QUESTION 1

```python
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

QUESTION 2

1. Read the csv file as DataFrame.

```python
df1=pd.read_csv('assignment_aums_3.csv')
df1
```

	PLAYER	POSITION	TEAM	SALARY
0	Paul Millsap	PF	Atlanta Hawks	18.671659
1	Al Horford	C	Atlanta Hawks	12.000000
2	Tiago Splitter	C	Atlanta Hawks	9.756250
3	Jeff Teague	PG	Atlanta Hawks	8.000000
4	Kyle Korver	SG	Atlanta Hawks	5.746479
..	...	...	...	...
412	Gary Neal	PG	Washington Wizards	2.139000
413	DeJuan Blair	C	Washington Wizards	2.000000
414	Kelly Oubre Jr.	SF	Washington Wizards	1.920240
415	Garrett Temple	SG	Washington Wizards	1.100602
416	Jarell Eddie	SG	Washington Wizards	0.561716

```
[417 rows x 4 columns]
```

1. Find size

```python
df1.shape
```

```
(417, 4)
```

1. Sort on player

```python
df1.sort_values(by='PLAYER')
```

	PLAYER	POSITION	TEAM	SALARY
68	Aaron Brooks	PG	Chicago Bulls	2.250000
291	Aaron Gordon	PF	Orlando Magic	4.171680
59	Aaron Harrison	SG	Charlotte Hornets	0.525093
235	Adreian Payne	PF	Minnesota Timberwolves	1.938840
1	Al Horford	C	Atlanta Hawks	12.000000
..	...	...	...	...
95	Wilson Chandler	SF	Denver Nuggets	10.449438
233	Zach LaVine	PG	Minnesota Timberwolves	2.148360
181	Zach Randolph	PF	Memphis Grizzlies	9.638555
86	Zaza Pachulia	C	Dallas Mavericks	5.200000
26	Zoran Dragic	SG	Boston Celtics	1.706225

```
[417 rows x 4 columns]
```

1. Sort on salary(increasing and decreasing)

```
df1.sort_values(by='SALARY',ascending=True)
```

	PLAYER	POSITION	TEAM	SALARY
267	Thanasis Antetokounmpo	SF	New York Knicks	0.030888
327	Cory Jefferson	PF	Phoenix Suns	0.049709
326	Jordan McRae	SG	Phoenix Suns	0.049709
324	Orlando Johnson	SG	Phoenix Suns	0.055722
325	Phil Pressey	PG	Phoenix Suns	0.055722
..	...	...	...	...
131	Dwight Howard	C	Houston Rockets	22.359364
255	Carmelo Anthony	SF	New York Knicks	22.875000
72	LeBron James	SF	Cleveland Cavaliers	22.970500
29	Joe Johnson	SF	Brooklyn Nets	24.894863
169	Kobe Bryant	SF	Los Angeles Lakers	25.000000

```
[417 rows x 4 columns]
```

```
df1.sort_values(by='SALARY',ascending=False)
```

	PLAYER	POSITION	TEAM	SALARY
169	Kobe Bryant	SF	Los Angeles Lakers	25.000000
29	Joe Johnson	SF	Brooklyn Nets	24.894863
72	LeBron James	SF	Cleveland Cavaliers	22.970500
255	Carmelo Anthony	SF	New York Knicks	22.875000
131	Dwight Howard	C	Houston Rockets	22.359364
..	...	...	...	...
200	Elliot Williams	SG	Memphis Grizzlies	0.055722
324	Orlando Johnson	SG	Phoenix Suns	0.055722
327	Cory Jefferson	PF	Phoenix Suns	0.049709
326	Jordan McRae	SG	Phoenix Suns	0.049709
267	Thanasis Antetokounmpo	SF	New York Knicks	0.030888

```
[417 rows x 4 columns]
```

1. Relabel column salary as "SALARY:

```
df1.rename(columns={'salary':'SALARY'})
```

	PLAYER	POSITION	TEAM	SALARY
0	Paul Millsap	PF	Atlanta Hawks	18.671659
1	Al Horford	C	Atlanta Hawks	12.000000
2	Tiago Splitter	C	Atlanta Hawks	9.756250
3	Jeff Teague	PG	Atlanta Hawks	8.000000
4	Kyle Korver	SG	Atlanta Hawks	5.746479
..	...	...	...	...
412	Gary Neal	PG	Washington Wizards	2.139000

```
413     DeJuan Blair        C   Washington Wizards    2.000000
414   Kelly Oubre Jr.       SF   Washington Wizards    1.920240
415   Garrett Temple        SG   Washington Wizards    1.100602
416    Jarell Eddie         SG   Washington Wizards    0.561716

[417 rows x 4 columns]
```

1. Display first 5 rows.

```
df1.head(5)

          PLAYER POSITION          TEAM     SALARY
0    Paul Millsap        PF   Atlanta Hawks   18.671659
1     Al Horford         C    Atlanta Hawks   12.000000
2   Tiago Splitter       C    Atlanta Hawks    9.756250
3     Jeff Teague        PG   Atlanta Hawks    8.000000
4     Kyle Korver        SG   Atlanta Hawks    5.746479
```

1. Select 3rd, 10th and 22nd rows.

```
df1.iloc[[3,10,22]]

           PLAYER POSITION          TEAM    SALARY
3      Jeff Teague        PG    Atlanta Hawks   8.00000
10  Walter Tavares        C     Atlanta Hawks   1.00000
22    Kelly Olynyk        C    Boston Celtics   2.16516
```

1. Top 5 highest paid.

