import necessary packages

In [1]:
```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

In [2]:
```
# load the file
```

In [4]:
```
 = pd.read_csv(r"D:\Data Science with AI\4th, 5th dec 2023 Inferential stats\Descriptive stats _PRA
```

In [5]:
```
income_df
```

Out[5]:

	Mthly_HH_Income	Mthly_HH_Expense	No_of_Fly_Members	Emi_or_Rent_Amt	Annual_HH_Income	Highest_Qualified_M
0	5000	8000	3	2000	64200	Under-G
1	6000	7000	2	3000	79920	I
2	10000	4500	2	0	112800	Under-G
3	10000	2000	1	0	97200	I
4	12500	12000	2	3000	147000	G
5	14000	8000	2	0	196560	G
6	15000	16000	3	35000	167400	Post-G
7	18000	20000	5	8000	216000	G
8	19000	9000	2	0	218880	Under-G
9	20000	9000	4	0	220800	Under-G
10	20000	18000	4	8000	278400	Under-G
11	22000	25000	6	12000	279840	I
12	23400	5000	3	0	292032	I
13	24000	10500	6	0	316800	G
14	24000	10000	4	0	244800	G
15	25000	12300	3	0	246000	G
16	25000	20000	3	3500	261000	G
17	25000	10000	6	0	258000	Under-G
18	29000	6600	2	2000	348000	G
19	30000	13000	4	0	385200	G
20	30500	25000	5	5000	351360	Under-G
21	32000	15000	4	0	445440	Profe
22	34000	19000	6	0	330480	Profe
23	34000	25000	3	4000	469200	Profe
24	35000	12000	3	0	466200	G
25	35000	25000	4	0	449400	Profe
26	39000	8000	4	0	556920	Under-G
27	40000	10000	4	0	412800	Under-G
28	42000	15000	4	0	488880	G
29	43000	12000	4	0	619200	G
30	45000	25000	6	0	523800	G
31	45000	40000	6	3500	507600	Profe
32	45000	10000	2	1000	437400	Post-G
33	45000	22000	4	2500	610200	Post-G
34	46000	25000	5	3500	596160	G
35	47000	15000	7	0	456840	Profe
36	50000	20000	4	0	570000	Profe
37	50500	20000	3	0	581760	Profe
38	55000	45000	6	12000	600600	G
39	60000	10000	3	0	590400	Post-G
40	60000	50000	6	10000	590400	G
41	65000	20000	4	5000	647400	I

	Mthly_HH_Income	Mthly_HH_Expense	No_of_Fly_Members	Emi_or_Rent_Amt	Annual_HH_Income	Highest_Qualified_M
42	70000	9000	2	0	756000	Gı
43	80000	20000	4	0	1075200	Gı
44	85000	25000	5	0	1142400	Under-Gı
45	90000	48000	7	0	885600	Post-Gı
46	98000	25000	5	0	1152480	Profe
47	100000	30000	6	0	1404000	Gı
48	100000	50000	4	20000	1032000	Profe
49	100000	40000	6	10000	1320000	Post-Gı

In [6]:
```
income_df.head()
```

Out[6]:

	Mthly_HH_Income	Mthly_HH_Expense	No_of_Fly_Members	Emi_or_Rent_Amt	Annual_HH_Income	Highest_Qualified_Me
0	5000	8000	3	2000	64200	Under-Gra
1	6000	7000	2	3000	79920	III
2	10000	4500	2	0	112800	Under-Gra
3	10000	2000	1	0	97200	III
4	12500	12000	2	3000	147000	Gra

In [7]:
```
income_df.tail()
```

Out[7]:

	Mthly_HH_Income	Mthly_HH_Expense	No_of_Fly_Members	Emi_or_Rent_Amt	Annual_HH_Income	Highest_Qualified_M
45	90000	48000	7	0	885600	Post-Gı
46	98000	25000	5	0	1152480	Profe
47	100000	30000	6	0	1404000	Gı
48	100000	50000	4	20000	1032000	Profe
49	100000	40000	6	10000	1320000	Post-Gı

In [8]:
```
# analyze the data
```

In [9]:
```
income_df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 50 entries, 0 to 49
Data columns (total 7 columns):
 #   Column                   Non-Null Count  Dtype 
---  ------                   --------------  ----- 
 0   Mthly_HH_Income          50 non-null     int64 
 1   Mthly_HH_Expense         50 non-null     int64 
 2   No_of_Fly_Members        50 non-null     int64 
 3   Emi_or_Rent_Amt          50 non-null     int64 
 4   Annual_HH_Income         50 non-null     int64 
 5   Highest_Qualified_Member 50 non-null     object
 6   No_of_Earning_Members    50 non-null     int64 
dtypes: int64(6), object(1)
memory usage: 2.9+ KB
```

In [11]:
```
income_df.shape
```

Out[11]:
```
(50, 7)
```

In [12]:
```
income_df.describe().T
```

Out[12]:

	count	mean	std	min	25%	50%	75%	max
Mthly_HH_Income	50.0	41558.00	26097.908979	5000.0	23550.0	35000.0	50375.0	100000.0
Mthly_HH_Expense	50.0	18818.00	12090.216824	2000.0	10000.0	15500.0	25000.0	50000.0
No_of_Fly_Members	50.0	4.06	1.517382	1.0	3.0	4.0	5.0	7.0
Emi_or_Rent_Amt	50.0	3060.00	6241.434948	0.0	0.0	0.0	3500.0	35000.0
Annual_HH_Income	50.0	490019.04	320135.792123	64200.0	258750.0	447420.0	594720.0	1404000.0
No_of_Earning_Members	50.0	1.46	0.734291	1.0	1.0	1.0	2.0	4.0

