

## **Practical-11**

**Aim: Develop a project on IoT application using Arduino or Raspberry Pi. with Tinkercad simulation software tool.**

### **Theory and procedure:**

Step 1: Name of the project

Step 2: information on the working principle of the project

Step 3: Team/ group name with enrolment no

Step 4: Develop the application in Tinker cad software

Step 5: write the code to perform the project

## **Project Name: Heart rate measurement and oxygen level (in body) measurement**

### **Introduction: -**

The IoT-based Heart Rate and Oxygen Level Measurement Project is aimed at developing a smart and efficient solution to monitor and track heart rate and oxygen levels using IoT technology. By leveraging the power of connected devices and wireless communication, this project aims to provide real-time and continuous monitoring of vital health parameters to enhance healthcare services and improve patient outcomes.

### **Project Aim: -**

The main objective of this project is to design and implement an IoT system that can accurately measure and transmit heart rate and oxygen level data in real-time. The project aims to create a user-friendly and portable device that can seamlessly integrate with existing healthcare

infrastructure, enabling remote monitoring, early detection of abnormalities, and prompt medical interventions.

## **Description of project: -**

The IoT-based Heart Rate and Oxygen Level Measurement Project aims to develop a portable and user-friendly solution for real-time monitoring of heart rate and oxygen levels using IoT technology. It utilizes specialized sensors to accurately measure these vital health parameters. The data is transmitted wirelessly to an IoT gateway, which acts as a central hub for data collection. The collected data is securely sent to a cloud infrastructure for storage, analysis, and access by healthcare professionals and patients through a mobile or web application. The project prioritizes data privacy and security through encryption and adherence to data protection regulations. By enabling remote monitoring and timely interventions, this project has the potential to enhance healthcare services and improve patient outcomes.

