

# Option 1: TinkerCAD Arduino Capstone: Secure Door Entry

Scenario: Locked entrance door that the user open.

1. An ultrasonic sensor will determine if there is someone at a secure door
  - a. User within 24" of the door,
    - i. RGB LED
      1. Within Range: Color YELLOW
      2. Outside of Range: Color RED
    - b. Temperature sensor will activate, taking the temperature of the user
      - a. Range Between 50 – 100 degrees the LCD monitor will prompt the user to type in a passcode  
Secure Door Code: 7,4,3  
User will get **2 guesses**.
        - i. User Guesses the Code
          1. Have the User use the Serial Monitor to type in the code
          2. LCD Monitor outputs Row 1: "Correct" Row 2: "Entry Granted"
          3. RGB LED: Color GREEN
          4. Speaker Buzzes to simulate entrance granted
          5. Servo Motor Activates acting as if the door is opening > Door will remain open for 5 seconds then reverse direction to simulate the door is closed > RGB LED Turns back to RED > Clear LCD Screen
        - b. User Does not Guess the code after 2 guesses
          - i. LCD monitor will output Row 1: "Error" Row 2: "Locked Out"
          - ii. RGB LED Color Flashes RED for 5 seconds (for example On for 250 ms, off 250 ms)
          - iii. RGB LCD Clears only when the current user is out of range (Greater than 24 inches), This will reset the program
      - b. Falling outside the range (Below 50 or above 100)
        - a. LCD Screen will output NO ADMITTANCE
        - b. RGB LED Color Flashes RED for 5 seconds (for example On for 250 ms, off 250 ms)
        - c. RGB LCD Clears only when the current user is out of range (Greater than 24 inches)

Project will utilize the following

1. Programming code: See Reference Code for base code
  - a. 1 dimensional array: allows user to store multiple values within one variable (see code below for setup)
2. Hardware
  - a. Arduino Board
  - b. LCD Monitor
  - c. RGB LED
  - d. Servo Motor (Represents Door or Machine)
  - e. Ultrasonic Sensor
  - f. Temperature Sensor
  - g. Piezo Speaker

## Code: User Input 3 Digit Door Code and Compare to Predefined 3 Digit Door Code

```
int doorcode[3] = {7, 4, 3};    //creates 1D array to stored 3 digit code to unlock the door
int usercode[3];               //creates 1D array to have user enter a 3 digit code
int codematch;                 //Variable to keep track the number of matches the user has
char junk = ' ';               //Variable used to clear Serial Monitor if bad input

void setup()
{
  Serial.begin (9600);
  Serial.println ("Enter Code: ");
  Serial.flush ();
}

void loop()
{
  //For Loop to
  //1. User inputs a value
  //2. Compares value to doorcode
  //3. Increase codematch variable if the match is made
  for (int x = 0; x <= 2; x++)
  {
    Serial.println ("Enter Number: ");

    //While Loop has user enter a value in the Serial Monitor
    while (Serial.available() == 0);
    {
      usercode[x] = Serial.parseFloat (); //stores user input to index x

      while (Serial.available () > 0)
      {
        junk = Serial.read();
      }
    }

    //IF Statement keeps track of how matches the user has
    if (doorcode[x] == usercode[x])
    {
      codematch++;
    }
  }

  //FOR Loop outputs the users entry to check if it is taking properly
  //Comment out when done with testing
  for (int x = 0; x <= 2; x++)
  {
    Serial.print ("User Number Entered: ");
    Serial.println (usercode[x]);
  }

  //OUTPUTS the total matches correct. Comment out when done with testing
  Serial.println (codematch);

  if (codematch == 3)
  {
    Serial.println ("SUCCESS");
  }
  else
  {
    Serial.println ("INCORRECT CODE");
  }
}
}
```

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