

**NAME: SAGAR GANGWANI**

**BATCH: J-1**

**BRANCH: MECHANICAL**

**ROLL NO: 16010521074**

**Template for Project submission**

The project document should have

1. Problem statement developed from need statement as per template given
2. block diagram / concept diagram explaining mechanical structure and general working of model  
handwritten diagrams / model using tinkercad / linkage is expected
3. Sensors , actuators and its control achieved using arduino type controller and its code  
Simulation of circuit on tinkercad

Timeline: Finalization of theme: Jan 26, 2022

Problem statement and submission of Gantt Chart: Jan 26, 2022

Concept Diagrams / Structure: Feb 03, 2022

Simulation of control: Mar 8, 2022

**Final Submission: Mar 8, 2022**

**Part 1:**

**Timeline and Gantt Chart (Distribution of work and Planning including Part 1)**

Roll Number	Name of Student Role played
160105210	Sagar Gangwani Designer
77	Fahad kazi Salesperson
160105210	
75	
16010221038	Eshan Trivedi Salesperson
16010321116	Krish Desai Customer
16010521072	Gunamshu Customer

Need Statement:

**Table 1: List of The sample Questionnaire to design the problem**

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1. Why is this a priority in today's time?
2. What challenges do you think will come as you try to purchase the product?
3. What will be the total cost of this technology?

**Identify client's objective**

4. What's your approximate budget for this project?
5. What will be the safety requirements if we buy this product?

1. What if there's a power failure in our society?
2. Is there any limit to pin code length?

3. We tend to forget house keys now and then,  
and also it can be easy to forget the pincode for  
the lock. Is there any alternative solution for  
this problem

**Identify constraints**

1. What will be the use of this system's circuit?
2. Where can this product be used? And does it ensure authorized access to highly secured places?
3. How can this project be used to control the switching of loads through password?

**Establish functions**

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**Table 2 The information obtained through basic research and Survey**

<b>Observation and Justification of requirements.</b>	<b>Requirements Specifications</b>
1. Because when we pass the phone the the door responds.	The lock should have NFC tag
2. It is observed that people tend to forget house keys now and then, and also it can be easy to forget the pincode for the lock. By using an application to grant a temporary key to people at a specific time and date.	The lock should have a temporary key
3. To record everything that happens in front of the lock with high quality.	The lock should a camera record full HD

4. This is because of safety purposes. Infrared motion is emitted by humans and animals in the form of heat. When an infrared energy surge occurs, an alarm is triggered.	The lock should contain infrared motion detectors(PIR)
5. To transfer commands from the user to the device from long distances.	The lock should have WI-FI.
6. It is used so that the battery does not run out faster.	The lock should have remote control that takes less energy

### 1.1 Establish client's objectives

- 1) In today's world everything has become very digitized. We can even witness modern currency being digitized nowadays. The ease of technology has increased so much that it has also eventually given rise to crime rate. Which is a thing to

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worry for us. So to compete in this world we need to be up to date with regards to many things. Which also includes a password based door lock system. 2) The total cost of our product is 3000/-

- 3) For safety purposes we will also provide you with an alternative key.

### 1.2 Identify constraints

- 1) Fail safe locks operate on a principle of that as long as power is supplied, the lock is active and when an unlock is triggered, the power cuts out, and the lock opens. They are generally used for emergency exits, or in a situation where if power is cut out, an exit is still possible.
- 2) There is no limit to PINCODE of password based door lock systems. 3) It is a low range circuit, i.e. if you forget the password it is not possible to open the door.

### 1.3 Establish functions

- 1) The simple circuit can be used at residential places to ensure better safety. 2) It can be used at organizations to ensure authorized access to highly secured places 3) With a slight modification this project can be used to control the switching of loads to password.

- 4) The main concept behind this project is a door-latch opening using a password entered through a keypad. User can change this password anytime he/she wish using a keypad

## Part 2:

### Design Specifications

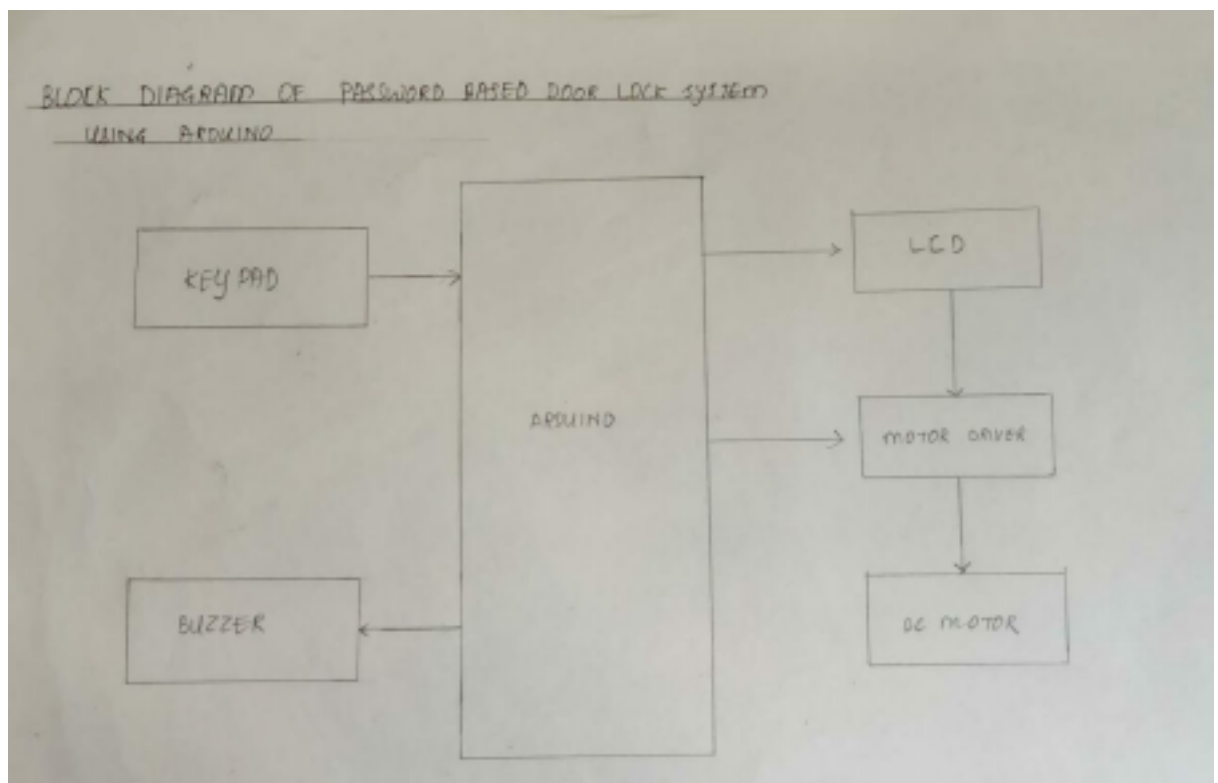
Students can submit either of following in order to explain the design and working of idea

- Block diagram
- 3 D model of design

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- mechanism models
- hand drawings/ sketches of ideas
- List of components needed for implementation



## LIST OF COMPONENTS NEEDED FOR IMPLANTATION

Name	Quantity	Component
U1	1	Arduino Uno R3
U2	1	LCD 16 x 2
R1	1	1 k $\Omega$ Resistor
R2	1	220 $\Omega$ Resistor
KEYPAD1	1	Keypad 4x4
SERVO1	1	Positional Micro Servo