In [15]:
```
ncome_df.isna().head()          #isna()-check whether the value is na or not
                                #whether is true means value is na and false means value is not na
```

Out[15]:

H_Expense	No_of_Fly_Members	Emi_or_Rent_Amt	Annual_HH_Income	Highest_Qualified_Member	No_of_Earning_Members
False	False	False	False	False	False
False	False	False	False	False	False
False	False	False	False	False	False
False	False	False	False	False	False
False	False	False	False	False	False

In [17]:
```
income_df.isna().any()
```

Out[17]:
```
Mthly_HH_Income            False
Mthly_HH_Expense           False
No_of_Fly_Members          False
Emi_or_Rent_Amt            False
Annual_HH_Income           False
Highest_Qualified_Member   False
No_of_Earning_Members      False
dtype: bool
```

no null value in the dataset

what is the mean expense of a household ?

In [18]:
```
income_df["Mthly_HH_Expense"].mean()
```

Out[18]:
```
18818.0
```

what is the median household expense?

In [19]:
```
income_df["Mthly_HH_Expense"].median()
```

Out[19]:
```
15500.0
```

what is the mothly expenses for most of the household ?

In [20]:
```
mth_exp_tmp = pd.crosstab(index=income_df["Mthly_HH_Expense"], columns="count")
mth_exp_tmp.reset_index(inplace=True)
mth_exp_tmp[mth_exp_tmp['count'] == income_df.Mthly_HH_Expense.value_counts().max()]
```

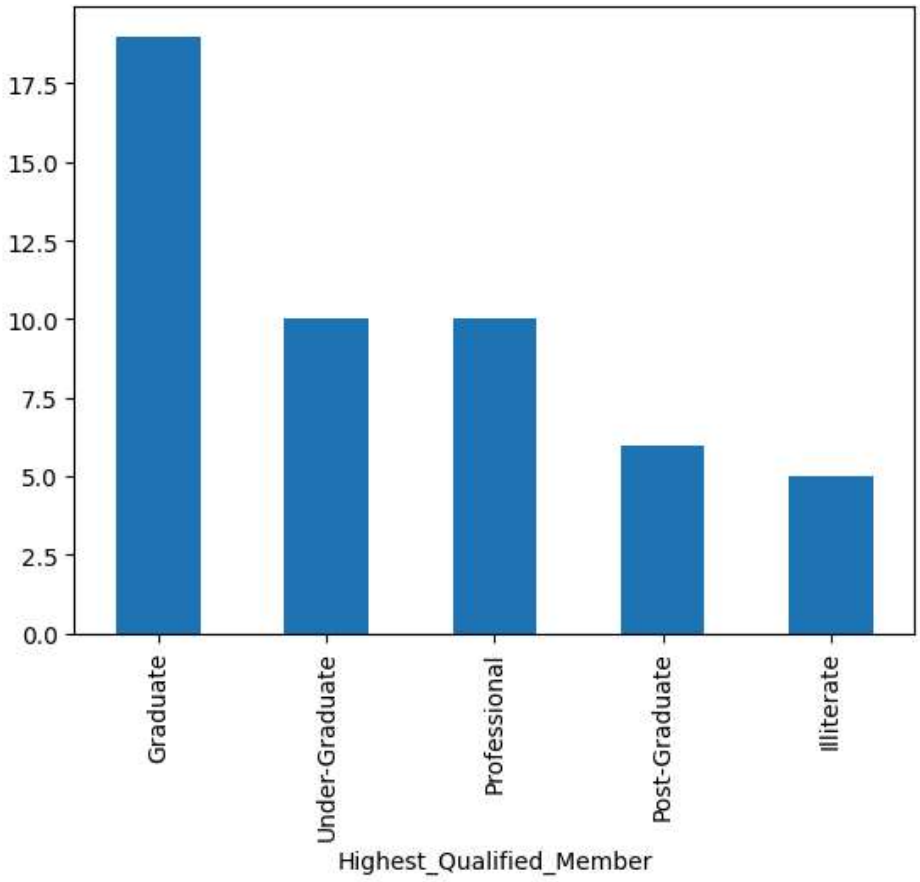
Out[20]:

col_0	Mthly_HH_Expense	count
18	25000	8

Plot the Histogram to count the Highest qualified member

In [22]:
```
income_df["Highest_Qualified_Member"].value_counts().plot(kind="bar")
```

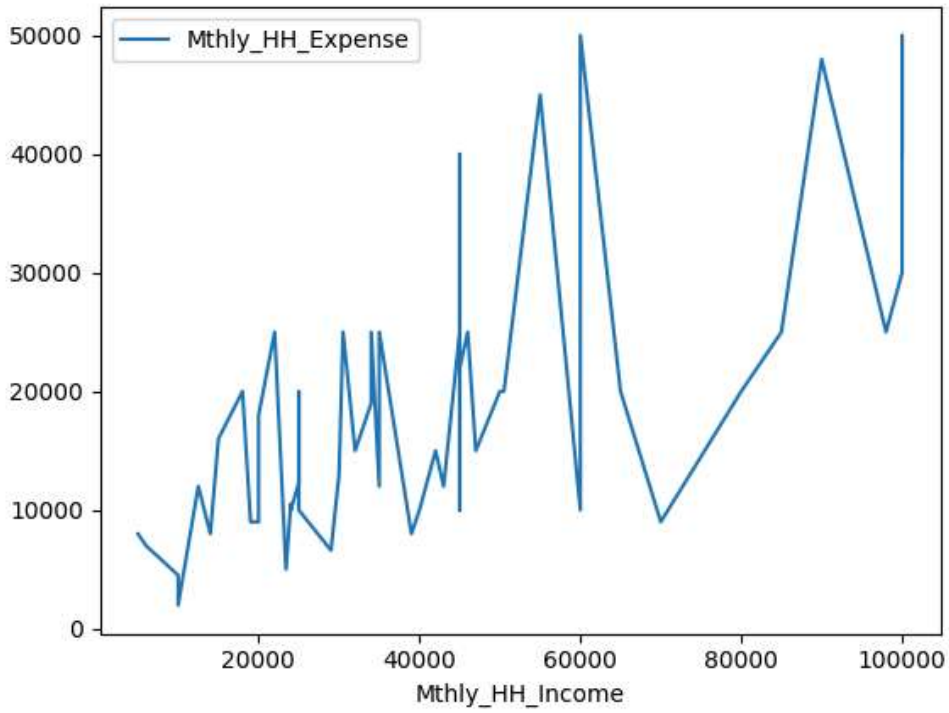
Out[22]: <Axes: xlabel='Highest_Qualified_Member'>



Calculate IQR(difference between 75% and 25% quartile)

In [23]:
```
income_df.plot(x="Mthly_HH_Income", y="Mthly_HH_Expense")
IQR=income_df["Mthly_HH_Expense"].quantile(0.75)-income_df["Mthly_HH_Expense"].quantile(0.25)
IQR
```

Out[23]: 15000.0



In [26]:
```
#Calculate Variance for first 3 columns.
pd.DataFrame(income_df.iloc[:,0:4].var().to_frame()).T
```

Out[26]:

	Mthly_HH_Income	Mthly_HH_Expense	No_of_Fly_Members	Emi_or_Rent_Amt
0	6.811009e+08	1.461733e+08	2.302449	3.895551e+07

In [28]:
```
#11.Calculate the count of Highest qualified member.
income_df["Highest_Qualified_Member"].value_counts().to_frame().T
```

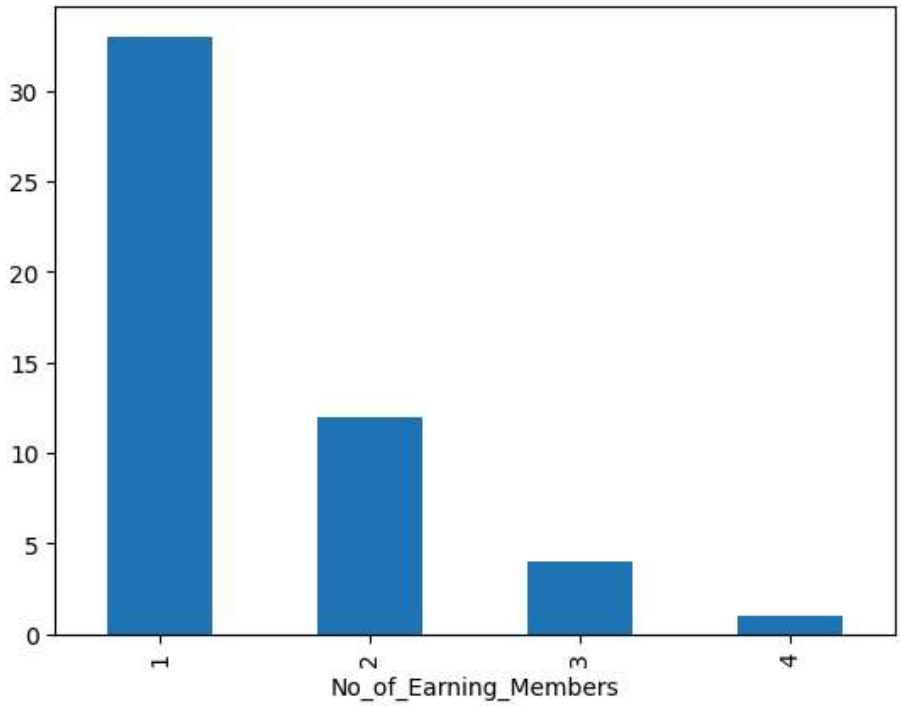
Out[28]:

Highest_Qualified_Member	Graduate	Under-Graduate	Professional	Post-Graduate	Illiterate
count	19	10	10	6	5

plot the histogram to count the no_of _earning_members

In [30]:
```
income_df["No_of_Earning_Members"].value_counts().plot(kind="bar")
```

Out[30]:
```
<Axes: xlabel='No_of_Earning_Members'>
```



Suppose you have option to invest in Stock A or Stock B. The stocks • have different expected returns and standard deviations. The expected return of Stock A is 15% and Stock B is 10%. Standard Deviation of the returns of these stocks is 10% and 5% respectively.¶

In [31]:
```
#here we need to calculate the coeff of variation

Coeff_of_var_StockA=10/15
print(Coeff_of_var_StockA)
Coeff_of_var_StockB=5/10
print(Coeff_of_var_StockB)
```

```
0.6666666666666666
0.5
```

In [ ]: