirements

4.2 FUTURE WORK

This system can be expanded in the future by adding network connectivityfor syncing data to a server or cloud storage in real-time. Additional user- facing features like displaying the user's name after a successful check-in can also improve overall functionality. The core RFID and Arduino-basedframework provides a solid foundation for such enhancements.
Overall, the project served as good exposure to integrating hardware andsoftware in a useful IoT-based solution centered around RFID and microcontroller technology.

VIDEO LINK

https://youtu.be/VSelwEoydwI

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BIODATA

Name : AKARSH SHRIVASTAVA

Mobile Number : 22BPS1182

E-mail : akarsh035@gmail.com

Permanent Address:

Name : AYUSH RANA

Mobile Number : 22BPS1196

E-mail : Ayush.rana2022@vitstudent.ac.in

Permanent Address:

Name : YASHVI SAXENA

Mobile Number : 22BPS1174

E-mail : Yashvi.saxena2022@vitstudent.ac.in

Permanent Address:

Name : MANAV AGARWAL

Mobile Number : 22BPS1064

E-mail : manav.agarwal2022@vitstudent.ac.in

Permanent Address: