Attrition Assignment Solution

Step1 - Launching

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
dataset1=pd.read_excel('general_data.xlsx', sheet_name=0)
dataset1.head()
```

Out[41]:

	Age	Attrition	...	YearsSinceLastPromotion	YearsWithCurrManager
0	51	No	...	0	0
1	31	Yes	...	1	4
2	32	No	...	0	3
3	38	No	...	7	5
4	32	No	...	0	4

[5 rows x 18 columns]

```
dataset1.columns
```

Out[42]:

```
Index(['Age', 'Attrition', 'BusinessTravel', 'Department', 'DistanceFromHome',
       'Education', 'EducationField', 'Gender', 'JobRole', 'MaritalStatus',
       'MonthlyIncome', 'NumCompaniesWorked', 'PercentSalaryHike',
       'TotalWorkingYears', 'TrainingTimesLastYear', 'YearsAtCompany',
       'YearsSinceLastPromotion', 'YearsWithCurrManager'],
      dtype='object')
```

Step 2 - Data Treatment:

dataset1.isnull()

Out[47]:

	Age	Attrition	...	YearsSinceLastPromotion	YearsWithCurrManager
0	False	False	...	False	False
1	False	False	...	False	False
2	False	False	...	False	False
3	False	False	...	False	False
4	False	False	...	False	False
...	...	...	...	...	...
4405	False	False	...	False	False
4406	False	False	...	False	False
4407	False	False	...	False	False
4408	False	False	...	False	False
4409	False	False	...	False	False

[4410 rows x 18 columns]

dataset1.duplicated()

Out[50]:

0	False
1	False
2	False
3	False
4	False
...	...
4405	True
4406	True
4407	True
4408	True
4409	False

Length: 4410, dtype: bool

```
dataset1.drop_duplicates()
```

Out[53]:

	Age	Attrition	...	YearsSinceLastPromotion	YearsWithCurrManager
0	51	No	...	0	0
1	31	Yes	...	1	4
2	32	No	...	0	3
3	38	No	...	7	5
4	32	No	...	0	4
...	...	...	...	...	...
3818	28	Yes	...	0	0
3910	41	No	...	1	2
4226	36	No	...	0	0
4395	40	No	...	4	7
4409	40	No	...	3	9

[1498 rows x 18 columns]

Step 3 – Univariate Analysis:

```
dataset3=dataset1[['Age','DistanceFromHome','Education','MonthlyIncome',
'NumCompaniesWorked', 'PercentSalaryHike','TotalWorkingYears', 'TrainingTimesLastYear',
'YearsAtCompany','YearsSinceLastPromotion', 'YearsWithCurrManager']].describe()
```

```
dataset3
```

Index	Age	DistanceFromHome	Education	MonthlyIncome	NumCompaniesWorked	PercentSalaryHike	TotalWorkingYears	TrainingTimesLastYear	YearsAtCompany	YearsSinceLastPromotion	YearsWithCurrManager
count	4410	4410	4410	4410	4391	4410	4401	4410	4410	4410	4410
mean	36.…	9.19252	2.91293	65029.3	2.69483	15.2095	11.2799	2.79932	7.00816	2.18776	4.12313
std	9.1…	8.10503	1.02393	47068.9	2.49889	3.65911	7.78222	1.28898	6.12514	3.2217	3.56733
min	18	1	1	10090	0	11	0	0	0	0	0
25%	30	2	2	29110	1	12	6	2	3	0	2
50%	36	7	3	49190	2	14	10	3	5	1	3
75%	43	14	4	83800	4	18	15	3	9	3	7
max	60	29	5	199990	9	25	40	6	40	15	17

```
dataset3=dataset1[['Age','DistanceFromHome','Education','MonthlyIncome',
'NumCompaniesWorked', 'PercentSalaryHike','TotalWorkingYears', 'TrainingTimesLastYear',
'YearsAtCompany','YearsSinceLastPromotion', 'YearsWithCurrManager']].median()
```

```
dataset3
```

Out[67]:

Age	36.0
DistanceFromHome	7.0
Education	3.0
MonthlyIncome	49190.0
NumCompaniesWorked	2.0
PercentSalaryHike	14.0
TotalWorkingYears	10.0
TrainingTimesLastYear	3.0
YearsAtCompany	5.0
YearsSinceLastPromotion	1.0
YearsWithCurrManager	3.0

dtype: float64

```
dataset3=dataset1[['Age','DistanceFromHome','Education','MonthlyIncome',
'NumCompaniesWorked', 'PercentSalaryHike','TotalWorkingYears', 'TrainingTimesLastYear',
'YearsAtCompany','YearsSinceLastPromotion', 'YearsWithCurrManager']].mode()
```

```
dataset3
```

Out[69]:

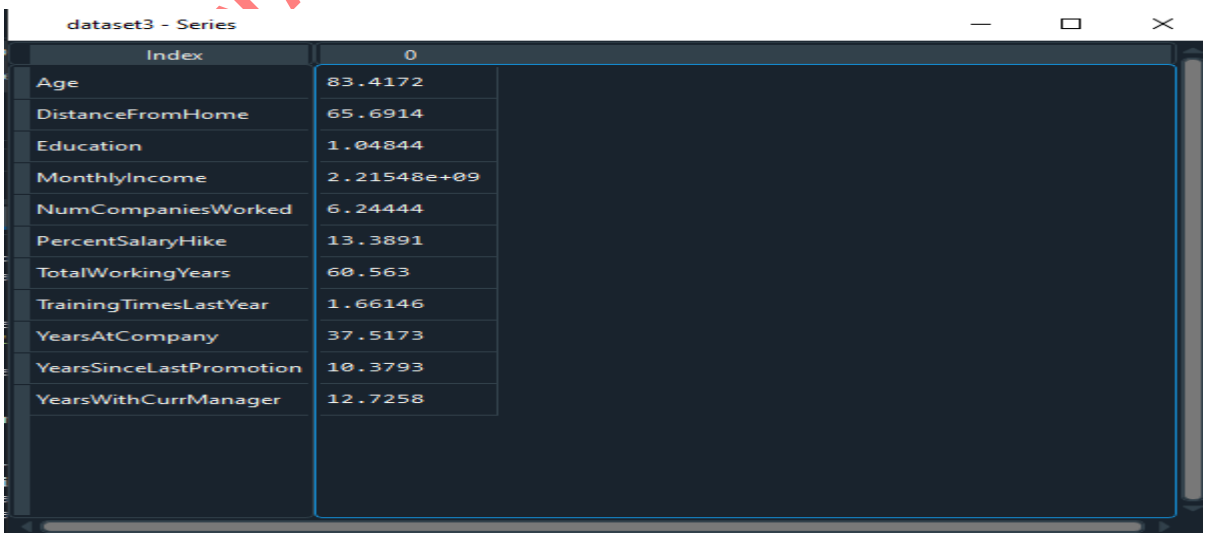
Age	35
DistanceFromHome	2
Education	3
MonthlyIncome	23420
NumCompaniesWorked	1
PercentSalaryHike	11
TotalWorkingYears	10
TrainingTimesLastYear	2
YearsAtCompany	5.0
YearsSinceLastPromotion	0
YearsWithCurrManager	2

dtype: float64

```
dataset3=dataset1[['Age','DistanceFromHome','Education','MonthlyIncome',
'NumCompaniesWorked', 'PercentSalaryHike','TotalWorkingYears', 'TrainingTimesLastYear',
'YearsAtCompany','YearsSinceLastPromotion', 'YearsWithCurrManager']].var()
```

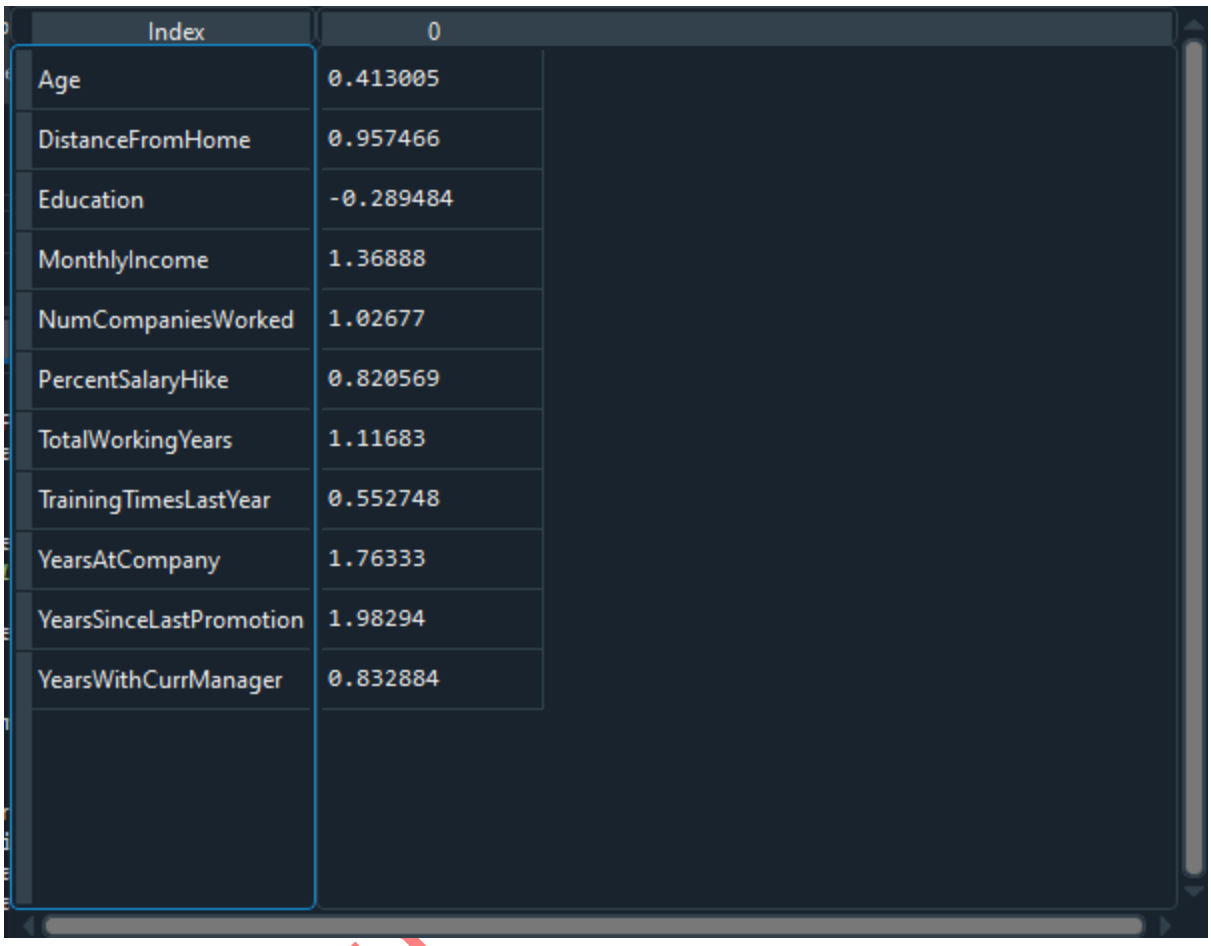
```
dataset3
```

1



```
dataset3=dataset1[['Age','DistanceFromHome','Education','MonthlyIncome',
'NumCompaniesWorked', 'PercentSalaryHike','TotalWorkingYears', 'TrainingTimesLastYear',
'YearsAtCompany','YearsSinceLastPromotion', 'YearsWithCurrManager']].skew()
```

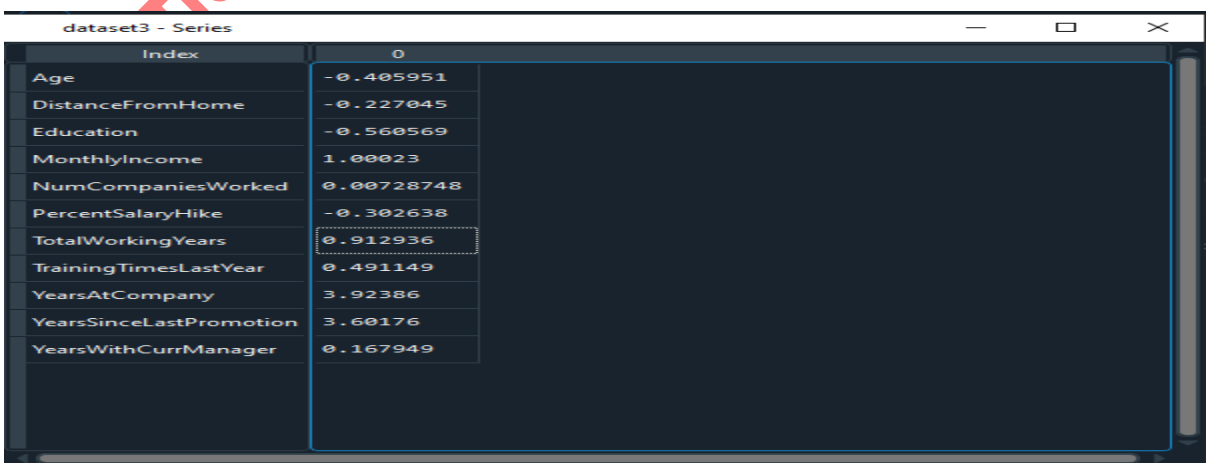
dataset3



Index	0
Age	0.413005
DistanceFromHome	0.957466
Education	-0.289484
MonthlyIncome	1.36888
NumCompaniesWorked	1.02677
PercentSalaryHike	0.820569
TotalWorkingYears	1.11683
TrainingTimesLastYear	0.552748
YearsAtCompany	1.76333
YearsSinceLastPromotion	1.98294
YearsWithCurrManager	0.832884