```
df1.sort_values(by="SALARY",ascending=False).head(5)

             PLAYER POSITION                  TEAM     SALARY
169     Kobe Bryant        SF    Los Angeles Lakers   25.000000
29      Joe Johnson        SF          Brooklyn Nets   24.894863
72     LeBron James        SF   Cleveland Cavaliers   22.970500
255  Carmelo Anthony        SF        New York Knicks   22.875000
131    Dwight Howard         C        Houston Rockets   22.359364
```

1. List those earned more than 10m USD.

```
#df1.query("SALARY>10")[["PLAYER",'POSITION',"TEAM","SALARY"]]
#df1.loc[(df1.SALARY>10)]
#df1[(df1.SALARY>10)]
df1.loc[(df1["SALARY"]>10)]

          PLAYER POSITION                  TEAM     SALARY
0     Paul Millsap        PF          Atlanta Hawks   18.671659
1      Al Horford         C          Atlanta Hawks   12.000000
29     Joe Johnson        SF          Brooklyn Nets   24.894863
30   Thaddeus Young        PF          Brooklyn Nets   11.235955
42    Al Jefferson         C     Charlotte Hornets   13.500000
```

```
..            ...     ...                  ...        ...
368   DeMar DeRozan    SG       Toronto Raptors  10.050000
383  Gordon Hayward    SF            Utah Jazz  15.409570
400       John Wall    PG  Washington Wizards  15.851950
401     Nene Hilario     C  Washington Wizards  13.000000
402    Marcin Gortat     C  Washington Wizards  11.217391

[69 rows x 4 columns]
```

1. Earnings of Stephen Curry

```
df1[["SALARY","PLAYER"]][(df1["PLAYER"]=="Stephen Curry")]
```

```
        SALARY          PLAYER
121   11.370786  Stephen Curry
```

1. All Point Guards(PG) salary more than 15m USD.

```
df1[df1["SALARY"]>15][df1["POSITION"]=="PG"]
```

```
C:\Users\vigne\AppData\Local\Temp\ipykernel_15856\171024139.py:1:
UserWarning: Boolean Series key will be reindexed to match DataFrame
index.
  df1[df1["SALARY"]>15][df1["POSITION"]=="PG"]
```

```
              PLAYER POSITION                   TEAM     SALARY
60      Derrick Rose       PG          Chicago Bulls  20.093064
74      Kyrie Irving       PG    Cleveland Cavaliers  16.407501
156       Chris Paul       PG    Los Angeles Clippers  21.468695
269  Russell Westbrook     PG  Oklahoma City Thunder  16.744218
400        John Wall       PG     Washington Wizards  15.851950
```

1. Team " Golden State Warriors"

```
df1[df1["TEAM"]=='Golden State Warriors']
```

```
                PLAYER POSITION                   TEAM     SALARY
117     Klay Thompson       SG  Golden State Warriors  15.501000
118     Draymond Green       PF  Golden State Warriors  14.260870
119      Andrew Bogut        C  Golden State Warriors  13.800000
120     Andre Iguodala       SF  Golden State Warriors  11.710456
121      Stephen Curry       PG  Golden State Warriors  11.370786
122     Jason Thompson       PF  Golden State Warriors   7.008475
123   Shaun Livingston       PG  Golden State Warriors   5.543725
124    Harrison Barnes       SF  Golden State Warriors   3.873398
125  Marreese Speights        C  Golden State Warriors   3.815000
126     Leandro Barbosa       SG  Golden State Warriors   2.500000
127       Festus Ezeli        C  Golden State Warriors   2.008748
128       Brandon Rush       SF  Golden State Warriors   1.270964
129       Kevon Looney       SF  Golden State Warriors   1.131960
130    Anderson Varejao       PF  Golden State Warriors   0.289755
```

1. How much money did each team pay for its players' salaries?

```
df1.groupby('TEAM')['SALARY'].sum().reset_index()
```

	TEAM	SALARY
0	Atlanta Hawks	69.573103
1	Boston Celtics	50.285499
2	Brooklyn Nets	57.306976
3	Charlotte Hornets	84.102397
4	Chicago Bulls	78.820890
5	Cleveland Cavaliers	102.312412
6	Dallas Mavericks	65.762559
7	Denver Nuggets	62.429404
8	Detroit Pistons	42.211760
9	Golden State Warriors	94.085137
10	Houston Rockets	85.285837
11	Indiana Pacers	62.695023
12	Los Angeles Clippers	66.074113
13	Los Angeles Lakers	68.607944
14	Memphis Grizzlies	93.796439
15	Miami Heat	81.528667
16	Milwaukee Bucks	52.258355
17	Minnesota Timberwolves	65.847421
18	New Orleans Pelicans	80.514606
19	New York Knicks	69.404994
20	Oklahoma City Thunder	96.832165
21	Orlando Magic	77.623940
22	Philadelphia 76ers	42.481345
23	Phoenix Suns	50.520815
24	Portland Trail Blazers	45.446878
25	Sacramento Kings	68.384890
26	San Antonio Spurs	84.652074
27	Toronto Raptors	74.672620
28	Utah Jazz	52.631878
29	Washington Wizards	90.047498

1. How many NBA players were there in each of the five positions?

```
df1['POSITION'].value_counts()
```

```
POSITION
SG    96
PF    85
PG    85
SF    82
C     69
Name: count, dtype: int64
```

1. What was the average salary of the players at each of the five positions

```
df1.groupby('POSITION')['SALARY'].mean()
```

```
POSITION
C      6.082913
PF     4.951344
PG     5.165487
SF     5.532675
SG     3.988195
Name: SALARY, dtype: float64
```