Importing libraries

In [3]:
```
import numpy as np
import matplotlib.pyplot as plt
```

Loading data from the given txt file

In [ ]:
```
data = np.loadtxt("imudata.txt", usecols=4, dtype='str')
```

Conversion of data from String to Integer type

In [ ]:
```
acc_val=[]
for i in data:
    acc_val.append(int(i))
len(acc_val)
```

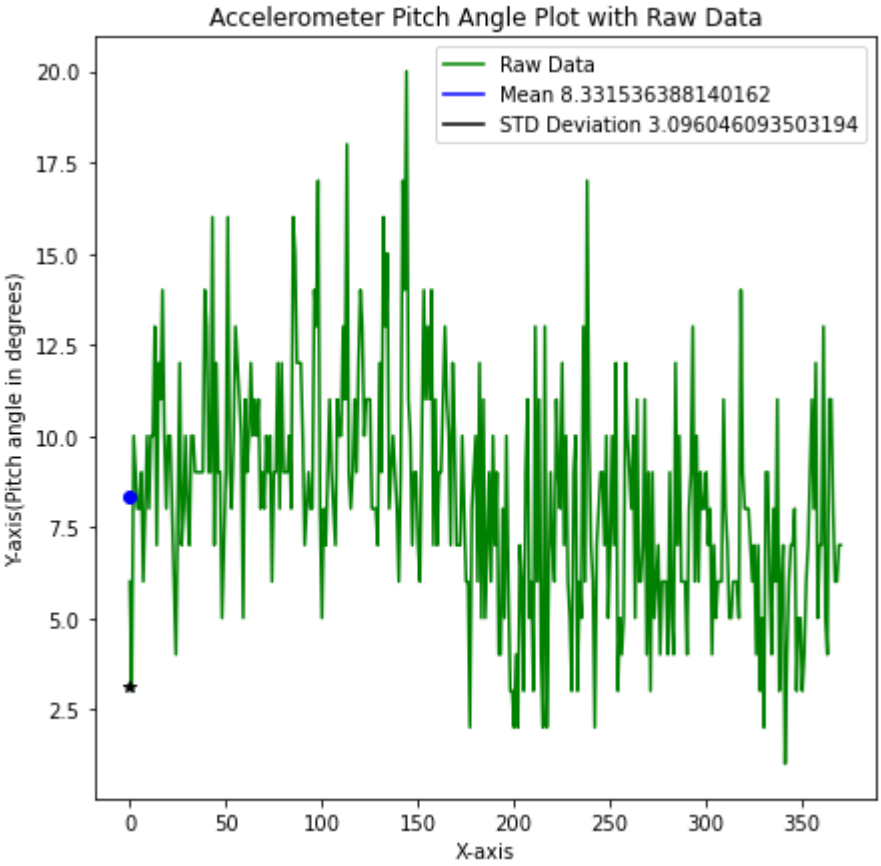
Moving Average Calculation Function

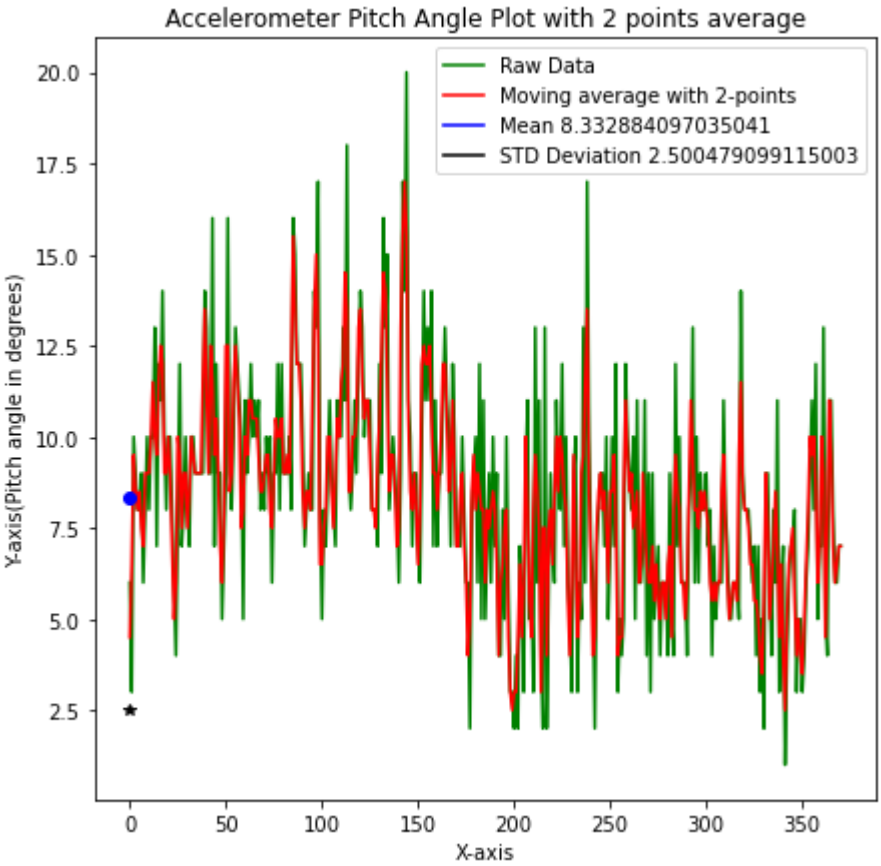
In [70]:
```
def Moving_Average(data,size):
    avg_arr=[]
    i=0
    while i<len(data)-size+1:
        win_avg=round((np.sum(data[i:i+size])/size),2)
        avg_arr.append(win_avg)
        i+=1
        if i==(len(data)-size+1):
            while i<=len(data)-1:
                win_avg=round((np.sum(data[i:len(data)])/(len(data)-i)),2)
                avg_arr.append(win_avg)
                i+=1
    return avg_arr
```

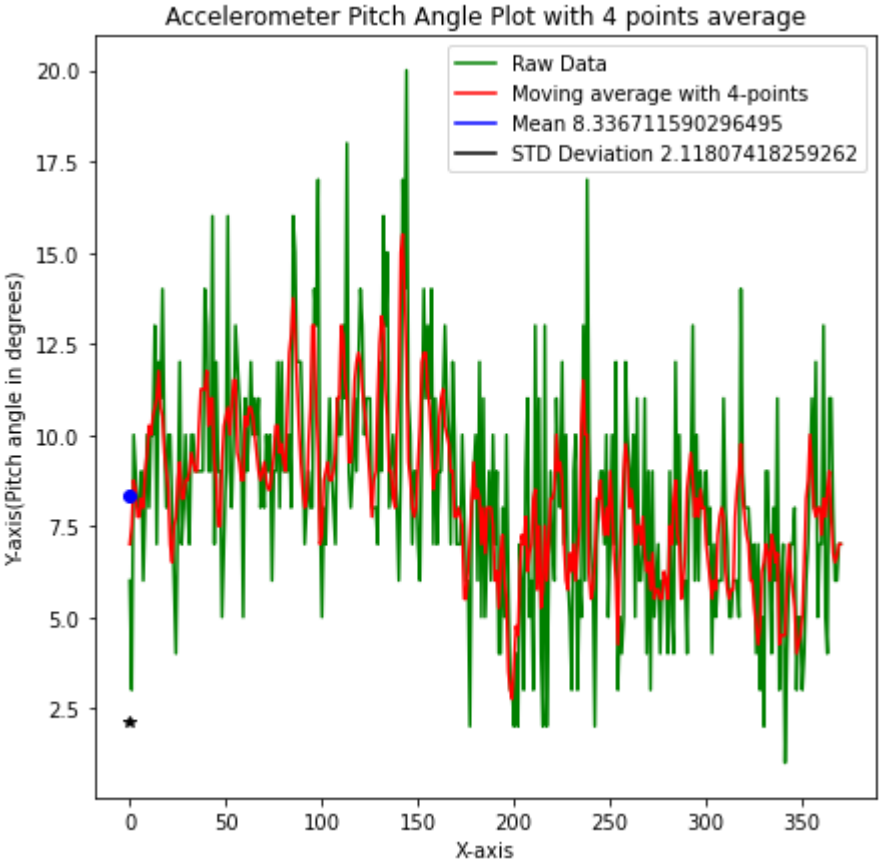
Plotting of Graphs with given point averages

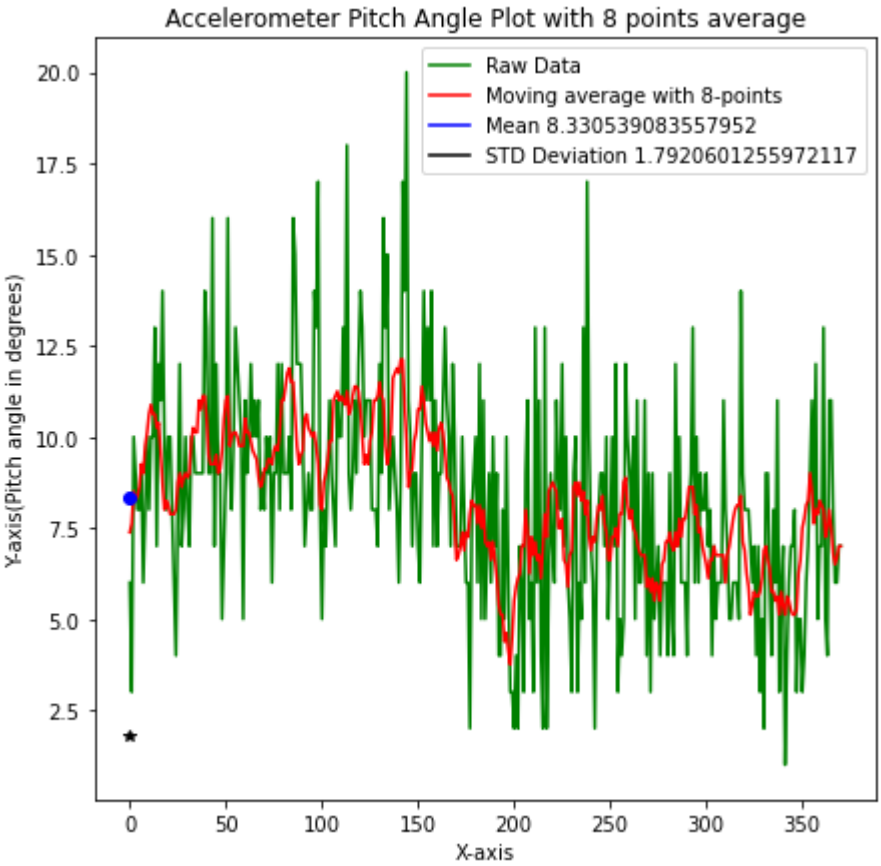
In [91]:
```
plt.figure(figsize=(7,7))
plt.plot(acc_val,label="Raw Data",color="g")
plt.plot(np.mean(acc_val),label="Mean {}".format(np.mean(acc_val)),linestyle="sc
plt.plot(np.std(acc_val),label="STD Deviation {}".format(np.std(acc_val)),linest
plt.plot(np.mean(acc_val),"ob")
plt.plot(np.std(acc_val),"*k")
plt.legend()
plt.title('Accelerometer Pitch Angle Plot with Raw Data')
plt.xlabel('X-axis')
plt.ylabel('Y-axis(Pitch angle in degrees)')
plt.show()
```

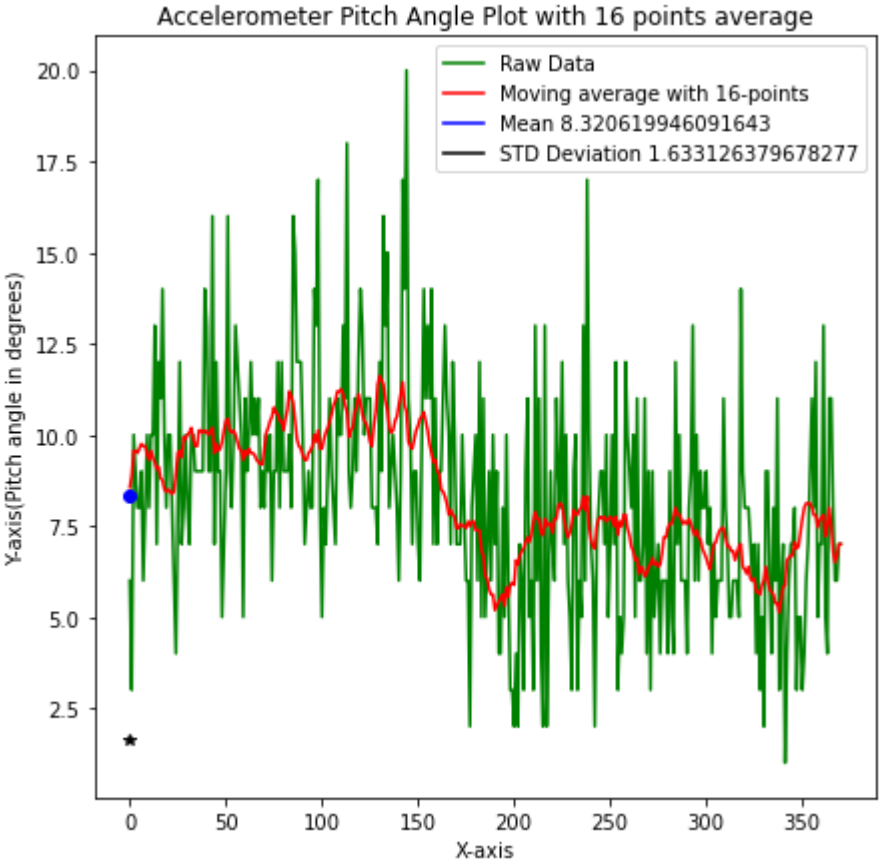
```
def plotting():
    arr=[2,4,8,16,64,128]
    for i in arr:
        plt.figure(figsize=(7,7))
        plt.plot(acc_val,label="Raw Data",color="g")
        plt.plot(Moving_Average(acc_val,i),label='Moving average with {}-points
        plt.plot(np.mean(Moving_Average(acc_val,i)),label="Mean {}".format(np.me
        plt.plot(np.std(Moving_Average(acc_val,i)),label="STD Deviation {}".form
        plt.plot(np.mean(Moving_Average(acc_val,i)),"ob")
        plt.plot(np.std(Moving_Average(acc_val,i)),"*k")
        plt.legend()
        plt.title('Accelerometer Pitch Angle Plot with {} points average'.format
        plt.xlabel('X-axis')
        plt.ylabel('Y-axis(Pitch angle in degrees)')
        plt.show()

mean=np.mean(two_point)
plotting()
```

