InspiHER {Tech} V1.0 – IEEE WIE Affinity Group of SLTC

Round 1 - InspiHER {CircuitriX} – Proposal

Team Details

Team ID: T09

Team Name: Dream Epic

Details	Team Leader	Member 01	Member 02
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Declaration

I certify that this proposal does not incorporate without acknowledgement, any material previously submitted for a previous Competition, Degree or Diploma in any university or organization, and to the best of my knowledge and belief it does not contain any material previously published or written by another person, except where due reference is made in the text.

(Provide the date and the signature of the team leader)

…… ……

……..…… 19/09/2021

Signature of the team leader Date

Introduction

Briefly explain your circuit design, giving a clear idea of the design. (Mention it's application and how you're going to implement it. If you have included a creative idea in your design, please mention it)

In the modern day world, people tend to digitize everything possible in order to make the process easier and also to impose higher security restriction to reduce theft and fraud. A digitized door looking mechanism is also one such application nowadays people are implementing. Through that the owner of the building would be able to increase the security of the building.

We have designed an automatic door locking system using Arduino modules. Through our system, a person who stands outside the door can unlock the door by entering his or her user id and password through a keypad. All the user inputs and system state will be displayed on the LCD display.

For a person who stands inside the building or house can open the door by simply pressing a button. A person can only enter a wrong password or wrong id for three times until the system freeze.

Through the system we designed we increase the security by allowing the guest to enter a user id and password and also by sending a security alert to the owner if the lock freezes.

If the system freezes due to wrong ID or wrong password, a SMS with a security alert will be send to the owner's mobile phone as a precaution.

Parts Used

- Arduino Uno
- Numeric Keypad
- LCD Display
- Green LED
- Red LED
- Buzzer
- Servo Motor
- Push Button
- GSM module sim900D

Methodology

Briefly describe the set of procedures, logics, systems and methods used.

In our door locking mechanism, a user who waits outside the door can enter his or her user id and password through a keypad and if the id or password entered is wrong for three times, the system will freeze and a security alert will be sent to the owner of the house or building. To implement this mechanism, we have used a while loop which iterates 3 times until the initial value is again set to zero after an access grant or screen freeze.

A user who stands inside the building can open the door by simply pressing a button. To implement the unlocking mechanism using the button, we have used interrupts. The interrupt is executed through the second pin which is one of the interrupts pin of the Arduino Uno. Even if someone was entering a user id or password from outside, if someone from inside press the button, the door will be opened immediately and system will go to its initial state and the welcome message will be displayed.

Altogether we used 8 functions for each main functionality in our program to improve the reusability, readability and simplicity of the code. One function is for the interrupt service routing and others for getting id input, getting password input, verifying password, countdown, unlocking door, locking the door and for the security alert. In password verifying function a switch case is use to compare the password with its matching user Id.

To operate the components, we used LiquidCrystal, Keypad, SoftwareSerial and servo libraries in our program.

To show the implementation of GSM module we have used a virtual terminal. A message will be displayed on the terminal when the GSM module is activated.

Design & Code

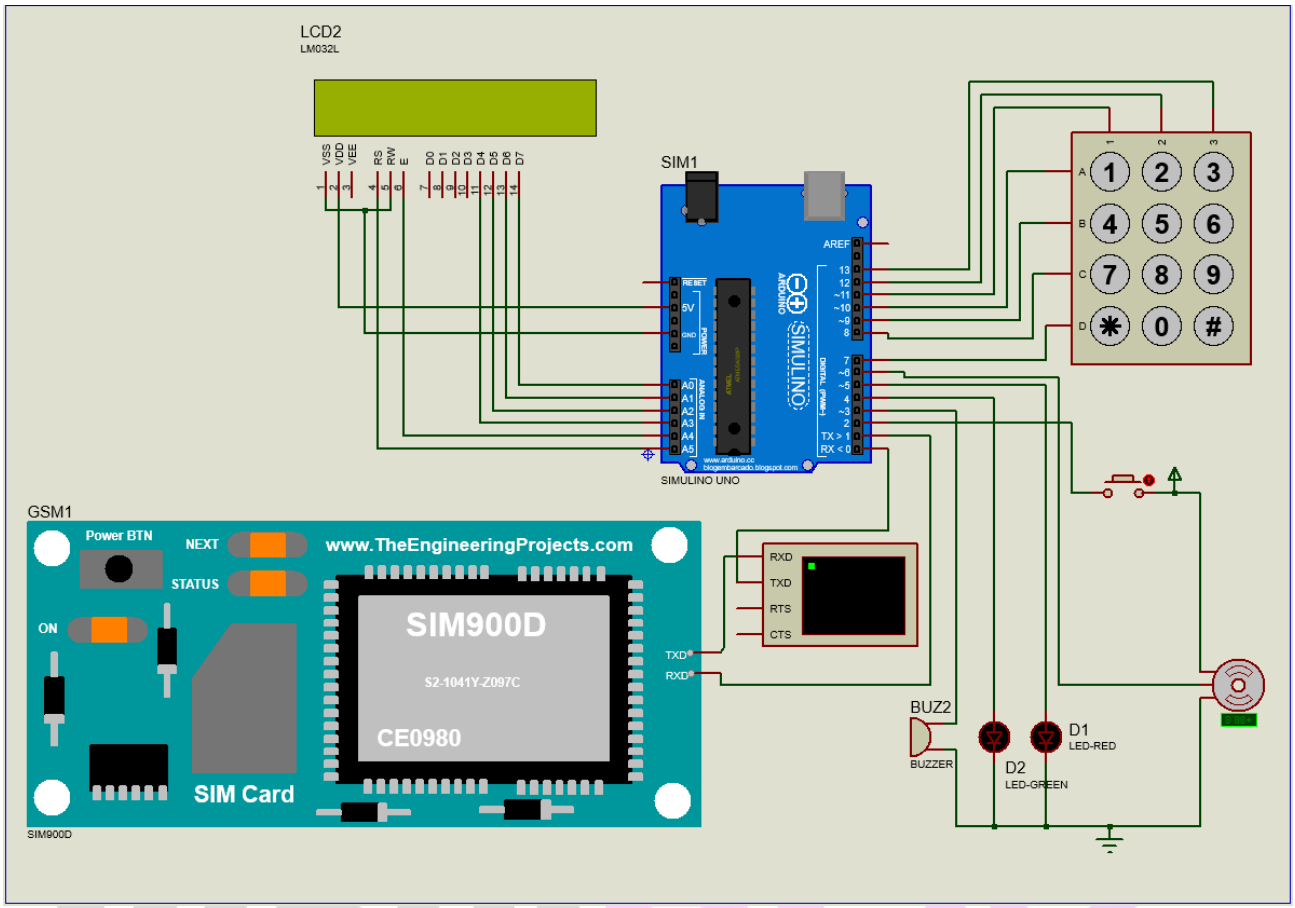

Figure 1: Inactivated door locking system

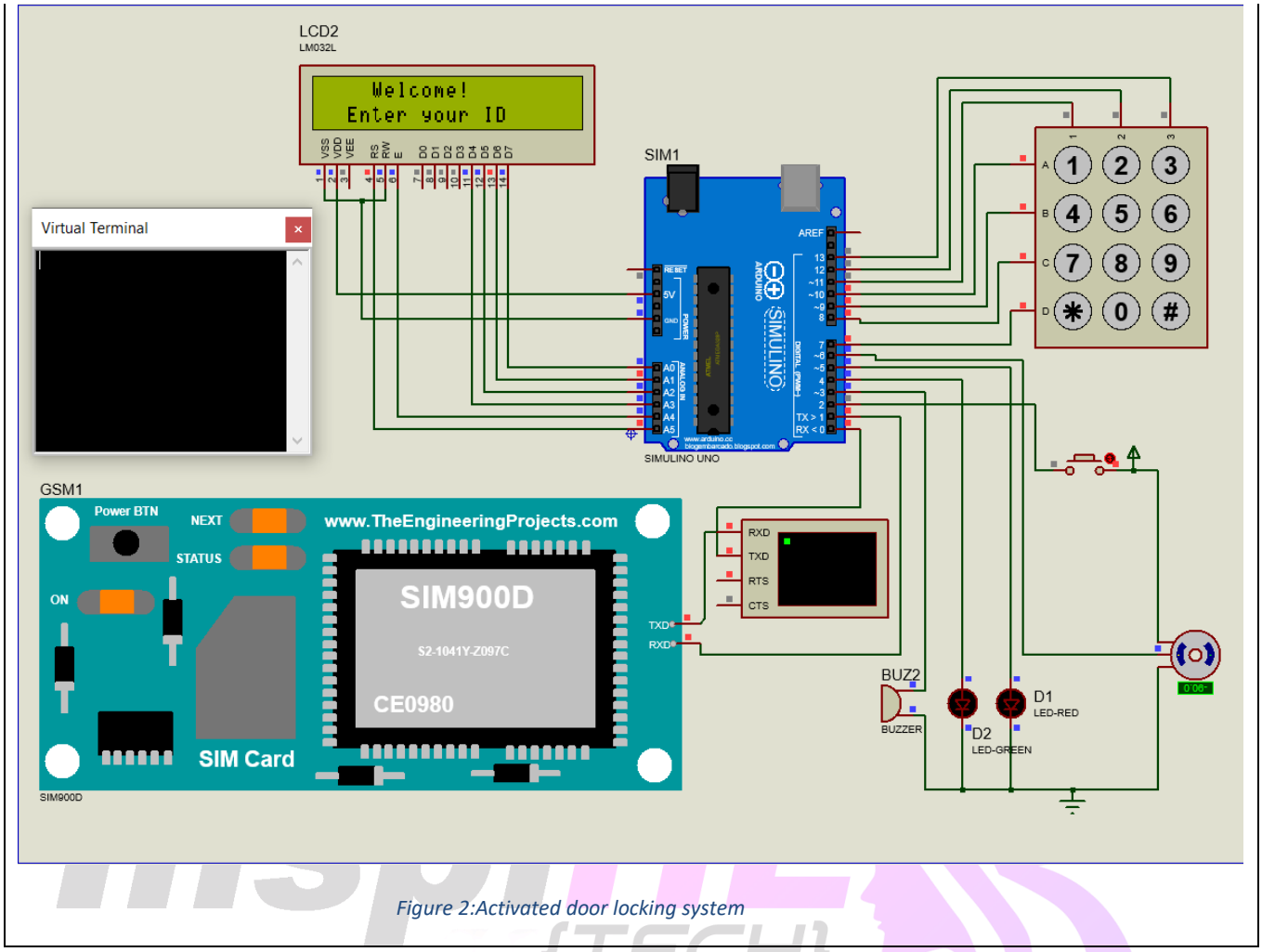

Figure 2:Activated door locking system

Problems Faced & Solutions

- As we used a while loop inside the loop( ) function to keep the count of the number of times an ID is entered until the system freezes. Due to that reason We couldn't execute any other condition checking or while lop inside loop( ) as the system iterates in the first loop until user input is give. Therefore, to implement the kill