EARTHQUAKE MONITORING

Activity Overview

Earthquakes cause great dangers to human lives. They are caused due to sudden release of energy in the Earth's crust that creates seismic waves.
 Earthquakes can be violent enough to toss people around and destroy whole cities.

The project initiative is to create a monitoring system which can detect if there are chances of an Earthquake in the near future.

Before any Earthquake there are foreshocks which are an indication of a massive earthquake likely to happen.

Using the Genuino 101 and a buzzer we will create an Earthquake alert system that will notify the people about an Earthquake.

SUBJECTS	TIME REQUIRED	AGE LEVEL
Science Computing	2 Hours	11 - 18 Years

What Shall We Learn?

How to use Genuino Accelerometer and Gyroscope to detect earthquakes.

How to integrate Genuino 101 with a buzzer to create an alarm system for earthquakes.

Activity Objective

We are trying to identify how we can alert people in case of an earthquake. We need to create an alarm system to make people aware about an upcoming earthquake.

Components Needed

To create our Earthquake detector we will need the following components:

Genuino 101

It is the brain of your earthquake detector and it has an inbuilt accelerometer and gyroscope which detects the foreshocks.

Buzzer Module

When the Genuino 101 will detect any movement it will alert the buzzer and it'll start beeping.

LED

It will let you know if your detector is on.

Push Button

This would be used to turn your detector on and off.

Power Supply

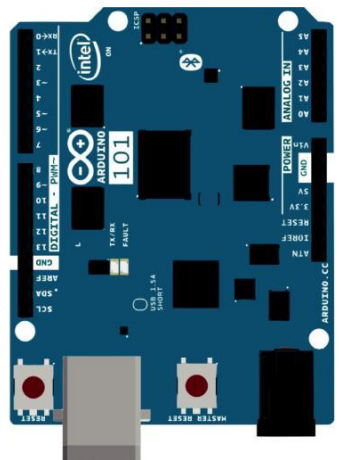So much computing needs energy to work upon right.

LED / PUSH BUTTON
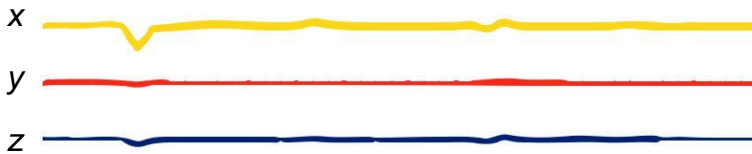
BUZZER MODULE

POWER SUPPLY

GENUINO 101 fritzing

Understanding Sensors

The Genuino 101 has inbuilt acceleromenter and gyroscope.

These components are highly sensitive to knocks and vibrations in all of the three physical axes (X axis, Y axis, Z axis).

Any acceleration caused due to movement in any of the axes is detected by the accelerometer and by connecting the Genuino 101 with a buzzer we will create an alert system.

If there is any vibration and movement from the predefined reference position on either of the axis the genuino 101 will alert the buzzer to beep.
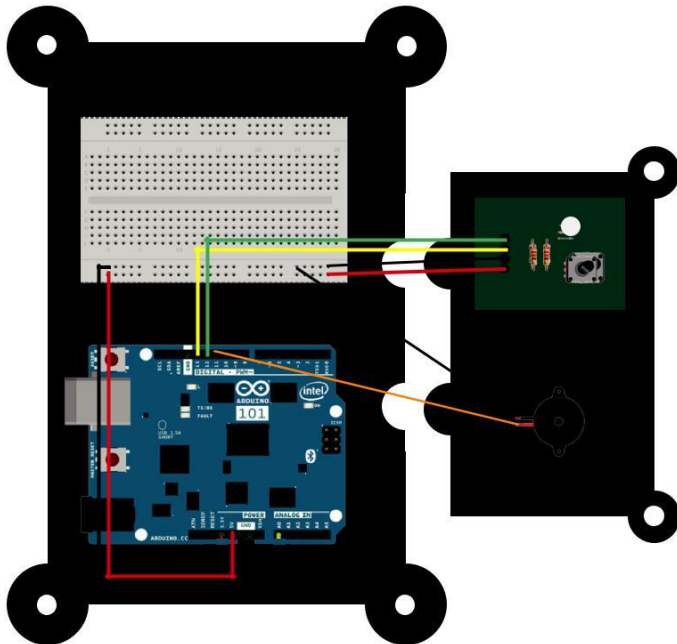

VIBRATIONS ON 3-AXES

We are ready to innovate and make our earthquake detector. Connect the LED and Push button module to the breadboard the way we learnt in the previous activity.

Then connect the buzzer to the breadboard which is connected to the Genuino 101.

Follow the steps in the images to connect the buzzer, the LED and the push button module together.

TOP VIEW

After connecting the Buzzer and the LED with the Genuino 101 we shall provide power using our laptop. Once the power is connected we shall begin with our programming.

Connecting Your Sensors

Let us begin programming our sensors.

Upload the code from *bit.ly/Earthquakedetector*
Now keep your device on a flat surface and push the button.
Wait for 20 seconds for the Genuino 101 to set up your reference position.

The LED light will blink once the reference position is set.

Yaay! You have created an Earthquake Detector.

Upload Button
(Top Left)

Setting Up A Reference Position?

When you have your project ready select a position where you will keep your device. Ensure it is a flat surface e.g. A table or a wall, once you select the position keep your device and click on the push button and wait for at least 20 seconds. The Genuino 101 will set up the position as your reference position. Once the led blinks it means your earthquake detector is on.

Now if there is any vibration and the device vibrates or moves from the defined X Y Z axis the buzzer will beep.

Output

Once the LED is lit up on your device, try shaking the Genuino 101 from its position, the buzzer will start beeping alerting about the vibration. If the buzzer is beeping it means you created an amazing Earthquake detector.

Model Cretaion

Before we begin with the model creation make sure you have:

- 6 Spacers
- 12 Screws
- Transparent acrylic board.

We will now arrange all the components in a case and make it look cool and easy to use.

We will begin by connecting the buzzer module to the base module.The breadboard and Arduino 101 are on the base module while your buzzer is on the buzzer module.
Now insert the spacers on the cutouts which are given in

the activity kit and tighten them using the screws provided to you.

We have our modules attached and spacers set up, now gently place the transparent acrylic board on the spacers and tighten it using the screw.

Once everything is ready, ensure all your screws are tightened and your modules are connected properly.
It should look something like this:
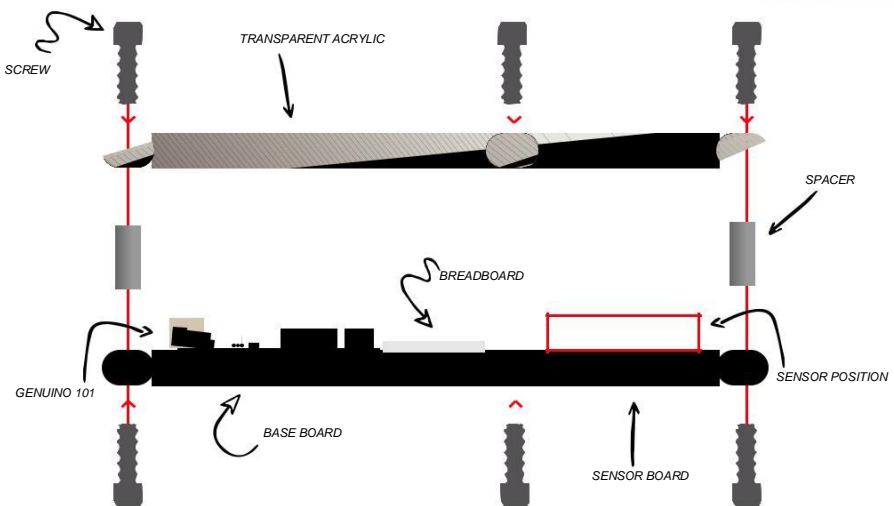
SIDE VIEW

Impact Analysis

Every year more than 100,000 people lose their lives due to Earthquakes. Now imagine if every city and town had an earthquake detector and it would alert the people before an earthquake by detecting the foreshocks we could save so many lives.

If every town had an earthquake detector we can alert a lot of people to move to safer places whenever there is a possibility of a massive earthquake.

Future Scope

We can further improvise this activity to help every citizen of the city by adding a GSM module (sim card) which will send alert SMS to all everyone whenever the monitoring devices detects chances of an Earthquake.