Arduino Source Code/Program:

```
#include<LiquidCrystal.h> // lcd Header
LiquidCrystal lcd(7,6,5,4,3,2); // pins for LCD Connection

#define buzzer 12 // buzzer pin
#define led 13 //led pin

#define x A0 // x_out pin of Accelerometer
#define y A1 // y_out pin of Accelerometer
#define z A2 // z_out pin of Accelerometer

/*variables*/
int xsample=0;
int ysample=0;
int zsample=0;
long start;
int buz=0;

/*Macros*/
#define samples 50
#define maxVal 20 // max change limit
#define minVal -20 // min change limit
#define buzTime 5000 // buzzer on time

void setup()
{
lcd.begin(16,2); //initializing lcd
Serial.begin(9600); // initializing serial
delay(1000);
lcd.print("EarthQuake ");
lcd.setCursor(0,1);
lcd.print("Detector ");
delay(2000);
lcd.clear();
lcd.print("Calibrating.....");
lcd.setCursor(0,1);
lcd.print("Please wait...");
pinMode(buzzer, OUTPUT);
pinMode(led, OUTPUT);
buz=0;
digitalWrite(buzzer, buz);
digitalWrite(led, buz);
for(int i=0;i<samples;i++) // taking samples for calibration
{
xsample+=analogRead(x);
ysample+=analogRead(y);
zsample+=analogRead(z);
}
```

```
xsample/=samples; // taking avg for x
ysample/=samples; // taking avg for y
zsample/=samples; // taking avg for z

delay(3000);
lcd.clear();
lcd.print("Calibrated");
delay(1000);
lcd.clear();
lcd.print("Device Ready");
delay(1000);
lcd.clear();
lcd.print(" X Y Z ");
}

void loop()
{
int value1=analogRead(x); // reading x out
int value2=analogRead(y); //reading y out
int value3=analogRead(z); //reading z out

int xValue=xsample-value1; // finding change in x
int yValue=ysample-value2; // finding change in y
int zValue=zsample-value3; // finding change in z

/*displying change in x,y and z axis values over lcd*/
lcd.setCursor(0,1);
lcd.print(xValue);
lcd.setCursor(6,1);
lcd.print(yValue);
lcd.setCursor(12,1);
lcd.print(zValue);
delay(100);

/* comparing change with predefined limits*/
if(xValue < minVal || xValue > maxVal || yValue < minVal || yValue > maxVal || zValue < minVal ||
zValue > maxVal)
{
if(buz == 0)
start=millis(); // timer start
buz=1; // buzzer / led flag activated
}

else if(buz == 1) // buzzer flag activated then alerting earthquake
{
lcd.setCursor(0,0);
lcd.print("Earthquake Alert ");
if(millis()>= start+buzTime)
```

```
buz=0;
}

else
{
lcd.clear();
lcd.print(" X Y Z ");
}

digitalWrite(buzzer, buz); // buzzer on and off command
digitalWrite(led, buz); // led on and off command

/*sending values to processing for plot over the graph*/
Serial.print("x=");
Serial.println(xValue);
Serial.print("y=");
Serial.println(yValue);
Serial.print("z=");
Serial.println(zValue);
Serial.println(" $");
}
```

Processing IDE Code/Program:

```
import processing.serial.*;
PFont f6,f8,f12,f10;
PFont f24;
Serial myPort; // The serial port
int xPos = 0; // horizontal position of the graph
float y1=0;
float y2=0;
float y3=0;

void setup ()
{
// set the window size: and Font size
f6 = createFont("Arial",6,true);
f8 = createFont("Arial",8,true);
f10 = createFont("Arial",10,true);
f12 = createFont("Arial",12,true);
f24 = createFont("Arial",24,true);
size(1200, 700);

// List all the available serial ports
println(Serial.list());
myPort = new Serial(this, "COM6", 9600);