switch mechanism we used an interrupt. Through that we can open the door at any time.

- As we cannot illustrate the message sending process through Proteus, to show the implementation of GSM module we have used a virtual terminal. A message will be displayed on the terminal when the GSM module is activated.

- As Tinkercad application does not have a GSM module, we were not able to integrate it to the system to include in the isometric image of the system

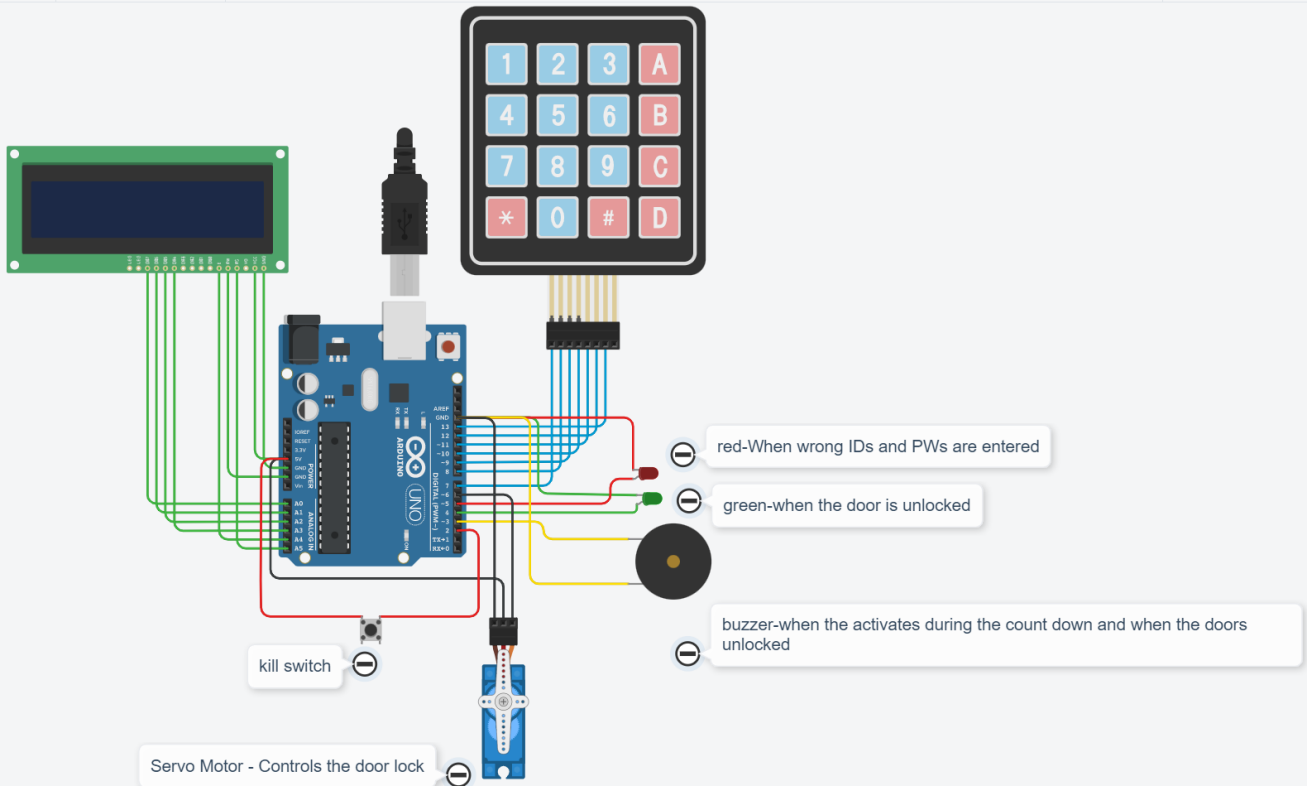

Figure 3: Isometric image of the system