### Part 3:

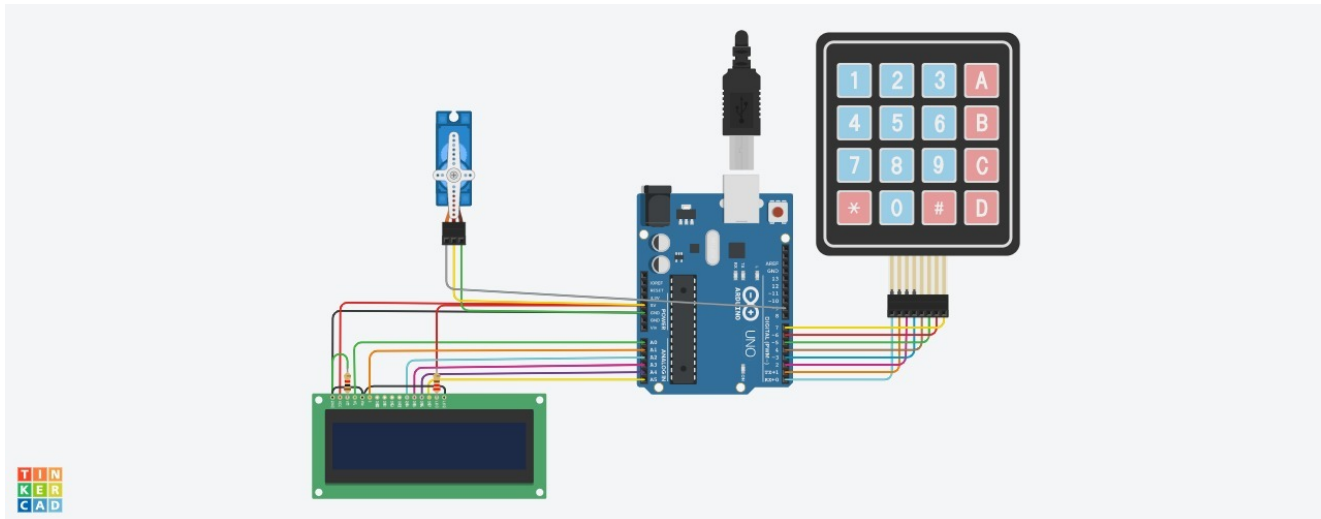
#### Control logic and Program

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Students can submit either of following in order to explain the design and working of idea

- Circuit diagram
- Program / Code
- Simulation video



### CODE:

```
#include <Keypad.h>
#include <LiquidCrystal.h>
#include <Servo.h>
```

```
#define Password_Length 5
```

```
Servo myservo;
```

```
LiquidCrystal lcd(A0, A1, A2, A3, A4, A5);
```

```
int pos = 0;
```

```
char Data[Password_Length];
```

```
char Master[Password_Length] = "1234";
```

```
byte data_count = 0, master_count = 0;
```

```
bool Pass_is_good;
```

```
bool door = false;
```

```
char customKey;
```

```
/---preparing keypad---/
```

```
const byte ROWS = 4;
```

```
const byte COLS = 4;
```

```
char keys[ROWS][COLS] = {
```

```
    {'1', '2', '3', 'A'},
```

```
    {'4', '5', '6', 'B'},
```

```
    {'7', '8', '9', 'C'},
```

```
    {'*', '0', '#', 'D'}
```

```
};
```

```
byte rowPins[ROWS] = {0, 1, 2, 3};
```

```
byte colPins[COLS] = {4, 5, 6, 7};
```

```
Keypad customKeypad( makeKeymap(keys), rowPins, colPins, ROWS, COLS);
```

```
/--- Main Action ---/
```

```
void setup()
```

```
{
```

```
    myservo.attach(9, 2000, 2400);
```

```
    ServoClose();
```

```
    lcd.begin(16, 2);
```

```
    lcd.print("Protected Door");
```

```
    loading("Loading");
```

```
    lcd.clear();
```

```
}
```

```

void loop()
{
  if (door == true)
  {
    customKey = customKeypad.getKey();
    if (customKey == '#')
    {
      lcd.clear();
      ServoClose();
      lcd.print("Door is closed");
      delay(3000);
      door = false;
    }
  }
  else
    Open();
}

```

```

void loading (char msg[]) {
  lcd.setCursor(0, 1);
  lcd.print(msg);

  for (int i = 0; i < 9; i++) {
    delay(1000);
    lcd.print(".");
  }
}

```

```

void clearData()
{
  while (data_count != 0)
  {
    Data[data_count--] = 0;
  }
  return;
}

```

```

void ServoClose()
{
  for (pos = 90; pos >= 0; pos -= 10) {
    myservo.write(pos);
  }
}

```



```

void ServoOpen()
{
    for (pos = 0; pos <= 90; pos += 10) {
        myservo.write(pos);
    }
}

void Open()
{
    lcd.setCursor(0, 0);
    lcd.print("Enter Password");

    customKey = customKeypad.getKey();
    if (customKey)
    {
        Data[data_count] = customKey;
        lcd.setCursor(data_count, 1);
        lcd.print(Data[data_count]);
        data_count++;
    }

    if (data_count == Password_Length - 1)
    {
        if (!strcmp(Data, Master))
        {
            lcd.clear();
            ServoOpen();
            lcd.print(" Door is Open ");
            door = true;
            delay(5000);
            loading("Waiting");
            lcd.clear();
            lcd.print(" Time is up! ");
            delay(1000);
            ServoClose();
            door = false;
        }
        else
        {
            lcd.clear();
            lcd.print(" Wrong Password ");
            door = false;
        }
        delay(1000);
        lcd.clear();
        clearData();
    }
}

```

}

}

#### **Part 4:**

##### **Learnings and scope of idea**

Students can submit either audio or video presentation of the complete project work which will include a combination of Parts 1, 2 and 3 along with learnings from the project and scope of application of the presented idea.