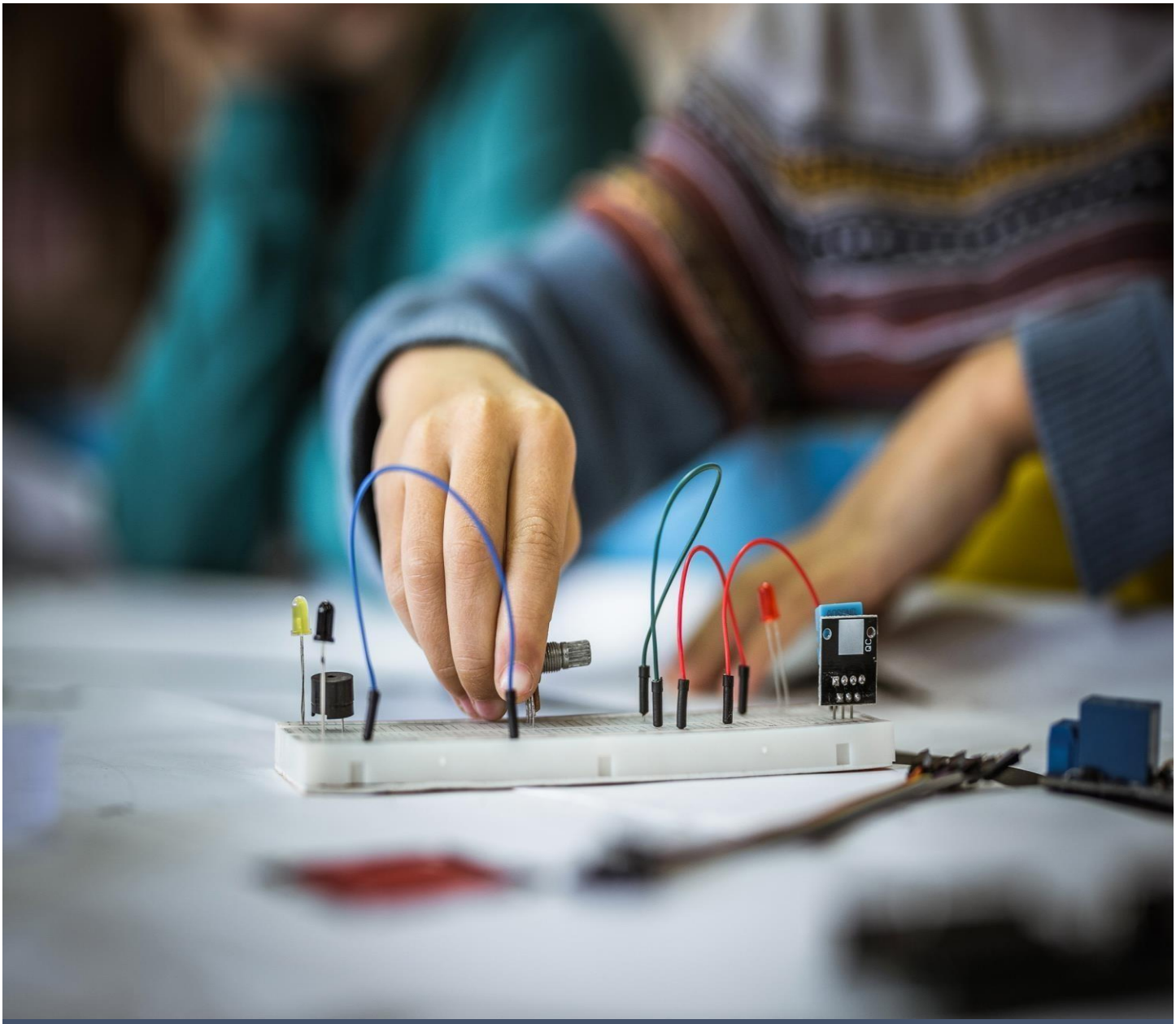

Gate Entry Management System

Semester Project: Instruments and Measurements

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Presented to: Sir Ali Khalid

Contents

Abstract

Be it universities like NUST, or any other gated premises, an entry management system is imperative for security. Currently, all the Gates in NUST rely on manual Gate Entry Management techniques. A security guard is present at the Gate who allows entry to any incoming vehicle after examining the NUST ID cards of the passengers. Not only is the method very hectic or time-consuming, but also fails to guarantee any security. While the new e-tag initiative has solved the problem of time-inefficiency, it does not guarantee extra security. Henceforth,in this project we shall a design a Gate Entry Management System that will store and display the information of the passengers entering the Gate e.g. Student, CMS, Day scholar or Hostelite etc.