### **Team / group name with enrolment no.:**

**Name:** Rathva Vishnubhai Dinubhai

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**Batch :** A2

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## Code: -

```
#include <Wire.h>
#include "MAX30100_PulseOximeter.h"
#include <LiquidCrystal.h>

#define UPDATE_TIME 1000

// variables and pin definition
const int rs = 8, en = 9, d4 = 10, d5 = 11, d6 = 12, d7 = 13;
byte heart [8] = {0b00000, 0b01010, 0b11111, 0b11111, 0b11111, 0b01110,
0b00100, 0b00000};
uint32_t previous_update_time = 0;

LiquidCrystal lcd(rs, en, d4, d5, d6, d7);
PulseOximeter pulse;

void on_pulse_detected()
{
    Serial.println("Pulse Detected!");
}

void setup() {
    Serial.begin(115200);
    Serial.print("Initializing Pulse Oximeter..");

    lcd.createChar(2, heart);
    lcd.begin(16, 2);
    lcd.clear();
    lcd.setCursor(2, 0);
    lcd.print("Initializing");
    lcd.setCursor(1, 1);
    lcd.print("Pulse Oximeter");

    delay(3000);

    if (!pulse.begin()) {
        Serial.println("Sensor begin Failed");
    }
}
```

```

    for (;;);
} else {
    Serial.println("Sensor begin Success");
}
//set current
pulse.setIRLedCurrent(MAX30100_LED_CURR_7_6MA);

// for the pulse detection
pulse.setOnBeatDetectedCallback(on_pulse_detected);
}

void loop() {
    pulse.update();

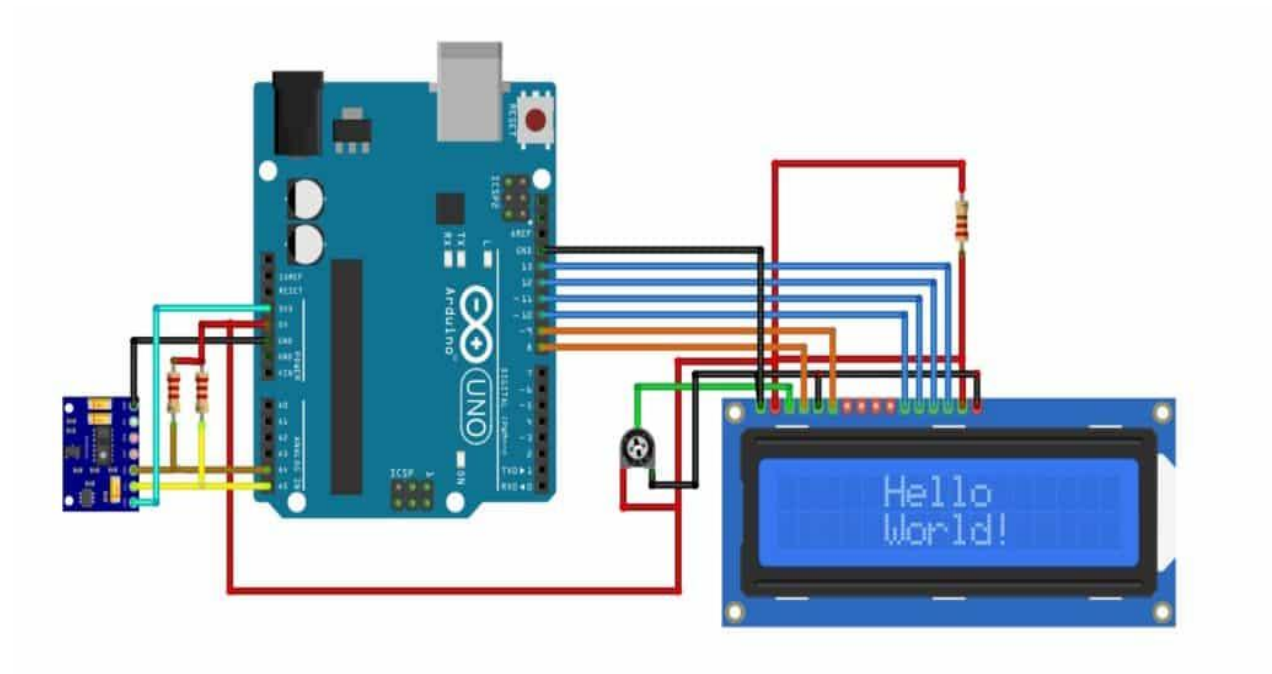
    if (millis() - previous_update_time > UPDATE_TIME) {

        // Display Result on LCD
        lcd.clear();
        lcd.setCursor(0, 0);
        lcd.write((uint8_t)2);
        lcd.print(" Rate:");
        lcd.print(pulse.getHeartRate());
        lcd.print("bpm");
        lcd.setCursor(0, 1);
        lcd.print(" SpO2 :");
        lcd.print(pulse.getSpO2());
        lcd.print("%");
        previous_update_time = millis();

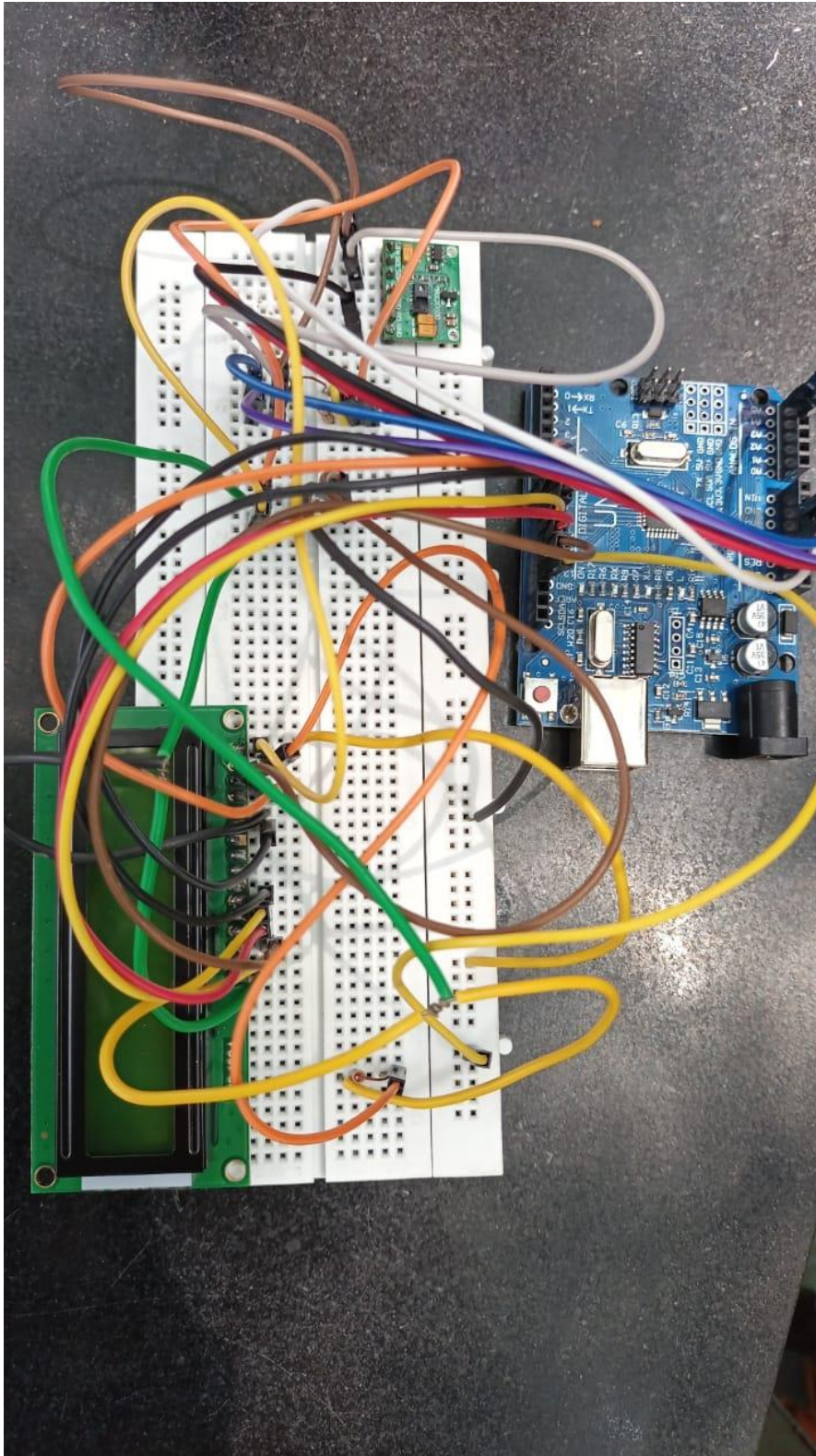
        // Display Result on Serial Monitor
        Serial.print("Heart ❤️ Rate:");
        Serial.print(pulse.getHeartRate());
        Serial.println("bpm");
        Serial.print(" SpO2 Level :");
        Serial.print(pulse.getSpO2());
        Serial.println("%");
        previous_update_time = millis();
    }
}

```

**Tinkercad circuit diagram : -**



**Prototype: -**



**Signature of faculty:**

**Grade:**

