

Assignment-2 : Moving Average

Name: Anushk Naval Roll: 18046

Problem:

Apply 3 and 5 years moving average to smooth the rainfall data shared with you in the last class. Do this assignment using python/matlab. Write your own code.

Presentaion of rainfall data: Moving Average

In [1]:

```
#For importing required modules

import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
print('Modules are imported.')
```

Modules are imported.

In [2]:

```
dataset = pd.read_csv('RainfallData.txt', sep=" ", engine='python')
dataset.columns = ['Year', 'Mean_Rainfall(mm)']
dataset['moving_avg_3'] = dataset['Mean_Rainfall(mm)'].rolling(window=3).mean()
dataset['moving_avg_5'] = dataset['Mean_Rainfall(mm)'].rolling(window=5).mean()
dataset.head()

m5 = dataset['moving_avg_5']
m3 = dataset['moving_avg_3']

x = dataset['Year']
y = dataset['Mean_Rainfall(mm)']
```

In [3]:

For plotting

plt.figure(figsize=(20,15))

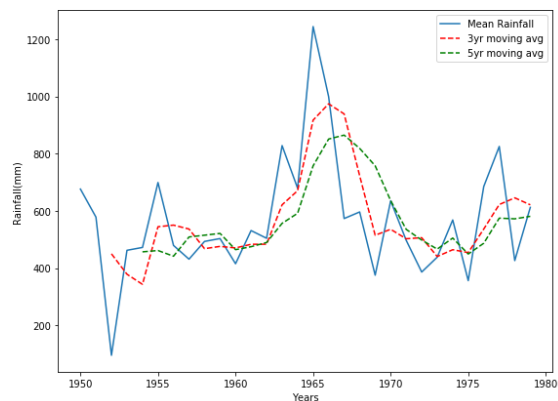
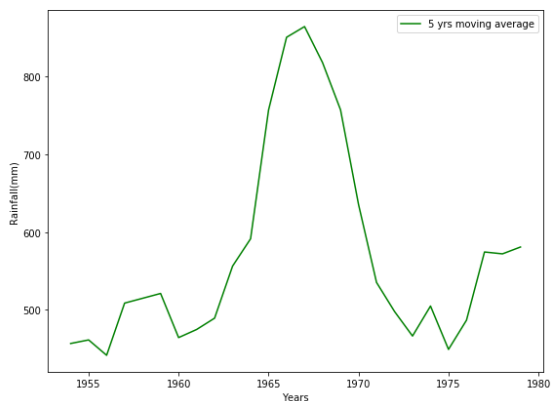
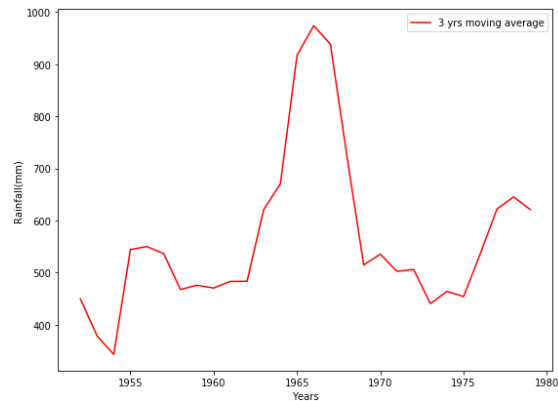
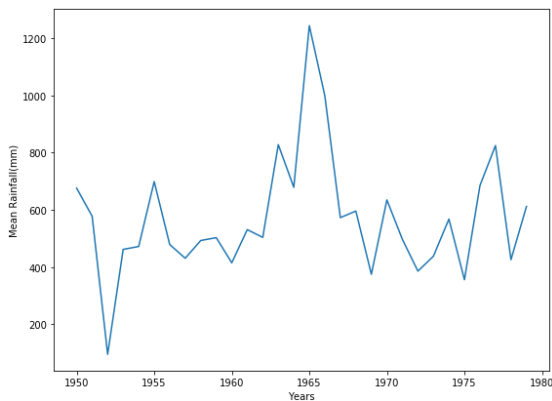
```
plt.subplot(221)
plt.plot(x,y)
plt.xlabel("Years")
plt.ylabel("Mean Rainfall(mm)")
```

```
plt.subplot(222)
plt.plot(x,m3,"r")
plt.xlabel("Years")
plt.ylabel("Rainfall(mm)")
plt.legend(["3 yrs moving average"])
```

```
plt.subplot(223)
plt.plot(x,m5,"g")
plt.xlabel("Years")
plt.ylabel("Rainfall(mm)")
plt.legend(["5 yrs moving average"])
```

```
plt.subplot(224)
plt.plot(x,y, x,m3,"r--", x,m5,"g--")
plt.xlabel("Years")
plt.ylabel("Rainfall(mm)")
plt.legend(['Mean Rainfall', '3yr moving avg', '5yr moving avg'])
```

plt.show()



The red curve is computed taking 3 years moving average. the green curve is computed taking 5 years moving average.

Presentation of rainfall data: Point rainfall

In [4]:

```
mean_0 = dataset['Mean_Rainfall(mm)'].mean()
mean_p20 = mean_0 + (.2*mean_0)
mean_n20 = mean_0 - (.2*mean_0)

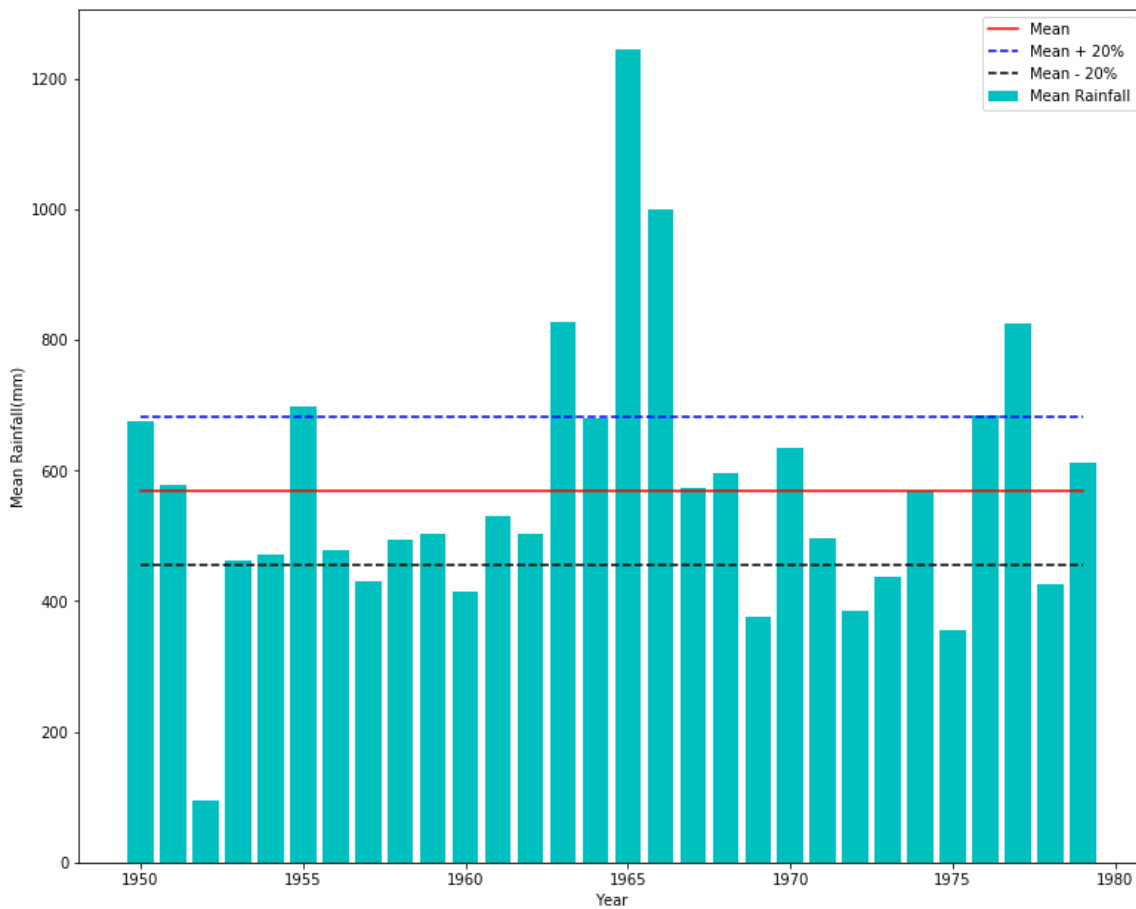
dataset['Mean'] = mean_0
dataset['Mean + 20%'] = mean_p20
dataset['Mean - 20%'] = mean_n20
dataset.head()
```

Out[4]:

	Year	Mean_Rainfall(mm)	moving_avg_3	moving_avg_5	Mean	Mean + 20%	Mean - 20%
0	1950	676	NaN	NaN	568.666667	682.4	454.933333
1	1951	578	NaN	NaN	568.666667	682.4	454.933333
2	1952	95	449.666667	NaN	568.666667	682.4	454.933333
3	1953	462	378.333333	NaN	568.666667	682.4	454.933333
4	1954	472	343.000000	456.6	568.666667	682.4	454.933333

In [5]:

```
p,q,r = dataset['Mean'],dataset['Mean + 20%'],dataset['Mean - 20%']  
fig = plt.figure(figsize=(10, 8))  
ax = fig.add_axes([0,0,1,1])  
ax.bar(x,y,color = 'c', label = 'Mean Rainfall')  
  
plt.plot(x,p,"r",label = 'Mean')  
plt.plot(x,q,"b--",label = 'Mean + 20%')  
plt.plot(x,r,"k--",label = 'Mean - 20%')  
  
plt.xlabel("Year")  
plt.ylabel("Mean Rainfall(mm)")  
plt.legend()  
plt.show()
```



In []: