Port City International University

Name: *Project Proposal*

Course Code: *CSE 334*

Course Name: *Computer Peripheral & Interfacing Lab*

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Title: ***Smart Home Security System Using Arduino UNO***

▶ ***Objective***   :   To develop a prototype of a smart home security system that:

- Detects motion near doors or windows.
- Alerts users via buzzer or alarm.
- Displays real-time system status on an LCD screen.

▶ ***Component We Use***   :

- Arduino UNO

- PIR Motion Sensor

- Ultrasonic Sensor (optional for distance-based detection)

- IR Sensor (optional for door sensor)

- Buzzer

- 16x2 LCD Display (with I2C module preferred)

- LEDs (for status indication)

- Jumper wires, Breadboard, Power supply

▶ ***Methodology:***

1. **Sensor Integration:**
   - Use a PIR sensor to detect human motion.
   - Use an IR sensor or ultrasonic sensor to monitor door/window activity.
2. **Alert System:**
   - Activate buzzer and LEDs when intrusion is detected.
   - Display warning messages on LCD display.
3. **Microcontroller Logic:**
   - Program Arduino to process sensor inputs and trigger appropriate outputs.
   - Implement timing logic to avoid false alarms.
4. **Testing & Optimization:**
   - Simulate intrusions and measure system responsiveness.
   - Tune sensor sensitivity and response timing.

▶ ***Expected Outcomes:***

- A working prototype that detects unauthorized entry.
- Visual and audible alerts on intrusions.
- Real-time monitoring on LCD display.

- Home and apartment security
- Office or shop surveillance
- Low-cost intruder alert system

►*Code for Simulation*:

```cpp
#include <Wire.h>
#include <LiquidCrystal_I2C.h>

// Define LCD with I2C address 0x27 (adjust if needed)
LiquidCrystal_I2C lcd(0x27, 16, 2);

// Define pins
const int pirSensor = 2;
const int buzzer = 3;
int motionDetected = 0;

void setup() {
  pinMode(pirSensor, INPUT);
  pinMode(buzzer, OUTPUT);

  // Start serial and LCD
  Serial.begin(9600);
  lcd.init();
  lcd.backlight();
  lcd.setCursor(0, 0);
  lcd.print("Home Security");
  lcd.setCursor(0, 1);
  lcd.print("System Ready");

  delay(2000); // Display message for 2 seconds
  lcd.clear();
}

void loop() {
  motionDetected = digitalRead(pirSensor);

  if (motionDetected == HIGH) {
    lcd.setCursor(0, 0);
    lcd.print("Motion Detected ");
    lcd.setCursor(0, 1);
    lcd.print("Alert Activated ");

    digitalWrite(buzzer, HIGH); // Turn on buzzer
    Serial.println("Intruder Alert!");

    delay(2000); // Keep alert for 2 seconds
  } else {
    lcd.setCursor(0, 0);
    lcd.print("System Active   ");
    lcd.setCursor(0, 1);
    lcd.print("No Motion Found ");

    digitalWrite(buzzer, LOW); // Turn off buzzer
  }

  delay(500);
}
```