

Practical No.:03

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CLASS: BE
SUB:Computer Laboratory-I (Machine Learning)"

Title: Write a program for developing an IIoT application for energy monitoring and optimization.

#Code:

```
// Define pin numbers
const int voltagePin = A0; // Potentiometer simulating voltage connected to A0
const int currentPin = A1; // Potentiometer simulating current connected to A1
const int ledPin = 8; // LED connected to digital pin 8

// Set a power threshold for alert (in arbitrary units)
const float powerThreshold = 20.0;

void setup() {
    // Initialize Serial communication for monitoring
    Serial.begin(9600);

    // Set LED pin as output
    pinMode(ledPin, OUTPUT);

    Serial.println("Energy Monitoring System Initialized...");
}

void loop() {
    // Read the voltage and current values from potentiometers
    int voltageValue = analogRead(voltagePin);
    int currentValue = analogRead(currentPin);
```

```
// Convert the analog readings to a voltage/current range

// assuming each potentiometer gives 0 to 5V, scaled from 0 to 1023

float voltage = voltageValue * (5.0 / 1023.0);

float current = currentValue * (5.0 / 1023.0);

// Calculate power consumption (Power = Voltage * Current)

float power = voltage * current;

// Display readings on Serial Monitor

Serial.print("Voltage: ");

Serial.print(voltage);

Serial.print(" V, Current: ");

Serial.print(current);

Serial.print(" A, Power: ");

Serial.print(power);

Serial.println(" W");

// Check if the power exceeds the threshold

if (power > powerThreshold) {

    // Turn on LED for alert

    digitalWrite(ledPin, HIGH);

    Serial.println("Alert: High Power Consumption Detected!");

} else {

    // Turn off LED if below threshold

    digitalWrite(ledPin, LOW);

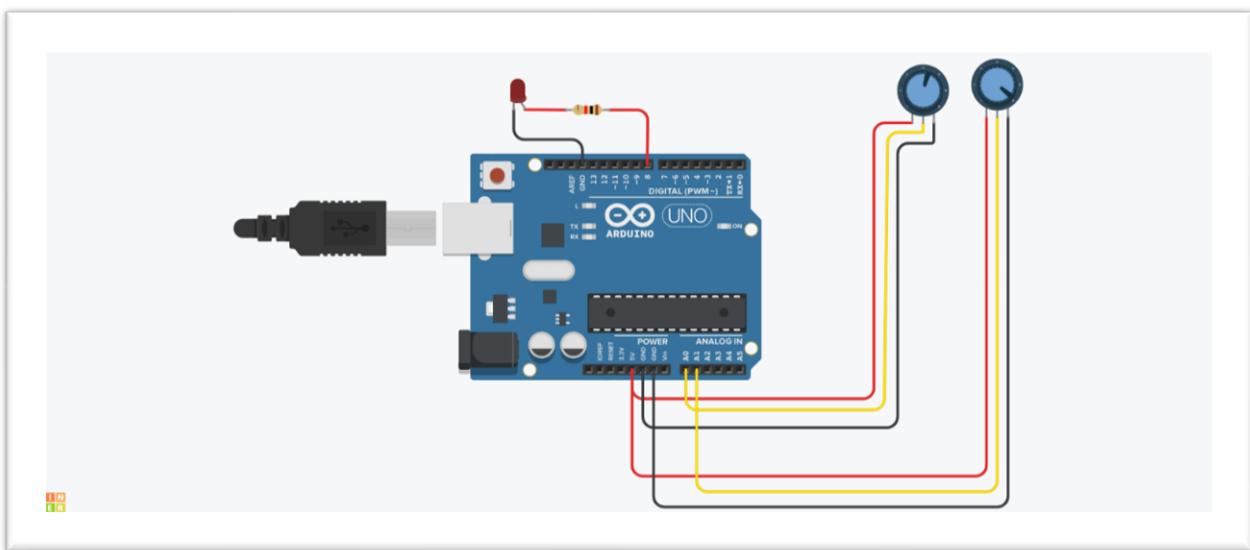
}

// Wait a second before the next reading

delay(1000);

}
```

#Circuit Diagram:



#Output:

0 A, Power: 5.51 W

Voltage: 1.90 V, Current: 2.20 A, Power: 4.18 W

Voltage: 1.90 V, Current: 2.20 A, Power: 4.18 W

Voltage: 1.90 V, Current: 0.60 A, Power: 1.14 W

Voltage: 1.90 V, Current: 0.60 A, Power: 1.14 W

Voltage: 1.90 V, Current: 0.10 A, Power: 0.19 W

Voltage: 2.70 V, Current: 0.10 A, Power: 0.26 W

Voltage: 2.70 V, Current: 0.10 A, Power: 0.26 W

Voltage: 2.70 V, Current: 0.10 A, Power: 0.26 W

Voltage: 4.80 V, Current: 0.10 A, Power: 0.47 W

Voltage: 4.80 V, Current: 0.10 A, Power: 0.47 W

Voltage: 4.80 V, Current: 0.10 A, Power: 0.47 W

Voltage: 3.30 V, Current: 0.10 A, Power: 0.32 W

Voltage: 3.30 V, Current: 0.10 A, Power: 0.32 W

Voltage: 1.80 V, Current: 0.10 A, Power: 0.18 W

Voltage: 1.10 V, Current: 0.10 A, Power: 0.11 W

Voltage: 0.20 V, Current: 0.10 A, Power: 0.02 W