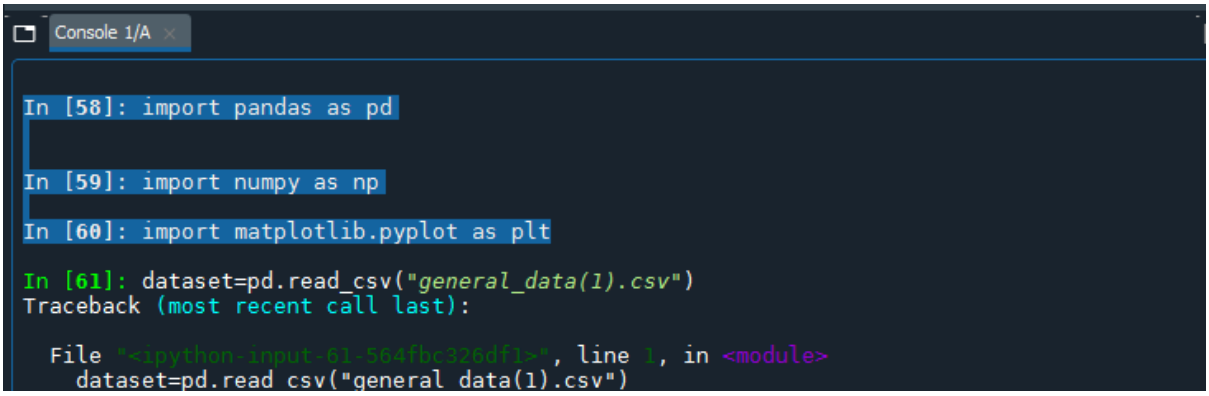
DAY 7 PROJECT

We need to analyse the reasons of attrition in the company and measures to stop that.

We have used Spyder-Ide for data-Analysis.

Firstly, we import numpy, pandas and matplotlib.

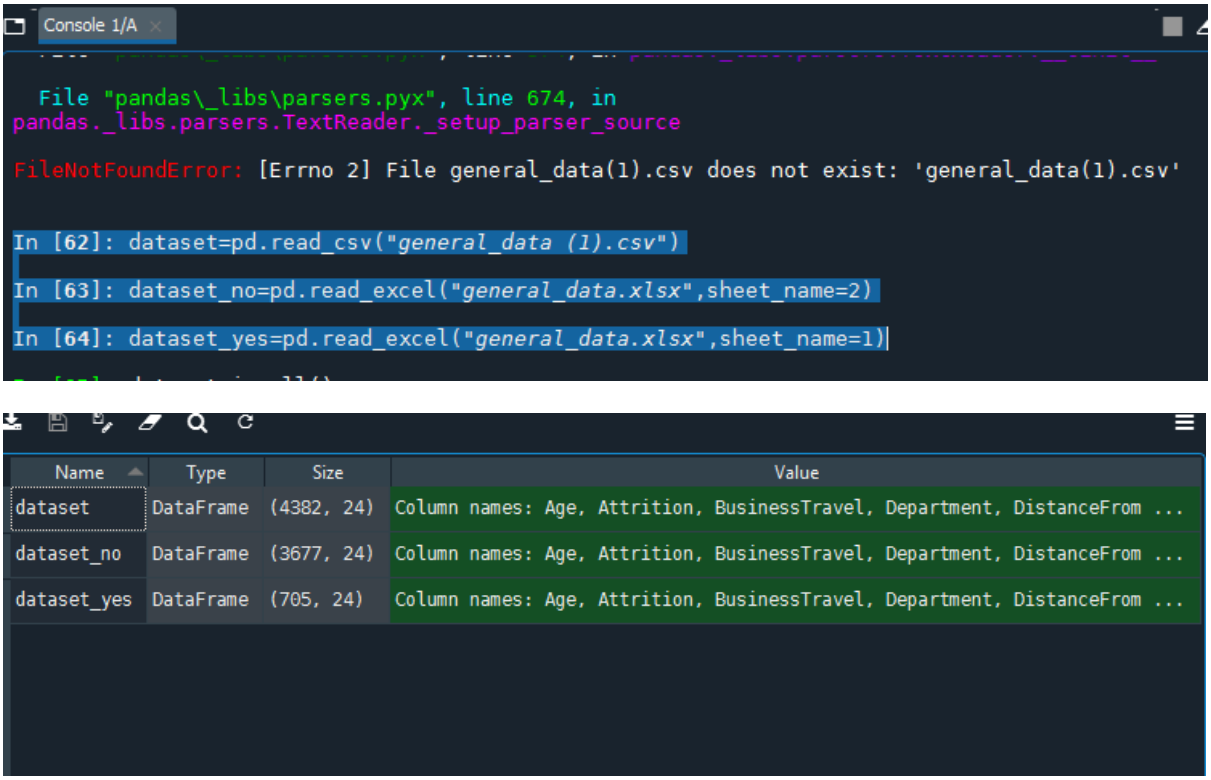


Import the data file which is named as **general_data** as variable **“dataset”**.

The excel sheet is distributed in two parts using filtering:

>>>> Attrition==Yes (Variable – **“dataset_yes”**)

>>>>Attrition==No (Variable – **“dataset_no”**)



Data Cleansing:

1. Checking for null value:

```
In [65]: dataset.isnull()
Out[65]:
        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 24 columns]
```

Result: No null values

2. Checking for duplicates :

```
Variable explorer  Help  Plots  Files
Console 1/A
[4410 rows x 24 columns]

In [66]: dataset.duplicated()
Out[66]:
0       False
1       False
2       False
3       False
4       False
        ...
4405    False
4406    False
4407    False
4408    False
4409    False
Length: 4410, dtype: bool

In [67]: dataset.dropna()
Out[67]:
      Age Attrition  ... YearsSinceLastPromotion YearsWithCurrManager
0      51        No  ...                       0                    0
```

Result: No duplicate values

3. Checking for NA and dropping it:

Dataset:

```
In [67]: dataset.dropna()
Out[67]:
      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
...   ...       ...  ...                     ...                  ...
4404   29        No  ...                       1                    5
4405   42        No  ...                       0                    2
4406   29        No  ...                       0                    2
4407   25        No  ...                       1                    2
4408   42        No  ...                       7                    8

[4382 rows x 24 columns]

In [68]: dataset=dataset.dropna()
```

Result: The rows have been reduced due to removal of NA entries.

Analysis In General:

Getting important information about each coloumn:

```
      dtype='object')

In [86]: dataset1=dataset[['Age','DistanceFromHome',
    ...:        'Education', 'JobLevel','MonthlyIncome',
    ...:        'NumCompaniesWorked', 'PercentSalaryHike','TotalWorkingYears',
'TrainingTimesLastYear',
    ...:        'YearsAtCompany', 'YearsSinceLastPromotion',
'YearsWithCurrManager']].describe()
```

dataset1 - DataFrame

Index	Age	DistanceFromHom	Education	JobLevel	MonthlyIncome	NumCompaniesWorked	PercentSalaryHike	TotalWorkingYears	TrainingTimesLastYear	YearsAtCompany	YearsSinceLastPromotion	YearsWithCurrManager
count	18	1	1	1	10090	0	11	0	0	0	0	0
mean	30	2	2	1	29110	1	12	6	2	3	0	2
std	36	7	3	2	49190	2	14	10	3	5	1	3
min	9...	8.1054	1.02473	1.10611	47142.3	2.49783	3.66301	7.78572	1.2894	6.12935	3.22499	3.56967
25%	36...	9.199	2.91237	2.0639	65061.7	2.69329	15.2106	11.2903	2.79827	7.0105	2.19169	4.1262
50%	43	14	4	3	83790	4	18	15	3	9	3	7
75%	60	29	5	5	199990	9	25	40	6	40	15	17
max	43...	4382	4382	4382	4382	4382	4382	4382	4382	4382	4382	4382

Median ,Mode and Variance:

```
'YearsWithCurrManager']].describe()

In [89]: dataset2=dataset[['Age','DistanceFromHome',
   ...:        'Education', 'JobLevel','MonthlyIncome',
   ...:        'NumCompaniesWorked', 'PercentSalaryHike','TotalWorkingYears',
'TrainingTimesLastYear',
   ...:        'YearsAtCompany', 'YearsSinceLastPromotion', 'YearsWithCurrManager']].median()

In [90]:
```

dataset2 - Series

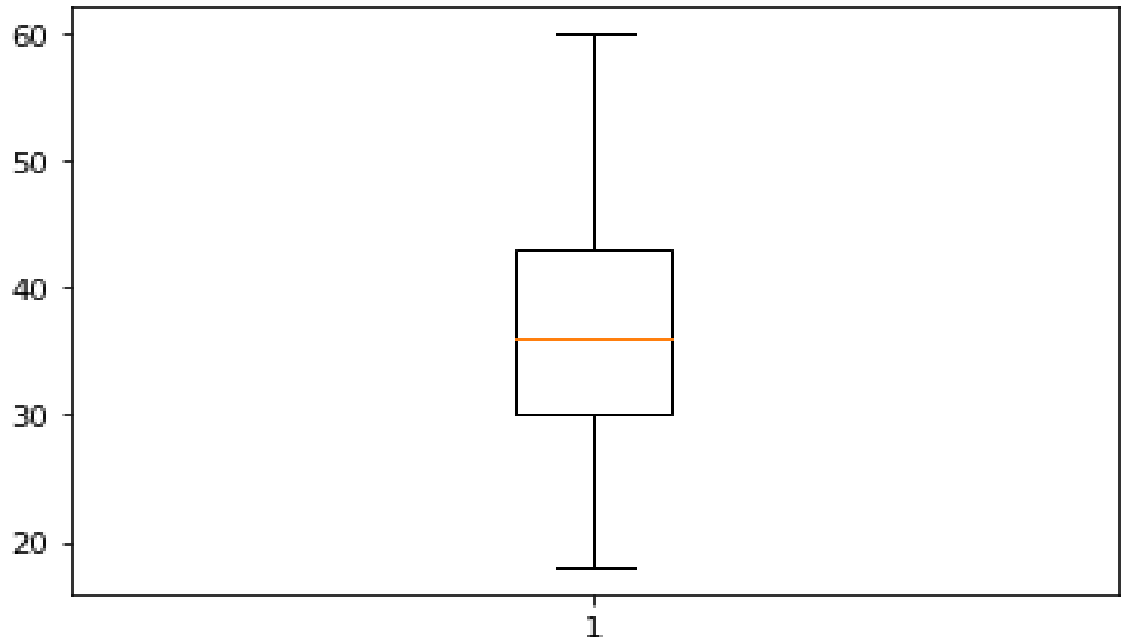
Index	0
Age	36
DistanceFromHome	7
Education	3
JobLevel	2
MonthlyIncome	49190
NumCompaniesWorked	2
PercentSalaryHike	14
TotalWorkingYears	10
TrainingTimesLastYear	3
YearsAtCompany	5
YearsSinceLastPromotion	1
YearsWithCurrManager	3

Index	0
Age	35
DistanceFromHome	2
Education	3
JobLevel	1
MonthlyIncome	23420
NumCompaniesWorked	1
PercentSalaryHike	11
TotalWorkingYears	10
TrainingTimesLastYear	2
YearsAtCompany	5
YearsSinceLastPromotion	0
YearsWithCurrManager	2

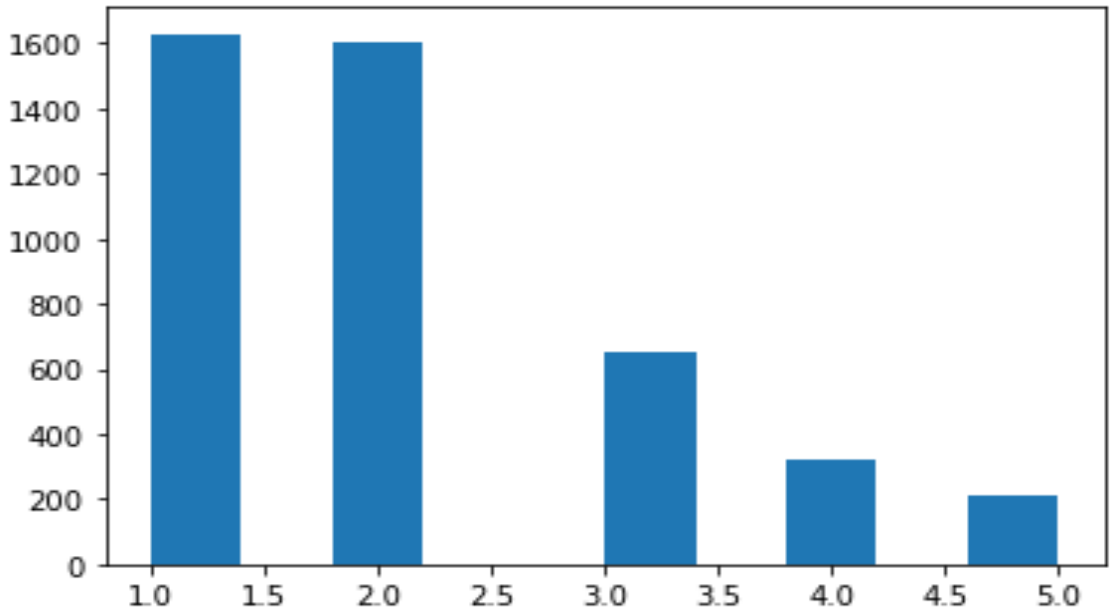
Index	0
0	83.4897
1	65.6974
2	1.05007
3	1.22349
4	2.2224e+09
5	6.23917
6	13.4176
7	60.6174
8	1.66256
9	37.5689
10	10.4006
11	12.7426

Attrition: About 700 employees left which is about 15.96%.

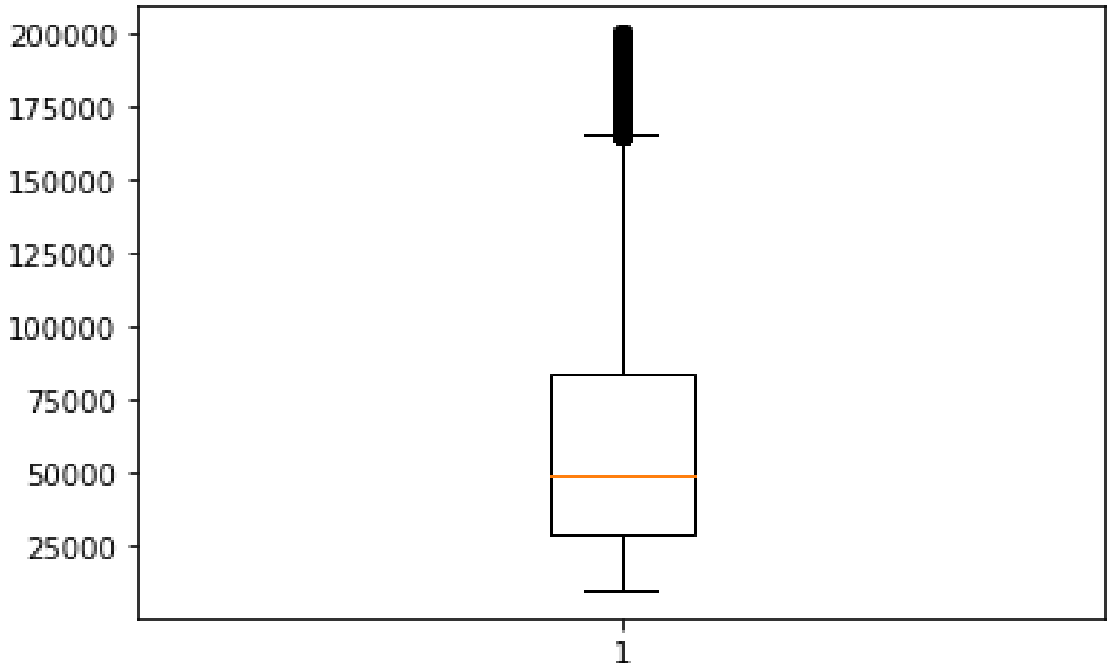
Age: Average age is about 36 (from the table). Moreover, the age is equally distributed.