```
dataset3=dataset1[['Age','DistanceFromHome','Education','MonthlyIncome',
'NumCompaniesWorked', 'PercentSalaryHike','TotalWorkingYears', 'TrainingTimesLastYear',
'YearsAtCompany','YearsSinceLastPromotion', 'YearsWithCurrManager']].kurt()
```

dataset3



dataset3 - Series

Index	0
Age	-0.405951
DistanceFromHome	-0.227045
Education	-0.560569
MonthlyIncome	1.00023
NumCompaniesWorked	0.00728748
PercentSalaryHike	-0.302638
TotalWorkingYears	0.912936
TrainingTimesLastYear	0.491149
YearsAtCompany	3.92386
YearsSinceLastPromotion	3.60176
YearsWithCurrManager	0.167949

	Mean	Median	Mode	Variance	Std Deviation	IQR	Skewness	Kurtosis
Mean Age (Yrs)	36	36	35	83.14	9.1	13	0.418	-0.4
Mean Distance from Home (Kms)	9	7	2	65.69	8.1	2	0.957	-0.22
Mean Monthly Income (Rs)	65000	49190	23420	2215480000	47068	54000	1.36	1
Mean Work Experience (Yrs)	11.29	10	10	60	7.72	9	1.11	0.91
Mean Years at Company (Yrs)	7	5	5	37.51	6.12	6	1.76	3.92
Mean Years since last promotion (Yrs)	2	1	0	10.37	3.22	3	1.98	3.6
