

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

```
In [2]: income_df=pd.read_csv(r"C:\Users\Twinkele\OneDrive\Desktop\Inc_Exp_Data.csv")  
income_df
```

Out[2]:

	Mthly_HH_Income	Mthly_HH_Expense	No_of_Fly_Members	Emi_or_Rent_Amt	Annual_Household_Income
0	5000	8000	3	2000	60000
1	6000	7000	2	3000	72000
2	10000	4500	2	0	120000
3	10000	2000	1	0	120000
4	12500	12000	2	3000	150000
5	14000	8000	2	0	168000
6	15000	16000	3	35000	180000
7	18000	20000	5	8000	216000
8	19000	9000	2	0	228000
9	20000	9000	4	0	240000
10	20000	18000	4	8000	240000
11	22000	25000	6	12000	264000
12	23400	5000	3	0	280800
13	24000	10500	6	0	288000
14	24000	10000	4	0	288000
15	25000	12300	3	0	300000
16	25000	20000	3	3500	300000
17	25000	10000	6	0	300000
18	29000	6600	2	2000	342000
19	30000	13000	4	0	360000
20	30500	25000	5	5000	378000
21	32000	15000	4	0	384000
22	34000	19000	6	0	408000
23	34000	25000	3	4000	408000
24	35000	12000	3	0	420000
25	35000	25000	4	0	420000
26	39000	8000	4	0	468000
27	40000	10000	4	0	480000
28	42000	15000	4	0	504000
29	43000	12000	4	0	516000

	Mthly_HH_Income	Mthly_HH_Expense	No_of_Fly_Members	Emi_or_Rent_Amt	Annual_HH_Income
30	45000	25000	6	0	
31	45000	40000	6	3500	
32	45000	10000	2	1000	
33	45000	22000	4	2500	
34	46000	25000	5	3500	
35	47000	15000	7	0	
36	50000	20000	4	0	
37	50500	20000	3	0	
38	55000	45000	6	12000	
39	60000	10000	3	0	
40	60000	50000	6	10000	
41	65000	20000	4	5000	
42	70000	9000	2	0	
43	80000	20000	4	0	
44	85000	25000	5	0	
45	90000	48000	7	0	
46	98000	25000	5	0	
47	100000	30000	6	0	
48	100000	50000	4	20000	
49	100000	40000	6	10000	

In [3]: `income_df.isna()`

Out[3]:	Mthly_HH_Income	Mthly_HH_Expense	No_of_Fly_Members	Emi_or_Rent_Amt	Annual_HH_Income
0	False	False	False	False	False
1	False	False	False	False	False
2	False	False	False	False	False
3	False	False	False	False	False
4	False	False	False	False	False
5	False	False	False	False	False
6	False	False	False	False	False
7	False	False	False	False	False
8	False	False	False	False	False
9	False	False	False	False	False
10	False	False	False	False	False
11	False	False	False	False	False
12	False	False	False	False	False
13	False	False	False	False	False
14	False	False	False	False	False
15	False	False	False	False	False
16	False	False	False	False	False
17	False	False	False	False	False
18	False	False	False	False	False
19	False	False	False	False	False
20	False	False	False	False	False
21	False	False	False	False	False
22	False	False	False	False	False
23	False	False	False	False	False
24	False	False	False	False	False
25	False	False	False	False	False
26	False	False	False	False	False
27	False	False	False	False	False
28	False	False	False	False	False
29	False	False	False	False	False

	Mthly_HH_Income	Mthly_HH_Expense	No_of_Fly_Members	Emi_or_Rent_Amt	Annual_HH_Income
30	False	False	False	False	False
31	False	False	False	False	False
32	False	False	False	False	False
33	False	False	False	False	False
34	False	False	False	False	False
35	False	False	False	False	False
36	False	False	False	False	False
37	False	False	False	False	False
38	False	False	False	False	False
39	False	False	False	False	False
40	False	False	False	False	False
41	False	False	False	False	False
42	False	False	False	False	False
43	False	False	False	False	False
44	False	False	False	False	False
45	False	False	False	False	False
46	False	False	False	False	False
47	False	False	False	False	False
48	False	False	False	False	False
49	False	False	False	False	False

In [4]: income_df

Out[4]:

	Mthly_HH_Income	Mthly_HH_Expense	No_of_Fly_Members	Emi_or_Rent_Amt	Annual_HH_Income
0	5000	8000	3	2000	60000
1	6000	7000	2	3000	72000
2	10000	4500	2	0	120000
3	10000	2000	1	0	120000
4	12500	12000	2	3000	150000
5	14000	8000	2	0	168000
6	15000	16000	3	35000	180000
7	18000	20000	5	8000	216000
8	19000	9000	2	0	228000
9	20000	9000	4	0	240000
10	20000	18000	4	8000	240000
11	22000	25000	6	12000	264000
12	23400	5000	3	0	278400
13	24000	10500	6	0	288000
14	24000	10000	4	0	288000
15	25000	12300	3	0	300000
16	25000	20000	3	3500	300000
17	25000	10000	6	0	300000
18	29000	6600	2	2000	342000
19	30000	13000	4	0	360000
20	30500	25000	5	5000	378000
21	32000	15000	4	0	384000
22	34000	19000	6	0	408000
23	34000	25000	3	4000	408000
24	35000	12000	3	0	420000
25	35000	25000	4	0	420000
26	39000	8000	4	0	456000
27	40000	10000	4	0	480000
28	42000	15000	4	0	492000
29	43000	12000	4	0	492000

	Mthly_HH_Income	Mthly_HH_Expense	No_of_Fly_Members	Emi_or_Rent_Amt	Annual_HI
30	45000	25000	6	0	
31	45000	40000	6	3500	
32	45000	10000	2	1000	
33	45000	22000	4	2500	
34	46000	25000	5	3500	
35	47000	15000	7	0	
36	50000	20000	4	0	
37	50500	20000	3	0	
38	55000	45000	6	12000	
39	60000	10000	3	0	
40	60000	50000	6	10000	
41	65000	20000	4	5000	
42	70000	9000	2	0	
43	80000	20000	4	0	
44	85000	25000	5	0	
45	90000	48000	7	0	
46	98000	25000	5	0	
47	100000	30000	6	0	
48	100000	50000	4	20000	
49	100000	40000	6	10000	

In [5]: `income_df.head()`

	Mthly_HH_Income	Mthly_HH_Expense	No_of_Fly_Members	Emi_or_Rent_Amt	Annual_HI
0	5000	8000	3	2000	
1	6000	7000	2	3000	
2	10000	4500	2	0	
3	10000	2000	1	0	
4	12500	12000	2	3000	



In [6]: `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 [7]: income_df.shape
```

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

```
In [8]: income_df.columns
```

```
Out[8]: Index(['Mthly_HH_Income', 'Mthly_HH_Expense', 'No_of_Fly_Members',
               'Emi_or_Rent_Amt', 'Annual_HH_Income', 'Highest_Qualified_Member',
               'No_of_Earning_Members'],
              dtype='object')
```

```
In [9]: len(income_df.columns)
```

```
Out[9]: 7
```

```
In [10]: income_df.describe()
```

```
Out[10]:      Mthly_HH_Income  Mthly_HH_Expense  No_of_Fly_Members  Emi_or_Rent_Amt  Annual_HH_Income
count          50.000000        50.000000       50.000000        50.000000        50.000000
mean         41558.000000      18818.000000       4.060000      3060.000000      3500.000000
std          26097.908979      12090.216824      1.517382      6241.434948      3500.000000
min          5000.000000      2000.000000      1.000000       0.000000       0.000000
25%         23550.000000      10000.000000      3.000000       0.000000       0.000000
50%         35000.000000      15500.000000      4.000000       0.000000       0.000000
75%         50375.000000      25000.000000      5.000000      3500.000000      3500.000000
max         100000.000000     50000.000000      7.000000      35000.000000     35000.000000
```



```
In [11]: income_df.isna()
```

Out[11]:	Mthly_HH_Income	Mthly_HH_Expense	No_of_Fly_Members	Emi_or_Rent_Amt	Annual_HH_Income
0	False	False	False	False	False
1	False	False	False	False	False
2	False	False	False	False	False
3	False	False	False	False	False
4	False	False	False	False	False
5	False	False	False	False	False
6	False	False	False	False	False
7	False	False	False	False	False
8	False	False	False	False	False
9	False	False	False	False	False
10	False	False	False	False	False
11	False	False	False	False	False
12	False	False	False	False	False
13	False	False	False	False	False
14	False	False	False	False	False
15	False	False	False	False	False
16	False	False	False	False	False
17	False	False	False	False	False
18	False	False	False	False	False
19	False	False	False	False	False
20	False	False	False	False	False
21	False	False	False	False	False
22	False	False	False	False	False
23	False	False	False	False	False
24	False	False	False	False	False
25	False	False	False	False	False
26	False	False	False	False	False
27	False	False	False	False	False
28	False	False	False	False	False
29	False	False	False	False	False

	Mthly_HH_Income	Mthly_HH_Expense	No_of_Fly_Members	Emi_or_Rent_Amt	Annual_HH_Income
30	False	False	False	False	False
31	False	False	False	False	False
32	False	False	False	False	False
33	False	False	False	False	False
34	False	False	False	False	False
35	False	False	False	False	False
36	False	False	False	False	False
37	False	False	False	False	False
38	False	False	False	False	False
39	False	False	False	False	False
40	False	False	False	False	False
41	False	False	False	False	False
42	False	False	False	False	False
43	False	False	False	False	False
44	False	False	False	False	False
45	False	False	False	False	False
46	False	False	False	False	False
47	False	False	False	False	False
48	False	False	False	False	False
49	False	False	False	False	False

In [12]: `income_df.isna().sum()`

Out[12]:

Mthly_HH_Income	0
Mthly_HH_Expense	0
No_of_Fly_Members	0
Emi_or_Rent_Amt	0
Annual_HH_Income	0
Highest_Qualified_Member	0
No_of_Earning_Members	0
dtype: int64	

In [13]: `income_df.isna().any()`