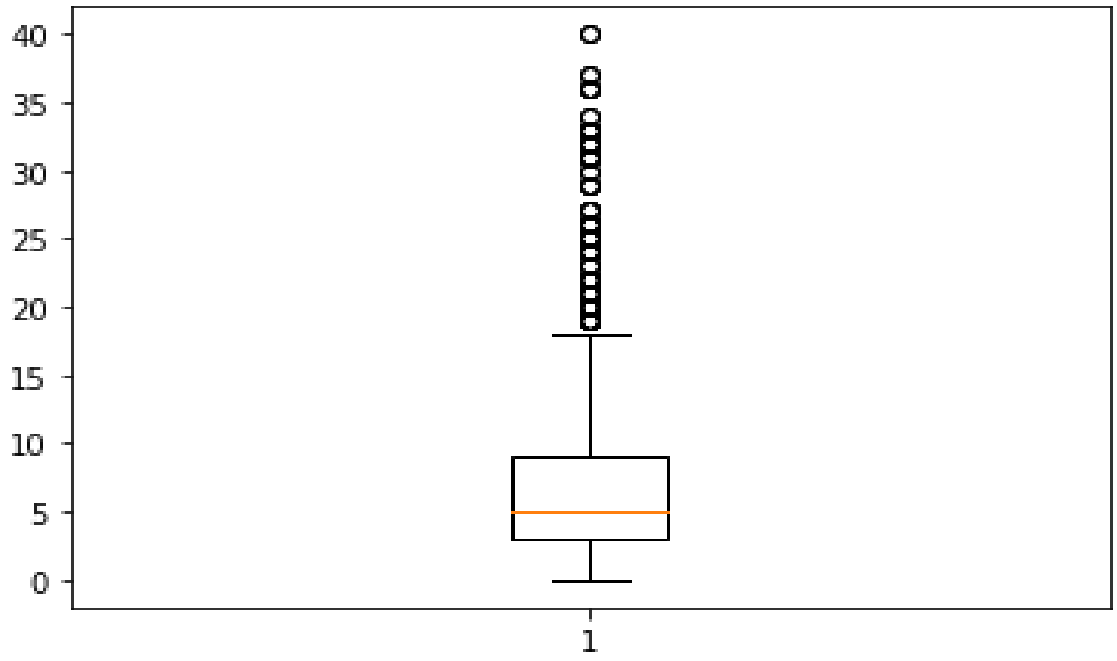
Job-level: The starting levels of job are highly densed.



Monthly-Income: We can see few outliers in this section.

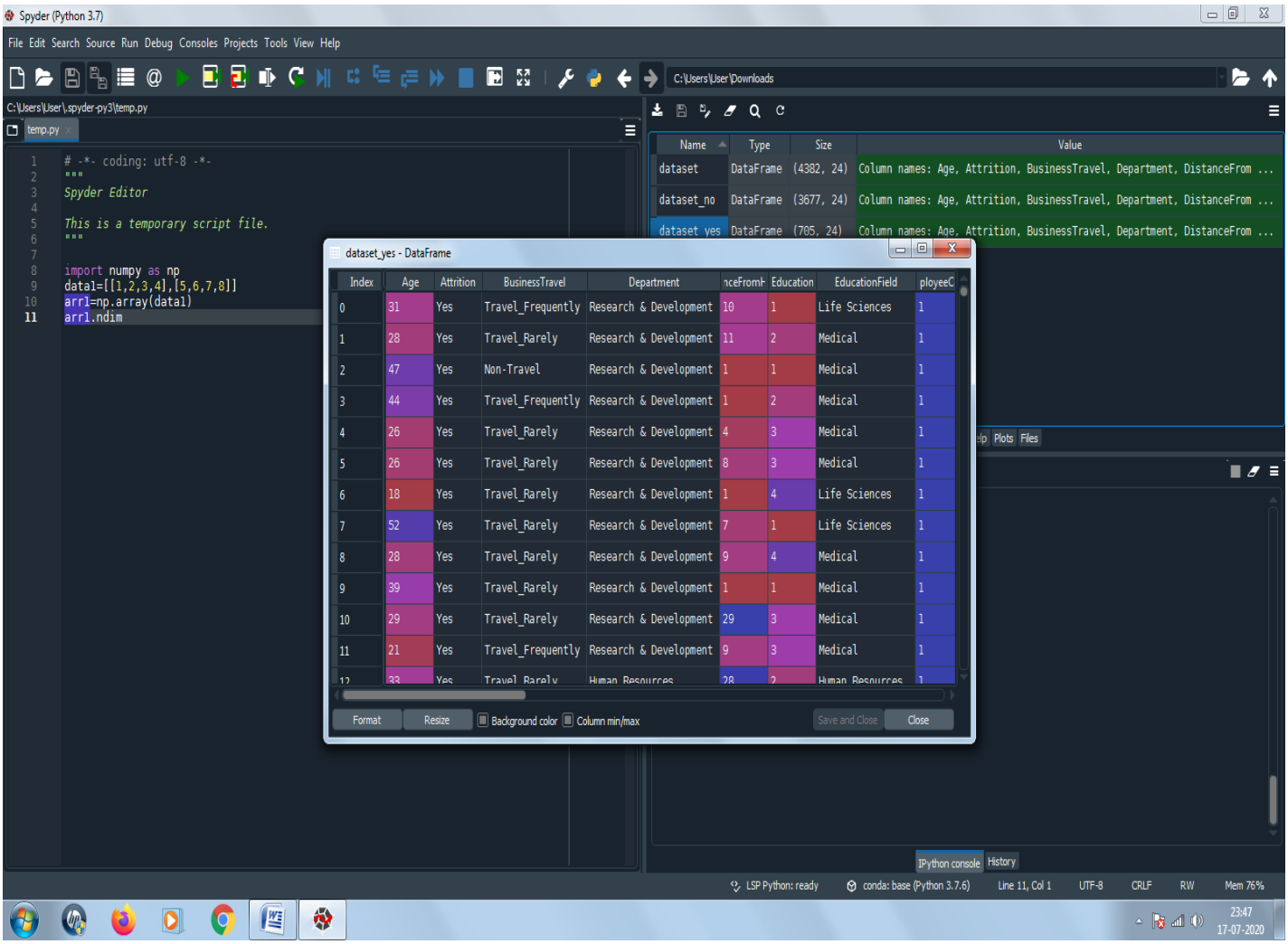


Years In Company: The average time period is about 3 but there are few experienced employees too.