Thanks to this, the Campus Administration will be aware of all the students present within the campus premises at any given time of the day.

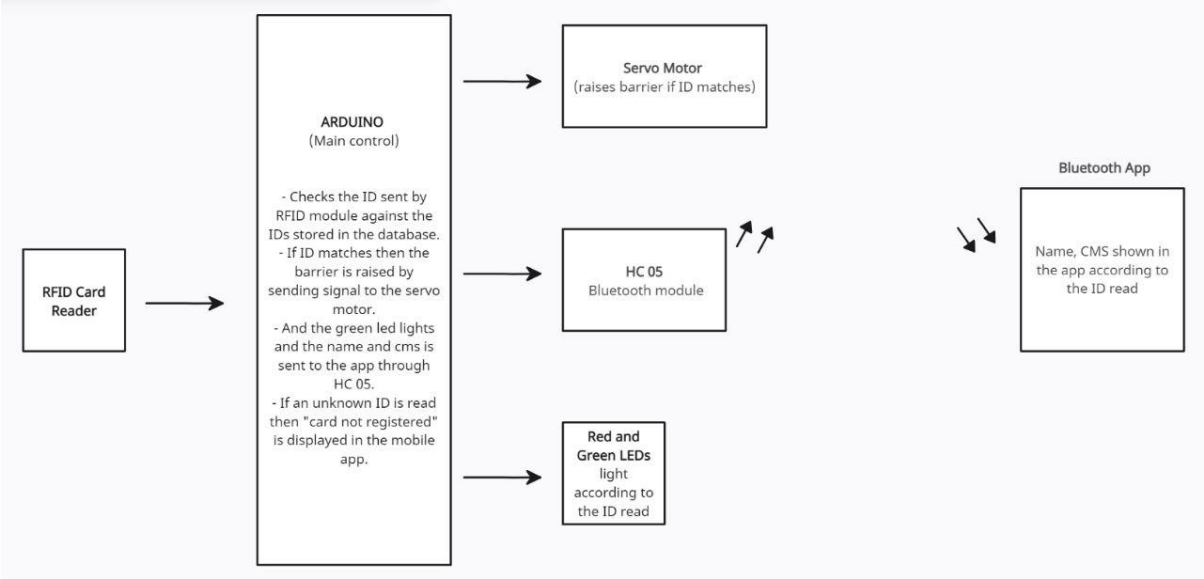
Introduction

RFID is the abbreviation of Radio frequency identification. RFID modules use electromagnetic fields to transfer data between the card and the reader. Different tags are attached to objects and when we place that object in front of the reader, the reader reads those tags. Another benefit of RFID is that it doesn't require to be in a line of sight to get detected. Unlike in barcode, where the reader has to be in the line of sight to the tag and then it can scan but in RFID there's no such restriction.

RFID based Card Entry System: This will detect the information available on the passenger's NUST ID Card and will grant or block access accordingly. Once the passenger leaves the campus, his data will be erased. This will be done with the help of RFID module.
This data will be displayed via Bluetooth module on a mobile application built with MIT app developer.

Methodology

Block Diagram



Working Principle

As soon as the card is displayed in front of the RFID scanner, It displays the data stored against that particular cards ID, If it displays Hostelite or Day scholar access is granted, green LED lights and the barrier lifts otherwise it displays ‘card is not registered’, access is denied and red LED lights. It also sounds an alarm if a day scholar tries to enter or is still in premises after curfew time.

To increase the accessibility all of this the data is further displayed in a mobile app via Bluetooth.

Components Used

- Arduino Uno
- RFID RC522
- Servo motor
- RTC DS3231
- Bluetooth module HC05
- MIT app builder for mobile app