```
Out[13]: 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
```

```
In [14]: income_df['Mthly_HH_Expense'].mean()
```

```
Out[14]: np.float64(18818.0)
```

```
In [15]: income_df['Mthly_HH_Expense'].median()
```

```
Out[15]: 15500.0
```

```
In [16]: 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()]
```

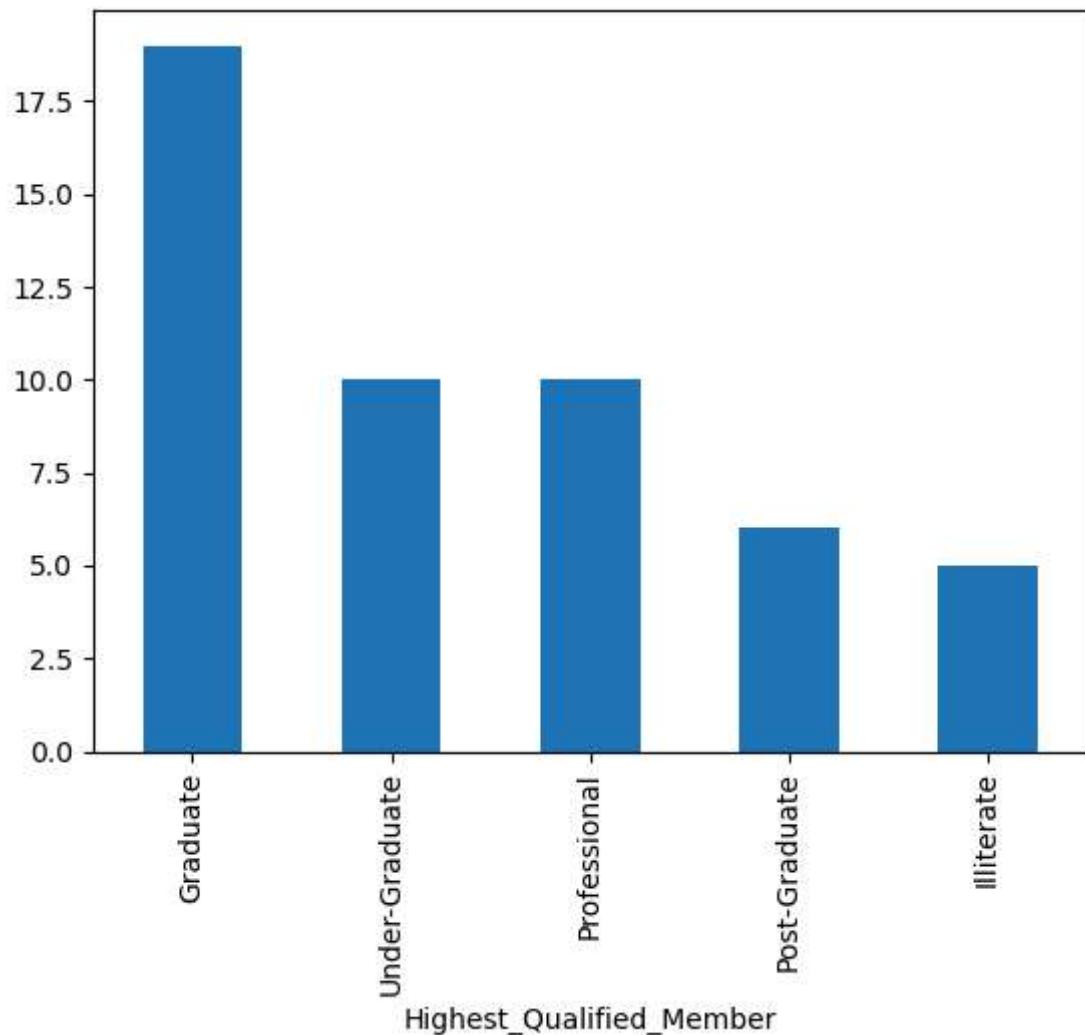
```
Out[16]: col_0  Mthly_HH_Expense  count
          18              25000      8
```