Analysis for employee who left the company:

As seen the data frame “**dataset_yes**” contains information of employees who left the job



The general information :

Index	Age	nceFromH	Education	JobLevel	nthlyInco	ompanies\	entSalaryH	lWorking\	ıgTimesLa	rsAtComp	ıceLastPrc	/ithCurrM
count	705	705	705	705	705	705	705	705	705	705	705	705
mean	33.6284	9.02411	2.87234	2.03262	61815	2.93759	15.4879	8.27376	2.65816	5.14894	1.96028	2.86525
std	9.67884	7.75518	1.01446	1.04871	44890.5	2.68128	3.78584	7.17676	1.1559	5.96097	3.15753	3.14656
min	18	1	1	1	10090	0	11	0	0	0	0	0
25%	28	2	2	1	28440	1	12	3	2	1	0	0
50%	32	7	3	2	49080	1	14	7	3	3	1	2
75%	39	15	4	2	71040	5	18	10	3	7	2	5
max	58	29	5	5	198590	9	25	40	6	40	15	14

Mode:

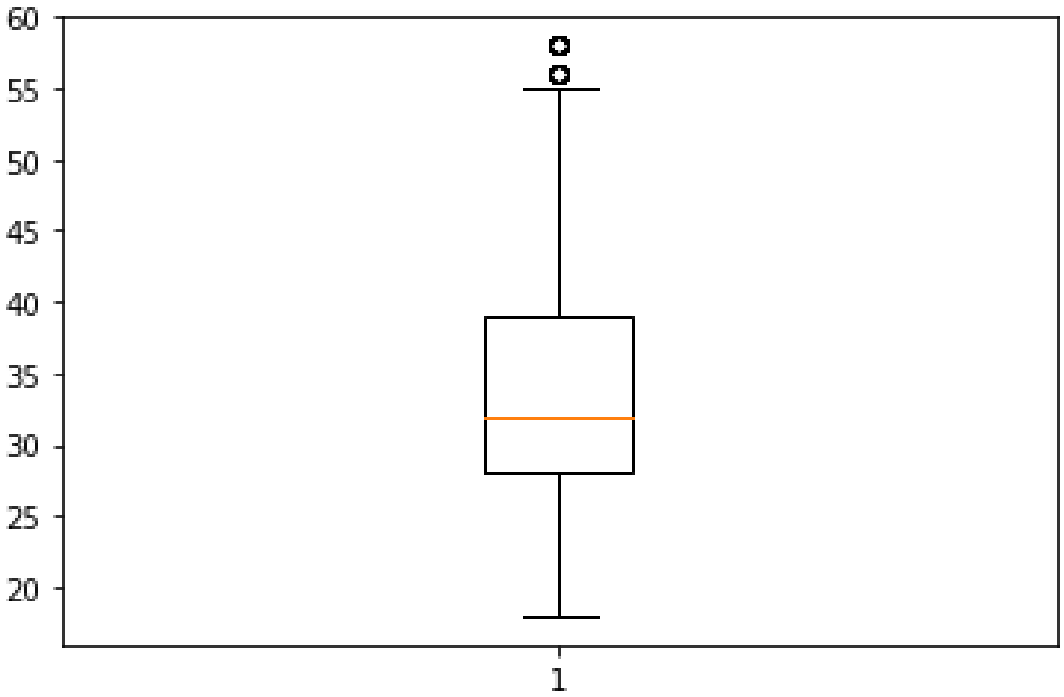
Index	Age	nceFromH	Education	JobLevel	nthlyInco	ompanies\	entSalaryl	lWorking\	gTimesLa	rsAtComp	iceLastPrc	/ithCurrM
0	31	2	3	2	25590	1	13	1	2	1	0	0
1	nan	nan	nan	nan	27410	nan	nan	nan	nan	nan	nan	nan
2	nan	nan	nan	nan	27430	nan	nan	nan	nan	nan	nan	nan
3	nan	nan	nan	nan	28860	nan	nan	nan	nan	nan	nan	nan
4	nan	nan	nan	nan	55620	nan	nan	nan	nan	nan	nan	nan

Median: ----------

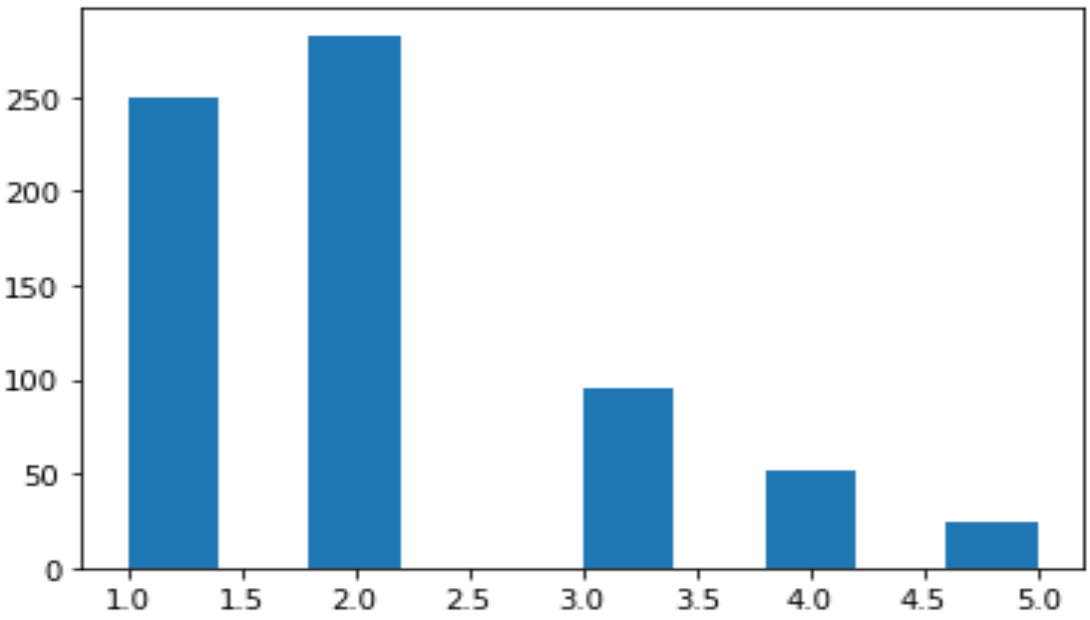
dataset2_yes - Series

Index	0
Age	32
DistanceFromHome	7
Education	3
JobLevel	2
MonthlyIncome	49080
NumCompaniesWorked	1
PercentSalaryHike	14
TotalWorkingYears	7
TrainingTimesLastYear	3
YearsAtCompany	3
YearsSinceLastPromotion	1
YearsWithCurrManager	2

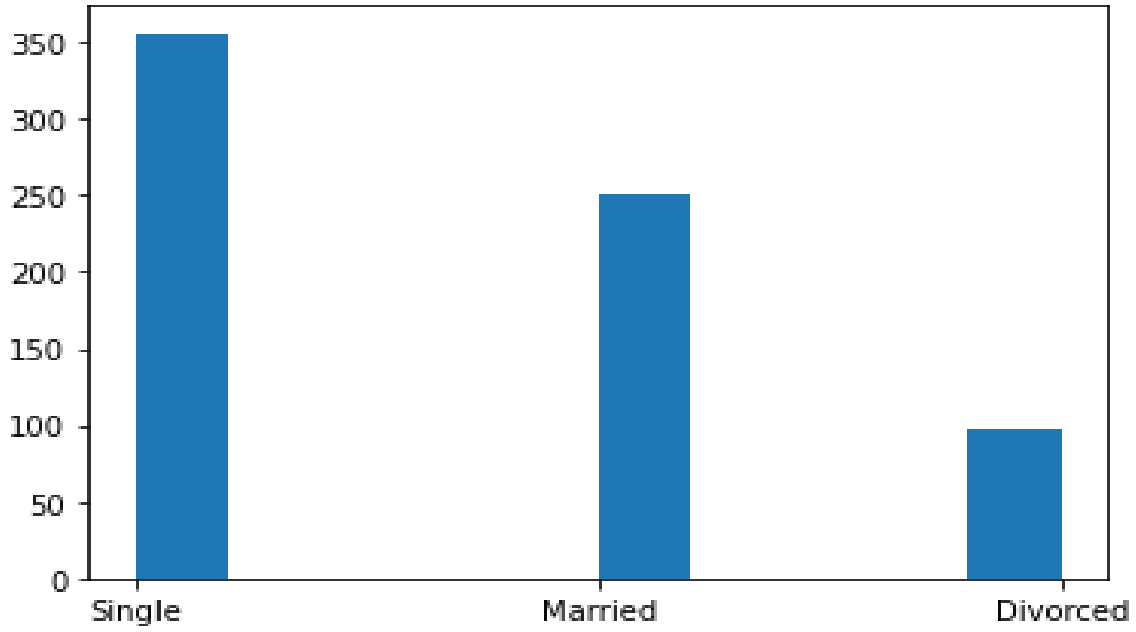
Age: Mainly people of 32-33 years leave to get new job and their are some outliners who probably leave because the are exhausted by their work.



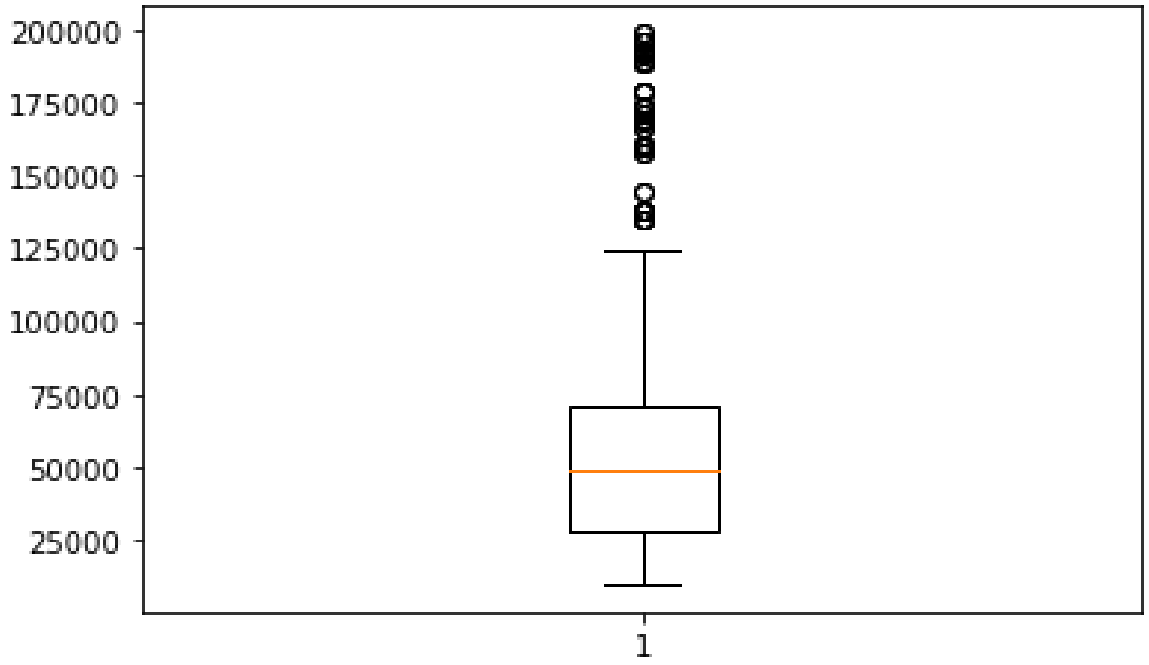
Job Level- Employees in starting of their carrier rush from on company to another to find a perfect Job profile (as they are not satisfied with the work they are doing)