RC522 RFID

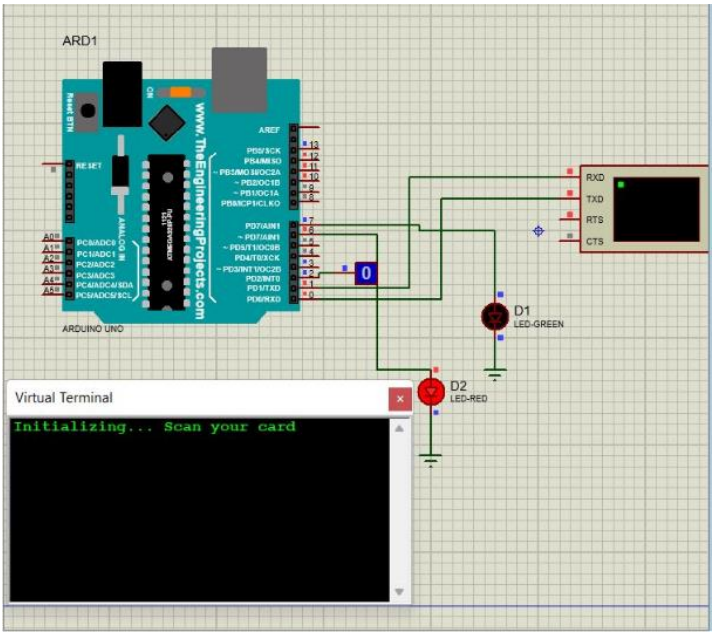
The RC522 RFID module based on is one of the cheapest RFID options you can get online for less than four dollars. It usually comes with an RFID card tag and a key fob tag with 1KB of memory. And the best part is that it can write a tag that means you can store any message in it.

HC-05 Bluetooth Module

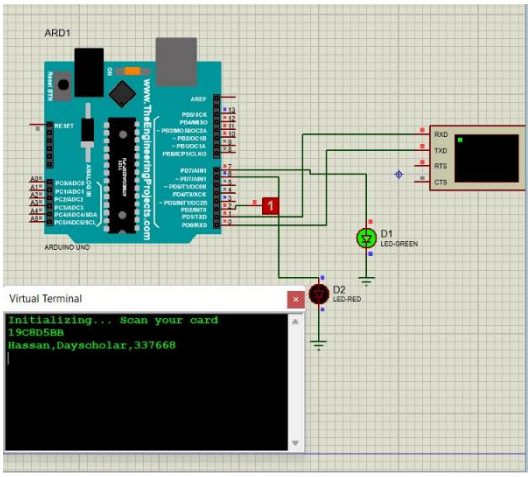
HC-05 Bluetooth Module is an easy-to-use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Its communication is via serial communication which makes an easy way to interface with controller or PC. HC-05 Bluetooth module provides switching mode between master and slave mode which means it able to use neither receiving nor transmitting data. Any serial data from 9600 to 115200 bps can be communicated with the device.