```
In [17]: income_df.columns
```

```
Out[17]: Index(['Mthly_HH_Income', 'Mthly_HH_Expense', 'No_of_Fly_Members',
               'Emi_or_Rent_Amt', 'Annual_HH_Income', 'Highest_Qualified_Member',
               'No_of_Earning_Members'],
               dtype='object')
```

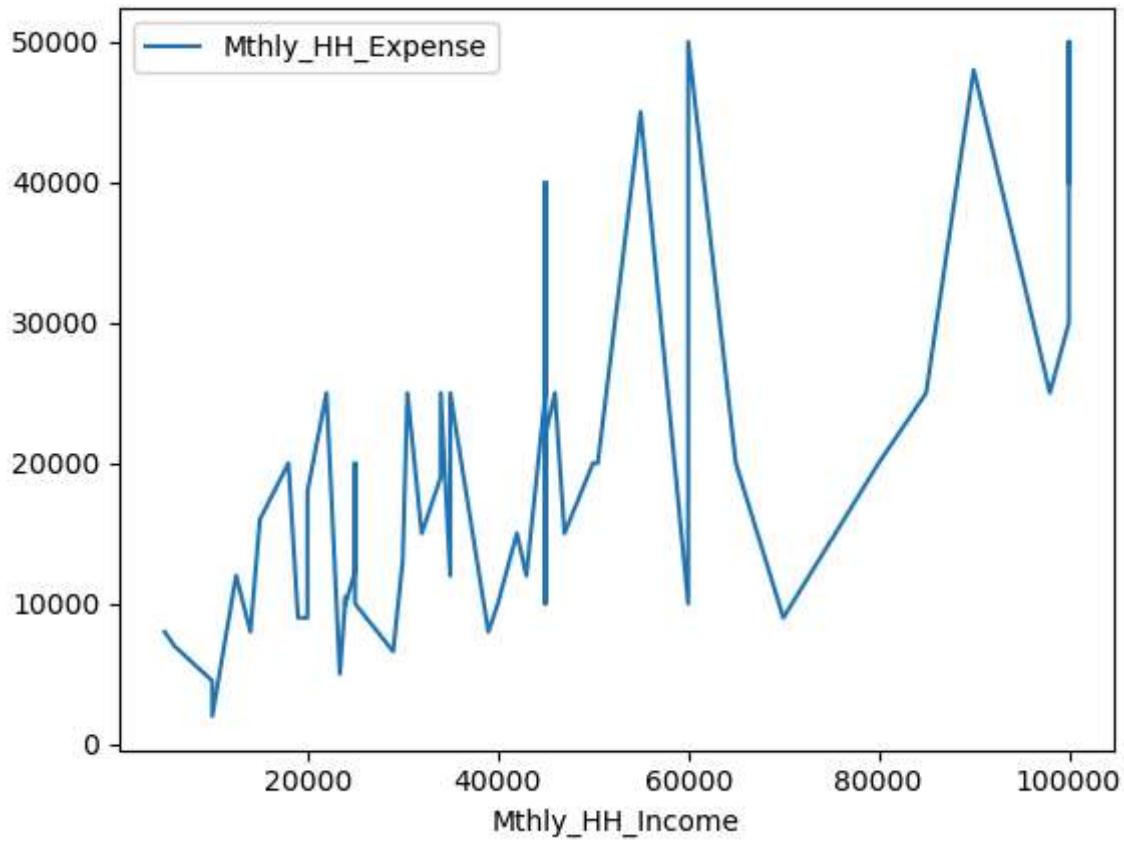
```
In [18]: income_df["Highest_Qualified_Member"].value_counts().plot(kind="bar")
```

```
Out[18]: <Axes: xlabel='Highest_Qualified_Member'>
```



```
In [19]: income_df.plot(x= "Mthly_HH_Income", y= "Mthly_HH_Expense")
```

```
Out[19]: <Axes: xlabel='Mthly_HH_Income'>
```



```
In [20]: IQR=income_df["Mthly_HH_Expense"].quantile(0.75)-income_df["Mthly_HH_Expense"].quantile(0.25)
IQR
```

```
Out[20]: np.float64(15000.0)
```

```
In [21]: IQR=income_df["Mthly_HH_Expense"].quantile(0.50)-income_df["Mthly_HH_Expense"].quantile(0.25)
IQR
```

```
Out[21]: np.float64(5500.0)
```

```
In [22]: income_df["Mthly_HH_Expense"].var()
```

```
Out[22]: 146173342.85714287
```

```
In [23]: income_df["Mthly_HH_Expense"].std()
```

```
Out[23]: 12090.216824240286
```

```
In [27]: coef=income_df["Mthly_HH_Expense"].std()/income_df["Mthly_HH_Expense"].mean()
coef
```

```
Out[27]: np.float64(0.6424814977277227)
```

```
In [ ]:
```