Mean Years with Current Manager (Yrs)	4	3	2	12.72	3.56	5	0.83	0.16

Inference from the analysis:

- All the above variables show positive skewness; while Age & Mean_distance_from_home are leptokurtic and all other variables are platykurtic.
- The Mean_Monthly_Income's IQR is at 54K suggesting company wide attrition across all income bands
- Mean age forms a near normal distribution with 13 years of IQR

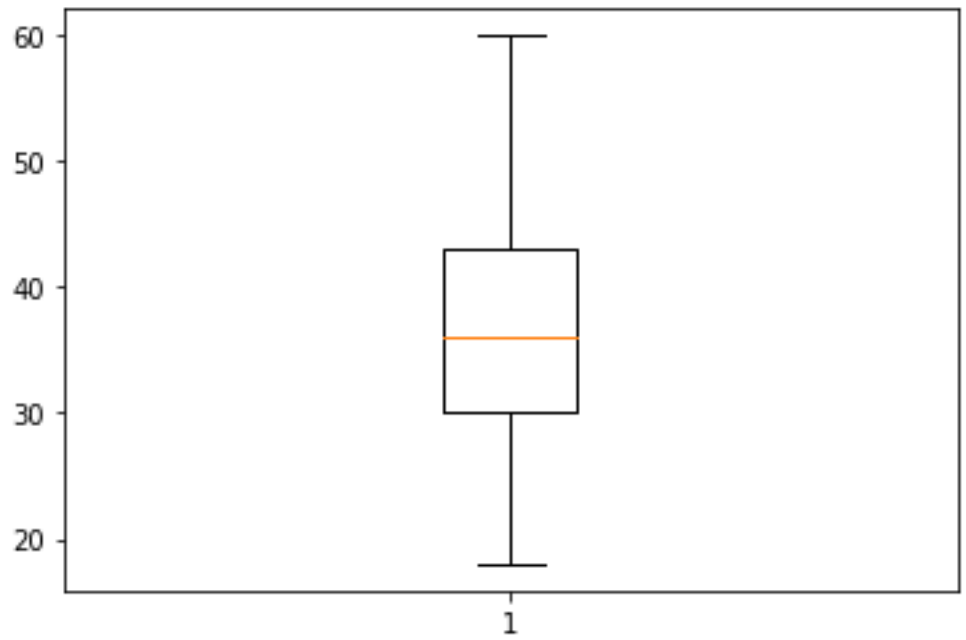
Outliers:

There's no regression found while plotting Age, MonthlyIncome, TotalWorkingYears, YearsAtCompany, etc., on a scatter plot

box_plot=dataset1.Age

plt.boxplot(box_plot)

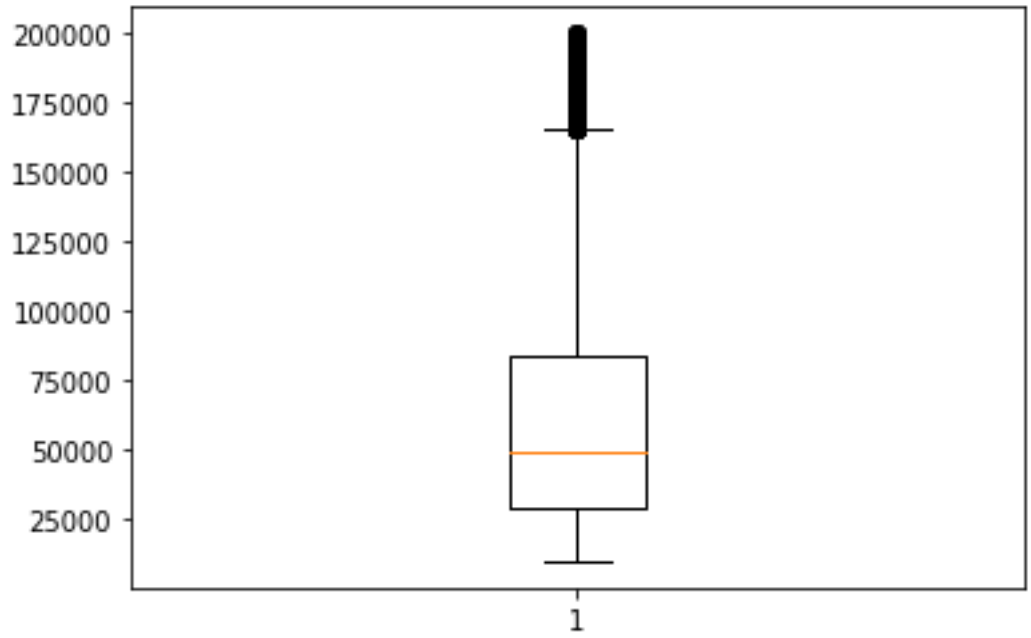
Out[23]:



Age is normally distributed without any outliers

box_plot=dataset1.MonthlyIncome

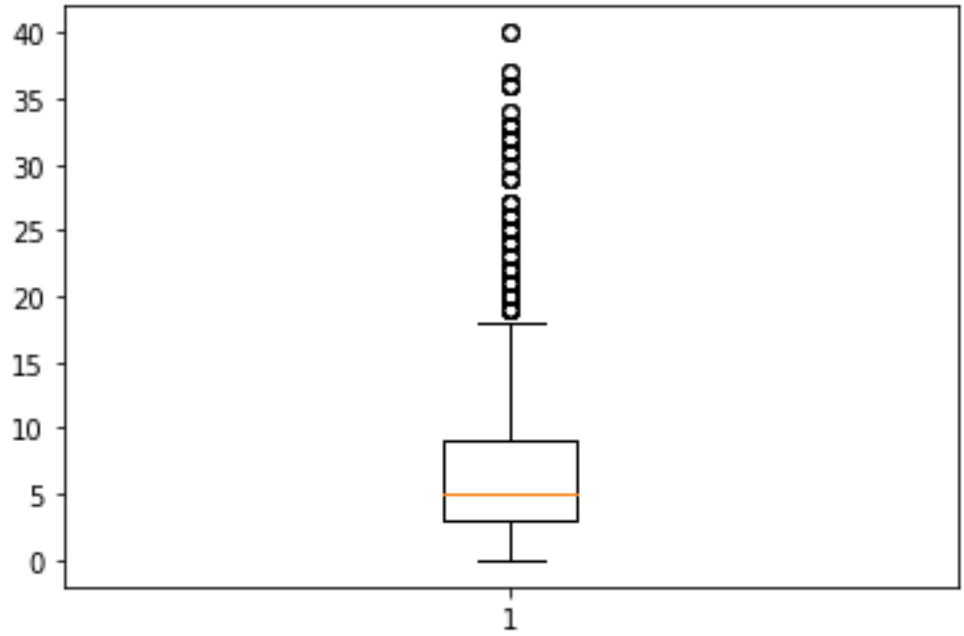
plt.boxplot(box_plot)



Monthly Income is Right skewed with several outliers

box_plot=dataset1.YearsAtCompany

plt.boxplot(box_plot)



Years at company is also Right Skewed with several outliers observed.