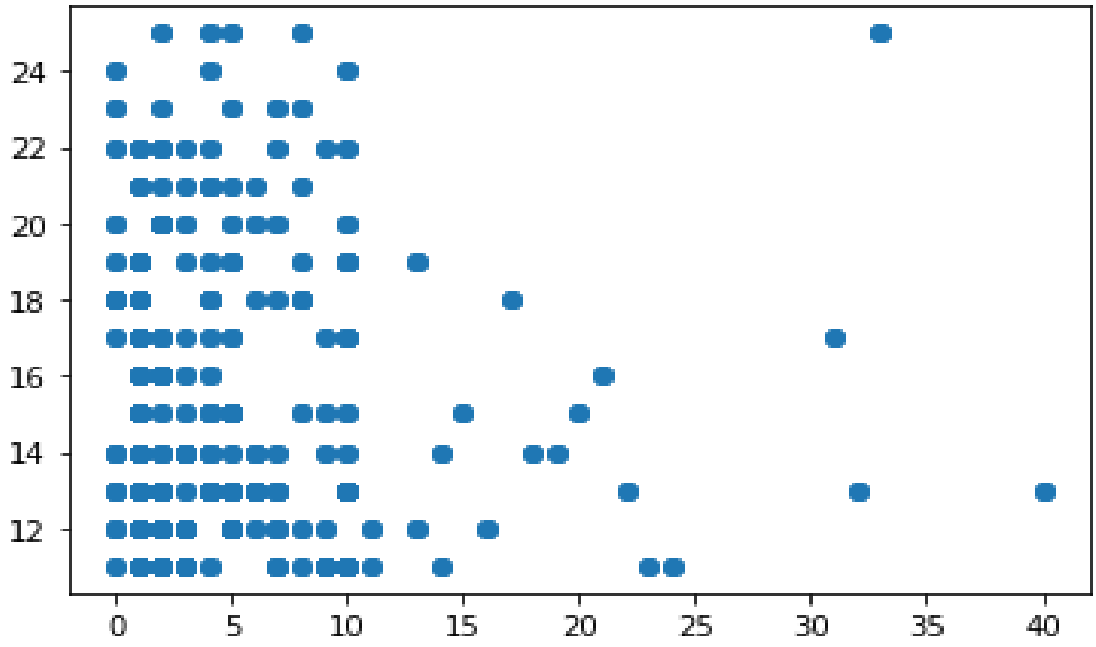
Marital status: Single employees are more ready to take risk and eager to transit.



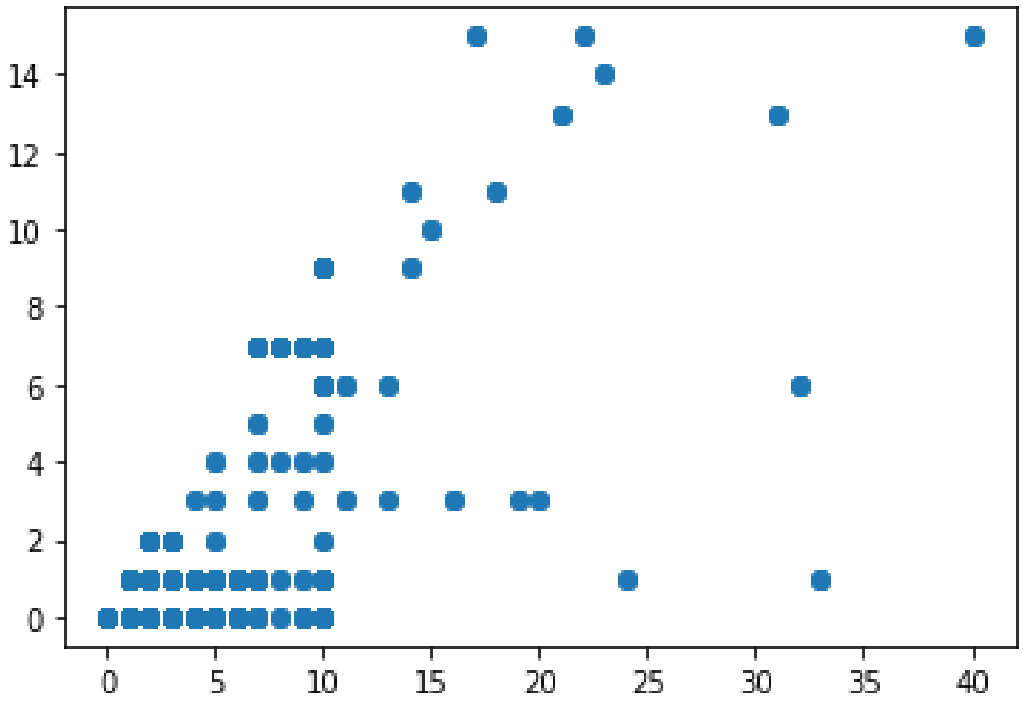
Monthly income: The attrition rate is evenly distributed between the employees regardless of their monthly income. And we can also observe that few high-paid employees have also left.



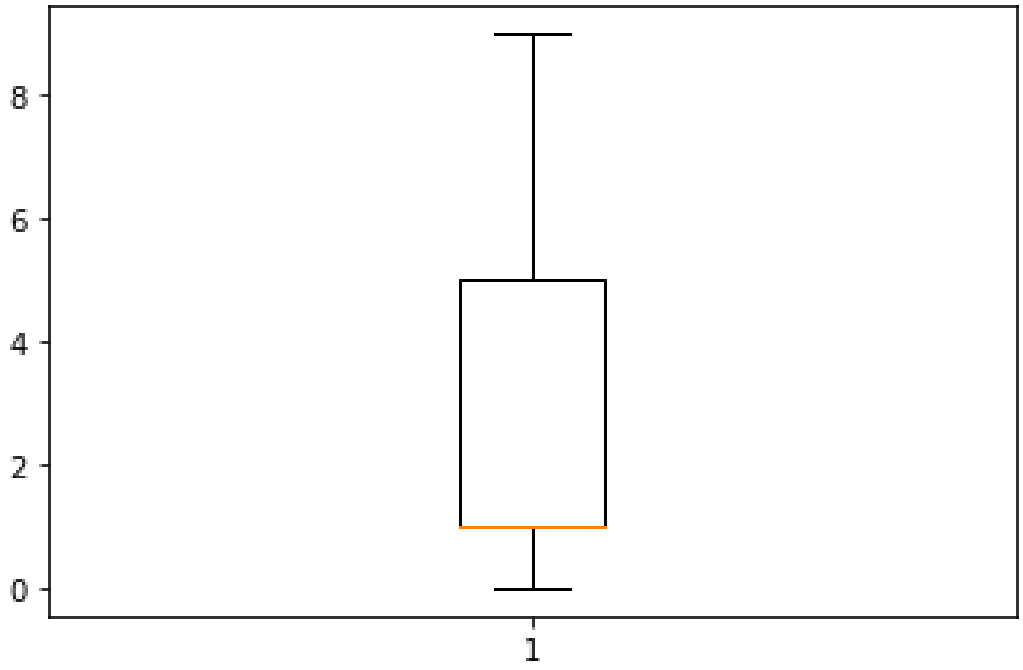
Monthly-Hike vs Time at Company: This scatter plot is significant in-order to know if one of the main reasons of attrition may be unhappiness of employees towards their salary hike. From this plot we observe that majorly employees who had spend about 0-10 years are more likely to leave .

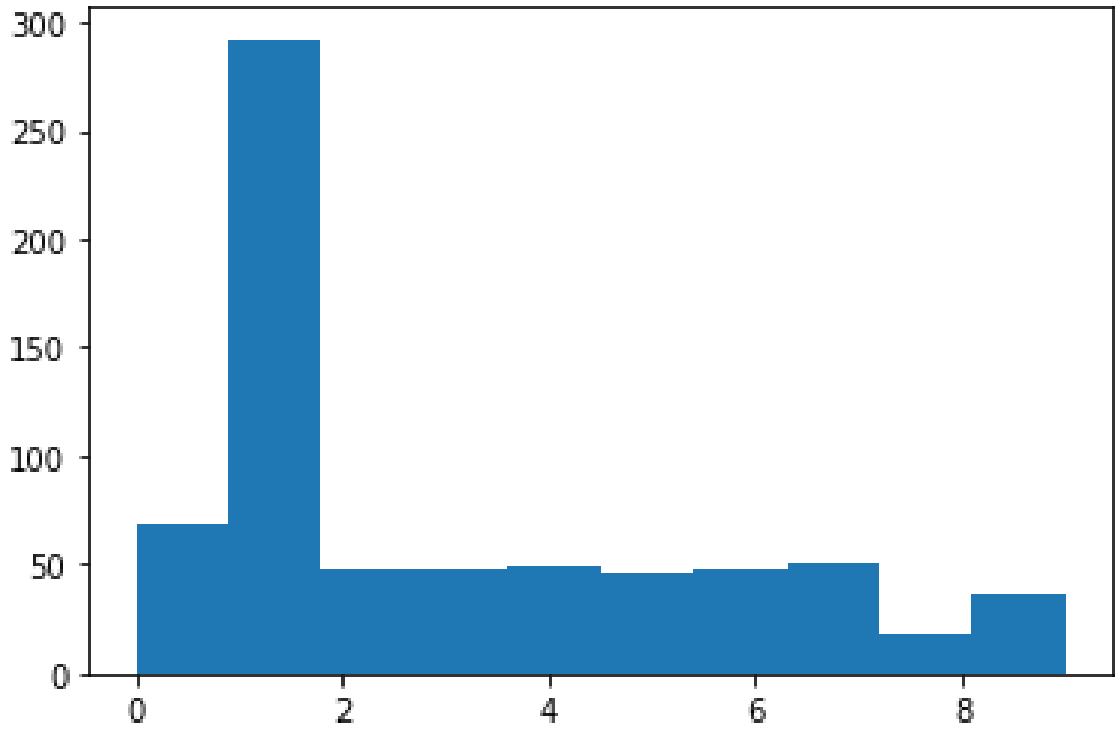


Time from last Promotion vs Time at Company: The plot shows that recently promoted employees have been leaving the company.



Companies worked: By this plot we may observe that 1st quartile and median line intersect . It means that the employees who have worked for 1 company are most likely to leave in order to experiment or to get better opportunities.





Conclusion:

We conclude that single employees who are in the age group of 32-22 having a mediocre job level(profile) and who have not worked in more companies are most likely to leave the company in order to gain opportunity and experience.