println(myPort);
myPort.bufferUntil('\n');
background(80);
}

void draw ()
{
serial ();
}

void serial()
{
String inString = myPort.readStringUntil('$'); // reading incomming date from serial
if (inString != null)
{
// extracting all required values of all three axis:
int l1=inString.indexOf("x=")+2;
String temp1=inString.substring(l1,l1+3);
l1=inString.indexOf("y=")+2;
String temp2=inString.substring(l1,l1+3);
l1=inString.indexOf("z=")+2;
String temp3=inString.substring(l1,l1+3);

//mapping x, y and z value with graph dimensions
float inByte1 = float(temp1+(char)9);
inByte1 = map(inByte1, -80,80, 0, height-80);
```

```
float inByte2 = float(temp2+(char)9);
inByte2 = map(inByte2,-80,80, 0, height-80);
float inByte3 = float(temp3+(char)9);
inByte3 = map(inByte3,-80,80, 0, height-80);
float x=map(xPos,0,1120,40,width-40);

//ploting graph window, unit
strokeWeight(2);
stroke(175);
Line(0,0,0,100);
textFont(f24);
fill(0,00,255);
textAlign(RIGHT);
xmargin("EarthQuake Graph (SESMIOGRAPH)",200,100);

fill(100);
strokeWeight(100);
line(1050,80,1200,80);

strokeWeight(1);
textAlign(RIGHT);
fill(0,0,255);
String temp="X:"+temp1;
Text(temp,100,95);

fill(0,255,0);
temp="Y:"+temp2;
Text(temp,100,92);

fill(255,0,0);;
temp="Z:"+temp3;
Text(temp,100,89);


//ploting x y and z values over graph
strokeWeight(2);
int shift=40;

stroke(0,0,255);
if(y1 == 0)
y1=height-inByte1-shift;
line(x, y1, x+2, height-inByte1-shift) ;
y1=height-inByte1-shift;

stroke(0,255,0);
if(y2 == 0)
y2=height-inByte2-shift;
line(x, y2, x+2, height-inByte2-shift) ;
y2=height-inByte2-shift;
```

```
stroke(255,0,0);
if(y2 == 0)
y3=height-inByte3-shift;
line(x, y3, x+2, height-inByte3-shift) ;
y3=height-inByte3-shift;

xPos+=1;

if (x >= width-30) // go back to begining
{
xPos = 0;
background(80);
}
}
}

void Line(int x1, int y1, int x2, int y2)
{
float xx1=map(x1,0,100,40,width-40);
float xx2=map(x2,0,100,40,width-40);
float yy1=map(y1,0,100,height-40,40);
float yy2=map(y2,0,100,height-40,40);

line(xx1,yy1,xx2,yy2);
xx2=map(100,0,100,40,width-40);
yy2=map(0,0,100,height-40,40);
line(xx1,yy1,xx2,yy2);

strokeWeight(1);
for(int i=1;i<21;i++)
{
yy2=map(i*10,0,200,height-40,40);
yy1=yy2;
line(xx1,yy1,xx2,yy2);
}
yy2=map(100,0,100,height-40,40);
yy1=map(0,0,100,height-40,40);
for(int i=1;i<41;i++)
{
xx1=map(i*5,0,200,40,width-40);
xx2=map(i*5,0,200,40,width-40);
line(xx1,yy1,xx2,yy2);
}

textAlign(RIGHT); // 100 degree
// result+=yy1;
fill(255);
strokeWeight(1);
```

```
textFont(f12);
for(int i=-10;i<11;i++)
{
String result="";
result+=5*i;
ymargin(result, x1,y1);
y1+=5;
}

x1=0;
y1=0;
strokeWeight(1);
textFont(f10);
for(int i=0;i<41;i++)
{
String result="";
result+=28*3*i;
xmargin(result, x1,y1);
x1+=5;
}

textAlign(RIGHT);

textAlign(RIGHT);
}

void ymargin(String value, int x1, int y1)
{

float xx1=map(x1,0,100,40,width-40);
float yy1=map(y1,0,100,height-40,40);
text(value,xx1-5,yy1+5);
}

void xmargin(String value, int x1, int y1)
{

float xx1=map(x1,0,200,40,width-40);
float yy1=map(y1,0,100,height-25,25);
text(value,xx1+7,yy1);
}

void Text(String value, int x1, int y1)
{

float xx1=map(x1,0,100,40,width-40);
float yy1=map(y1,0,100,height-25,25);
text(value,xx1,yy1);
}
```