**What is a accelerometer?**

It is an integral part of an IMU which is basically used to determine the “g” force experienced on whatever device the accelerometer is mounted upon.

**Working☺**

An accelerometer produces a sinusoidal output hence the output fron an accelerometer cannot be linearly related to the force and hence tilt (pitch and roll) experienced by the device

**Formulae☺**

1 g is the normal force experienced by the device due to the acceleration due to gravity .

The output form an accelerometer is analog in nature which is the read by a microcontroller.

This converts it to the ADC Units( not a unit bt jst for refnce )

For a 10 bit adc we have the range of 0-1023 ADC Units. The accelerometer is connected to 3.3 v supply.

This means that under 0 G condition the output read would be half of the input ~~ 1.65.

Now o🡪0 adc

3v🡪1023

So 1.65🡪512

The reading under zero g is 512 Adc units.

**Check the below link for formulae:=>**

<http://www.instructables.com/id/Accelerometer-Gyro-Tutorial/>

<https://chionophilous.wordpress.com/2011/06/20/getting-started-with-accelerometers-and-micro-controllers-arduino-adxl335/>

**code explanation☺**

first the rest condition readings are read. These must be in the vicinity of 512 ADC UNITS.

Then the readings under a certail orientation is found.

The difference is taken which is in ADC UnitS. So this is now converted to G force unit.

The remaining codes are further derivations of this logic to find tilt(roll and pitch).whose formulae are given in the above link. ^^^^^^

**Problems faced in implementation of accelerometer as an activation device in a specific orientation☺**

The accelerometer woul give an output voltage +/-1.65 v or +/- 512 ADC units in any orientation.

After several test no specific pattern could be obtained to relate the accelerometer output readings with the specific plane orientation as the above conditions were met in many trial conditions.

The objective of the trial experiments was to activate the device under specific orientation.

Although the device was being activated under such conditions bt these conditions to activate the device were so easily met under activities such as running, punching…or any sort of sudden quick jerk in any orientation.

The actual cause is that an accelerometer dictates the “g” force it experiences irrespective of the orientation.the orientation is obtained with a gyro sensor and both the readings are averaged using different algorithms such as complimentary filter, kalman filter etc. bt the drawback of the gyro is that its reading drifts with time . that is even after the cause acting upon the gyro is removed it still inhibits to come back to its rest Position.

Hence the idea to use an accelerometer as an activation device was left for the time being until the next replacement is found.