Results and Discussion

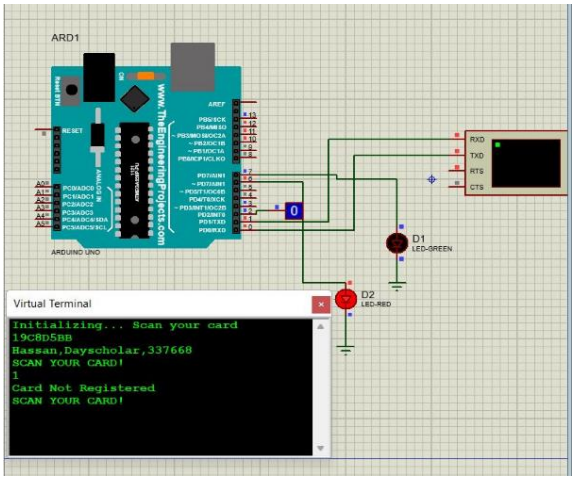
Simulation



Working simulation; idle case



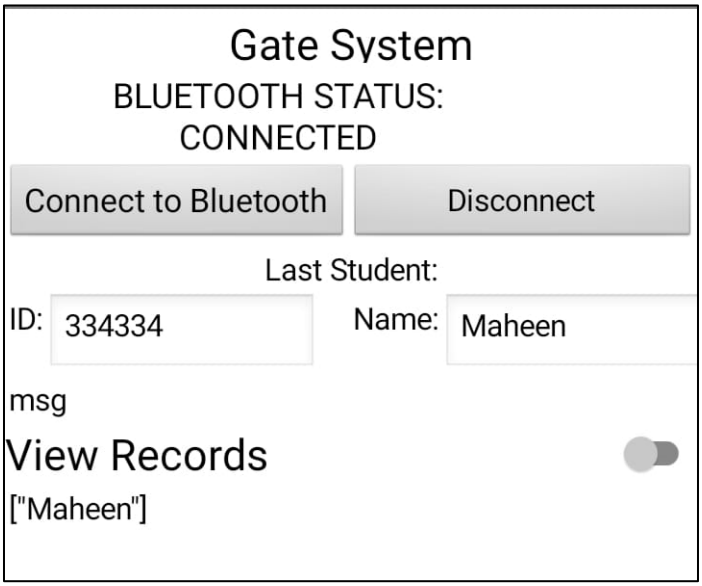
Case of correct ID input



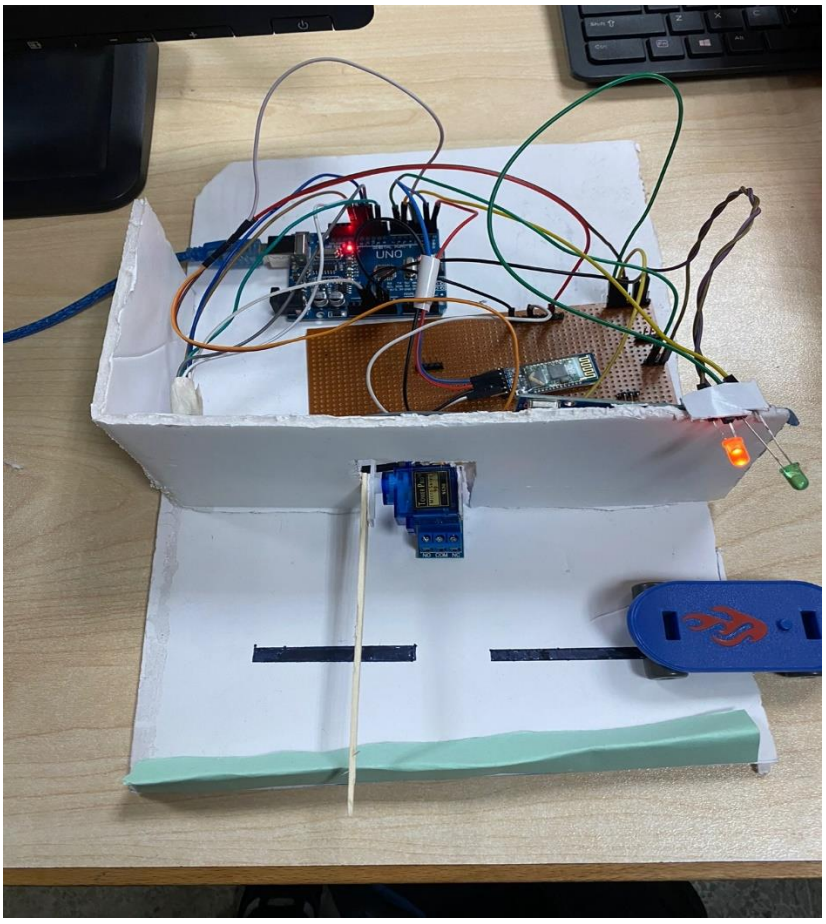
Case of a not registered ID scanned

Hardware Implementation

Bluetooth APP



Hardware



Conclusion

This project helped us put our theoretical knowledge into practice and polish our skills on Arduino. Through this project we were able to learn new software and learn app development. It enlightened us with the essence of teamwork and hard work.

Applications

1) Universities and Educational Institutions:

Universities, School, colleges require maximum security, especially in the light of recent events occurring in Pakistan.

2) Gated Housing Communities:

Gated Housing Communities can employ our design to provide utmost protection for theirresidents.

3) Malls:

Shopping malls can use this. However, since they usually have unrestricted access, wecan skip the RFID Card Based Entry system.

4) Industrial Areas:

To grant access to only authorized personnel and workers.

Future Goals

In future, we can make the following improvements to this circuit:

- The circuit can include an anti-intruder system, which may have an LED or buzzer that turns ON if any unauthorized person somehow manages to bypass the RFID Card Entrysystem.
- We can add a camera so that the photograph of the person entering the premises can be captured.

Contribution

Maheen Salman	Hardware and Report
Hassan Saqib	Hardware and Code
Fiza Ayub	Hardware and Presentation
Syed Muhammad Abubakar	Hardware and Simulation

References

- Ng, W.W.Y. ; Yi-Song Qiao ; Li Lin ; Hai-Lan Ding, "Intelligent book positioning for library using RFID and book spine matching", IEEE International Conference on Machine Learning and Cybernetics (ICMLC)(Volume:2),pp:465-470, July 2011
- Narayanan A., Sanjay Singh and Somasekharan M., "Implementing RFID in Library: Methodologies, Advantages and Disadvantages", Scientific Information Resource Division, IGCAR, pp: 271-281
- Joju Mohan, Rahul K Raj, and Dhaneesh Chandran, "RFID Based Library Automation with wireless 2.4GHz 802.11b wireless communication", IEEE Conference, pp: 1-3, March 2012.