Practical No.:04

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ROLL NO.01

COURSE: AI&DS

CLASS: BE

SUB:Computer Laboratory-I (Machine Learning)"

Title: Write a program for implementing security measures in an IIoT system.

#Code:

```
#include <Keypad.h>


// Define pins

const int pirPin = 2;     // PIR sensor connected to digital pin 2

const int ledPin = 11;    // LED connected to digital pin 11

const int buzzerPin = 12;  // Buzzer connected to digital pin 12


// Define access code

const String accessCode = "1234"; // The passcode for access

String enteredCode = "";

bool motionDetected = false;


// Set up keypad

const byte ROWS = 4; // Four rows

const byte COLS = 4; // Four columns

char keys[ROWS][COLS] = {

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

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

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

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

};

byte rowPins[ROWS] = {3, 4, 5, 6};   // Connect keypad rows to pins
```

```
byte colPins[COLS] = {7, 8, 9, 10};  // Connect keypad columns to pins

Keypad keypad = Keypad(makeKeymap(keys), rowPins, colPins, ROWS, COLS);


void setup() {

  Serial.begin(9600);

  pinMode(pirPin, INPUT);

  pinMode(ledPin, OUTPUT);

  pinMode(buzzerPin, OUTPUT);


  Serial.println("Security System Initialized.");

}


void loop() {

  // Check for motion

  int pirState = digitalRead(pirPin);


  // If motion is detected and wasn't previously detected

  if (pirState == HIGH && !motionDetected) {

    motionDetected = true;

    Serial.println("Motion detected! Please enter code to disarm.");

  }


  // If motion was detected, wait for keypad input

  if (motionDetected) {

    char key = keypad.getKey();

    if (key) {

      if (key == '#') { // '#' key will submit the code

        if (enteredCode == accessCode) {

          Serial.println("Access granted. System disarmed.");

          digitalWrite(ledPin, LOW);

          noTone(buzzerPin); // Stop buzzer

          enteredCode = "";  // Clear entered code

          motionDetected = false;  // Reset motion flag

        } else {
```

```cpp
      Serial.println("Access denied! Incorrect code.");

      triggerAlarm();

      enteredCode = "";  // Reset entered code

    }

  } else if (key == '*') { // '*' key clears the entered code

    enteredCode = "";

    Serial.println("Code cleared. Try again.");

  } else {

    enteredCode += key;  // Append pressed key to entered code

    Serial.print("Entered: ");

    Serial.println(enteredCode);

  }

  }

} else {

  // Turn off alarm if no motion and system disarmed

  digitalWrite(ledPin, LOW);

  noTone(buzzerPin);

}


  delay(100);

}


// Function to trigger alarm

void triggerAlarm() {

  digitalWrite(ledPin, HIGH); // Turn on LED

  tone(buzzerPin, 1000);      // Sound buzzer

  Serial.println("ALERT! Unauthorized access detected!");

}
```
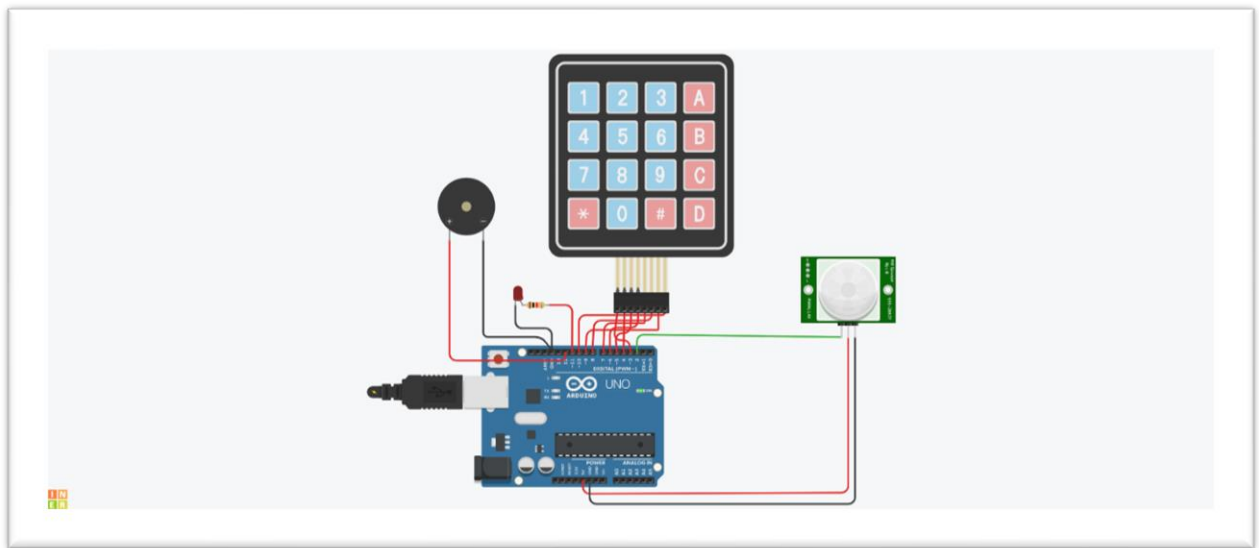
#Circuit Diagram:

#Output:

Security System Initialized.

Motion detected! Please enter code to disarm.

Entered: 1

Entered: 12

Entered: 123

Entered: 1235

Entered: 12356

Entered: 123561

Entered: 1235612

Entered: 12356123

Entered: 123561234

Entered: 1235612348

Entered: 1235612348A

Code cleared. Try again.

Entered: 1

Entered: 12

Entered: 123

Entered: 1234

Entered: 12340

Code cleared. Try again.

Entered: 1

Entered: 12

Entered: 123

Entered: 1234

Access granted. System disarmed.