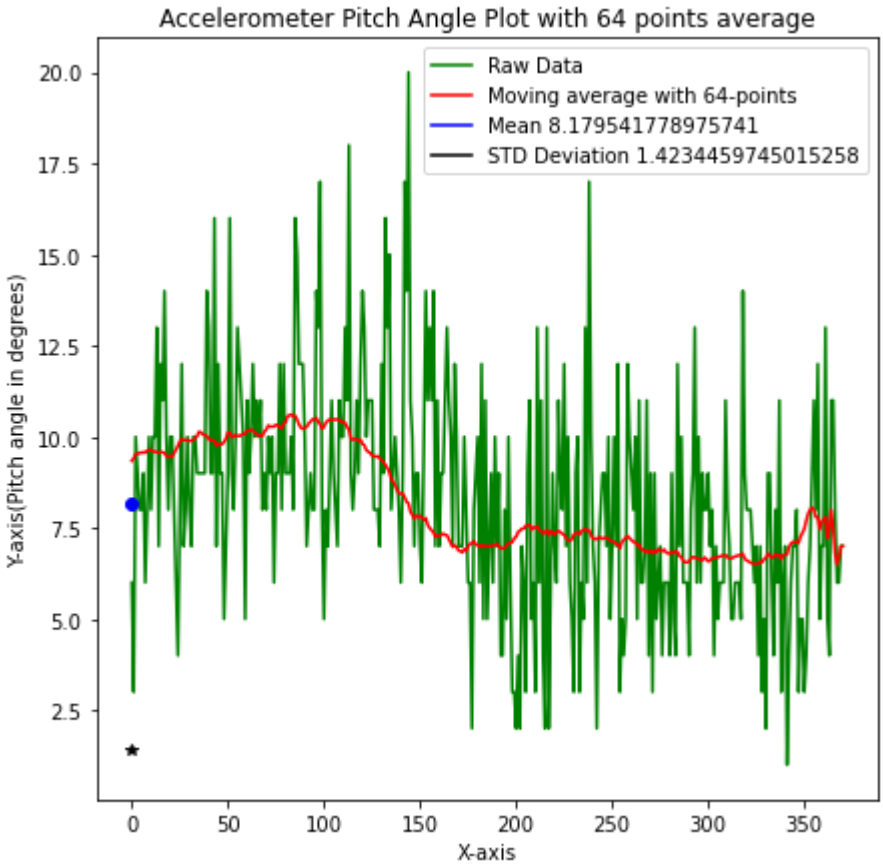


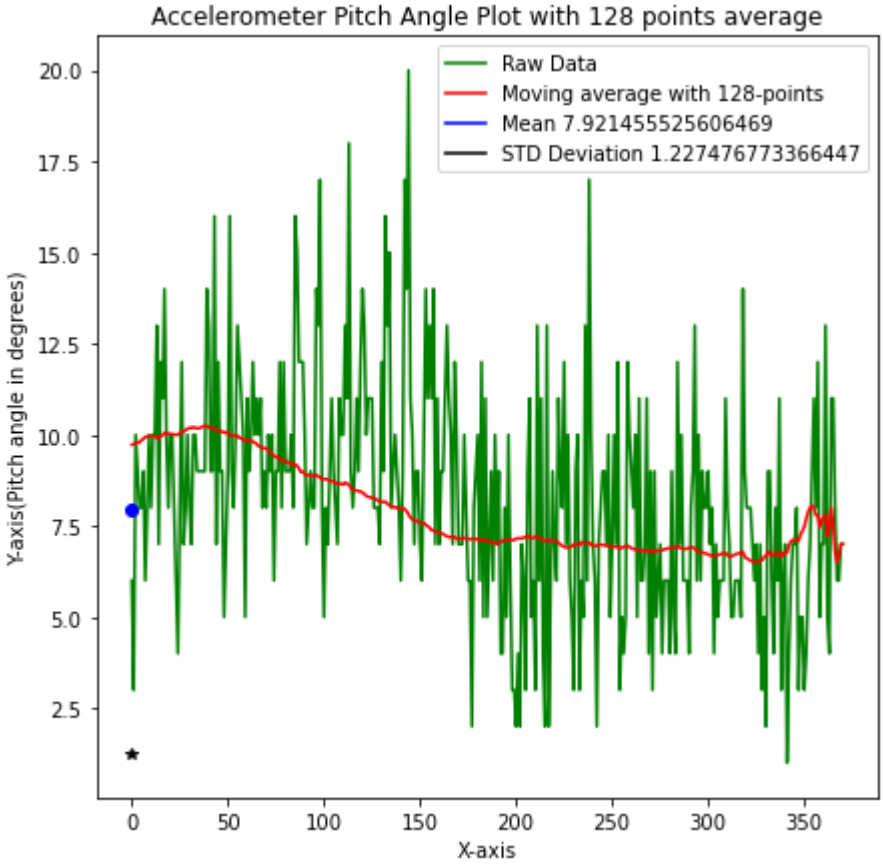

Accelerometer Pitch Angle Plot with 2 points average
Raw Data
Moving average with 2-points
Mean 8.332884097035041
STD Deviation 2.500479099115003
Y-axis(Pitch angle in degrees)
X-axis
20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0
50
100
150
200
250
300
350


Accelerometer Pitch Angle Plot with 4 points average
Raw Data
Moving average with 4-points
Mean 8.336711590296495
STD Deviation 2.11807418259262
Y-axis(Pitch angle in degrees)
X-axis
20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0
50
100
150
200
250
300
350


Accelerometer Pitch Angle Plot with 8 points average
Raw Data
Moving average with 8-points
Mean 8.330539083557952
STD Deviation 1.7920601255972117
Y-axis(Pitch angle in degrees)
X-axis
20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0
50
100
150
200
250
300
350


Accelerometer Pitch Angle Plot with 16 points average
Raw Data
Moving average with 16-points
Mean 8.320619946091643
STD Deviation 1.633126379678277
Y-axis(Pitch angle in degrees)
X-axis
20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0
50
100
150
200
250
300
350


Accelerometer Pitch Angle Plot with 64 points average
Raw Data
Moving average with 64-points
Mean 8.179541778975741
STD Deviation 1.4234459745015258
Y-axis(Pitch angle in degrees)
X-axis
20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0
50
100
150
200
250
300
350


Accelerometer Pitch Angle Plot with 128 points average
Raw Data
Moving average with 128-points
Mean 7.921455525606469
STD Deviation 1.227476773366447
Y-axis(Pitch angle in degrees)
X-axis
20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0
50
100
150
200
250
300
350

In [ ]:

In [ ]:

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