Task 9 **Detection of axis using Accelerometer**

25.03.2022

Problem Definition:

Construct a circuit with Triple axis accelerometer by interfacing both the actuator and sensors with the help of Arduino. The Triple Axis Acceleration Sensor connected with the Arduino UNO Board will detect the vibration and LED should be made to glow when the vibration is high.

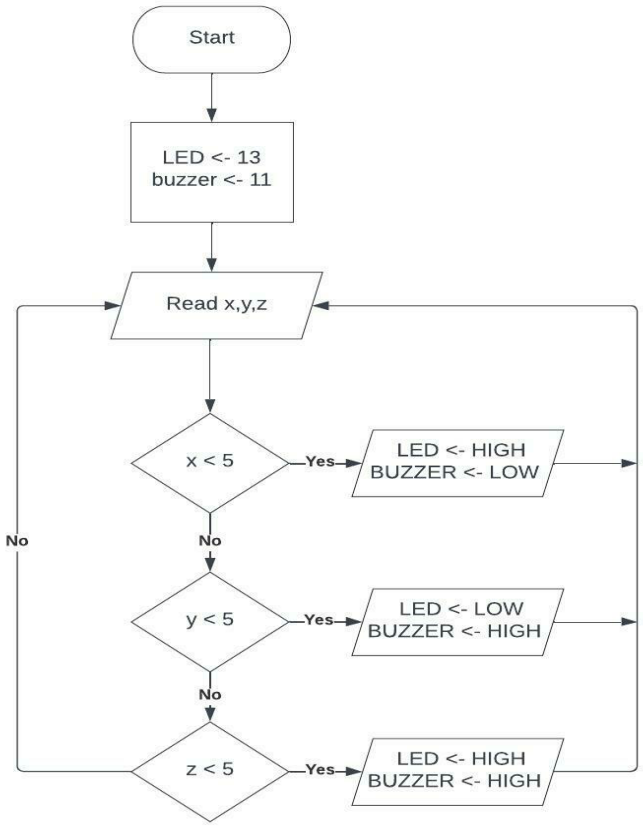
Tools Used:

- **Software :** Arduino
- **Hardware** : Triple Axis Acceleration Sensor, wires and LED
- **Board** : Arduino UNO

Sensor description:

An accelerometer is an electronic sensor that measures the acceleration forces acting on an object, in order to determine the object's position in space and monitor the object's movement. Acceleration, which is a vector quantity, is the rate of change of an object's velocity

Flowchart:



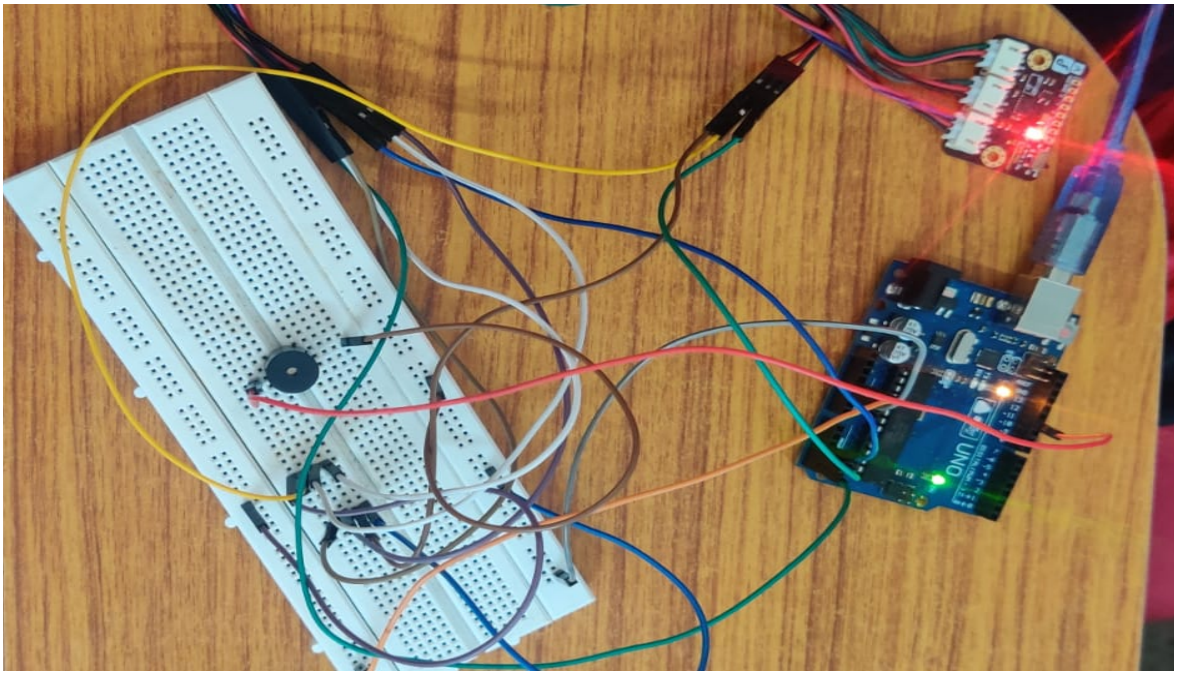
Source code:

```
float X=0.774;
float gx=0.237;

float Y=0.781;
float gy=0.21;

float Z=0.923;
float gz=0.235;

const int buzzer = 11;
const int ledPin = 13;

void setup()
{
  pinMode(ledPin, OUTPUT);
  pinMode(buzzer, OUTPUT);
  Serial.begin(9600);
}
void loop()
{
     int x,y,z;
     x=analogRead(5);
     y=analogRead(4);
     z=analogRead(3);
     x = (x*5/1024.0 - X)/gx,2;
     y = ((y*5/1024.0- Y)/gy),2;
     z = ((z*5/1024.0-Z)/gz),2;
     Serial.print("x= ");
     Serial.print(x);
     Serial.print(',');
     Serial.print("y= ");
     Serial.print(y);
     Serial.print(',');
     Serial.print("z= ");
     Serial.println(z);
     delay(300);

     if( x < 5)       {
       Serial.println(" X axis ");
       Serial.println(" LED ");
       digitalWrite(ledPin, HIGH);

     }
```

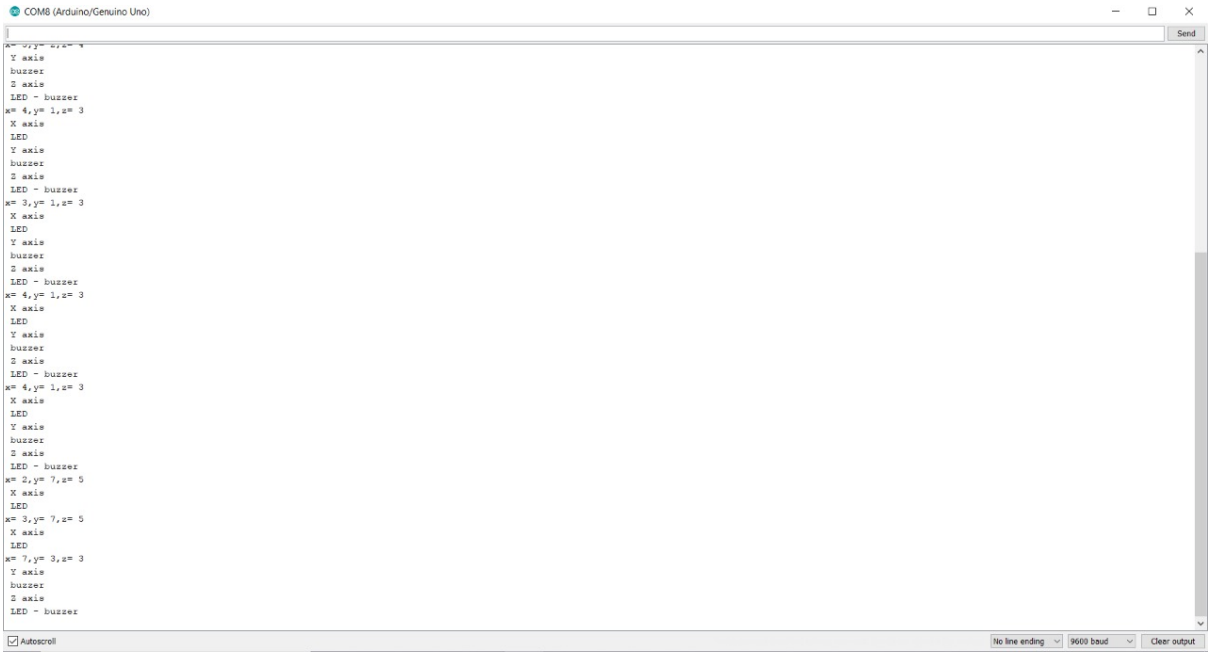
```
    if( y < 5)        {
      Serial.println(" Y axis ");
      Serial.println(" buzzer ");
      digitalWrite(buzzer, HIGH);

    }
    if( z < 5)        {
      Serial.println(" Z axis ");
      Serial.println(" LED - buzzer ");

      digitalWrite(ledPin, HIGH);
      digitalWrite(buzzer, HIGH);
      delay(100);
      digitalWrite(ledPin, LOW);
      digitalWrite(buzzer, LOW);
    }
    delay(1000);
}
```

Sample input and output:

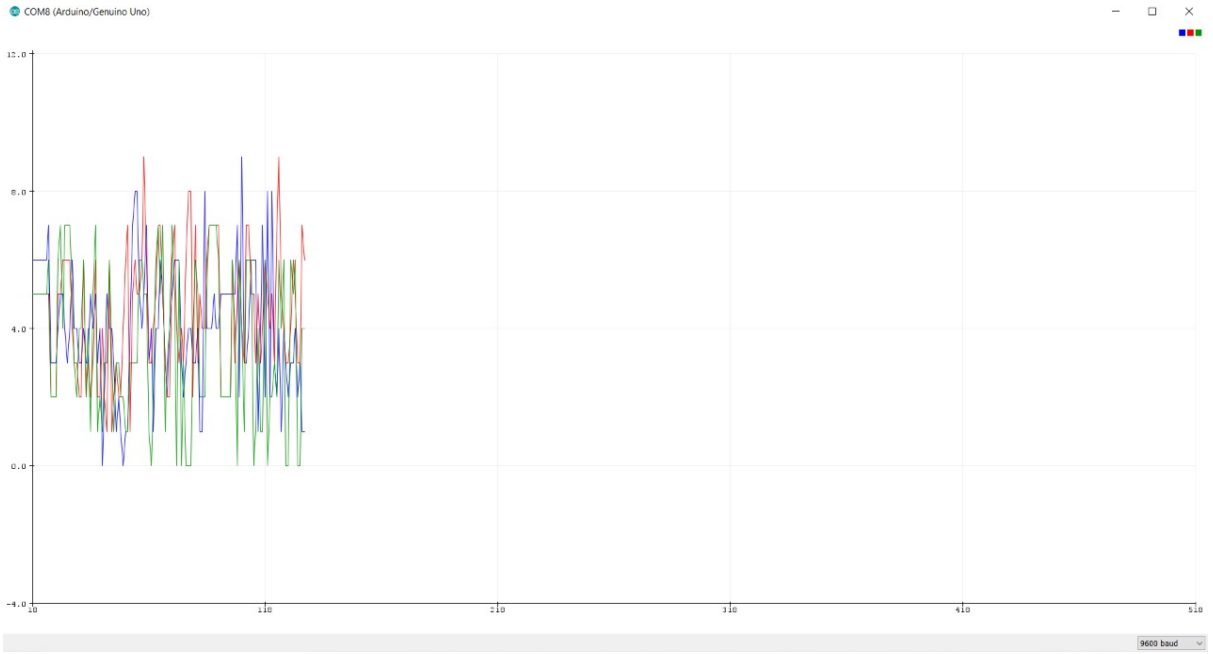
Based on the axis the led blinks :



Serial monitor of accelerometer:



Serial plotter of accelerometer:



Applications:

- For inertial navigation systems, highly sensitive accelerometers are used.
- To detect and monitor vibrations in rotating machinery.
- To display images in an upright position on screens of digital cameras.
- For flight stabilization in drones.
- Accelerometers are used to sense orientation, coordinate acceleration, vibration, shock.

Conclusion:

When any tilt or motion is detected, the sensor output is displayed on the serial monitor of Arduino software and the LED and Buzzer are set HIGH accordingly.