In [49]:
```
import pandas as pd
```

In [4]:
```
df = pd.read_csv("BCG_dataset.csv")
```

In [6]:
```
df
```

Out[6]:

	Company	Year	Total Revenue	Net Income	Total Assets	Total Liabilities	Cash Flow from Operating Expenses
0	Microsoft	2024	245122	88136	512163	243686	118548
1	Microsoft	2023	211915	72361	411976	205753	87582
2	Microsoft	2022	198270	72738	364840	198298	89035
3	Tesla	2024	97690	7153	122070	48390	14923
4	Tesla	2023	96773	14974	106618	43009	13256
5	Tesla	2022	81462	12556	82338	36440	14724
6	Apple	2024	391035	93736	364980	308030	118254
7	Apple	2023	383285	96995	352583	290437	110543
8	Apple	2022	394328	99803	352755	302083	122151

In [10]:
```
df['Revenue Growth (%)'] = df.groupby(['Company'])['Total Revenue'].pct_change() * 100
df['Net Income Growth (%)'] = df.groupby(['Company'])['Net Income'].pct_change() * 100
```

In [19]:
```
df['Revenue Growth (%)'].fillna(0, inplace=True)
df['Net Income Growth (%)'].fillna(0, inplace=True)
```

In [20]:
```
df
```

Out[20]:

	Company	Year	Total Revenue	Net Income	Total Assets	Total Liabilities	Cash Flow from Operating Expenses	Revenue Growth (%)	Net Income Growth (%)
0	Microsoft	2024	245122	88136	512163	243686	118548	0.000000	0.000000
1	Microsoft	2023	211915	72361	411976	205753	87582	-13.547132	-17.898475
2	Microsoft	2022	198270	72738	364840	198298	89035	-6.438902	0.520999
3	Tesla	2024	97690	7153	122070	48390	14923	0.000000	0.000000
4	Tesla	2023	96773	14974	106618	43009	13256	-0.938684	109.338739
5	Tesla	2022	81462	12556	82338	36440	14724	-15.821562	-16.147990
6	Apple	2024	391035	93736	364980	308030	118254	0.000000	0.000000
7	Apple	2023	383285	96995	352583	290437	110543	-1.981920	3.476786
8	Apple	2022	394328	99803	352755	302083	122151	2.881146	2.894995

In [28]:
```
df['Liabilities Growth (%)'] = df.groupby('Company')[' Total Liabilities'].pct_change() * 100
df['Cash Flow from Operations Growth (%)'] = df.groupby('Company')['Cash Flow from Operating Expenses'].pct_change() * 10
```

In [37]:
```
df
```

Out[37]:

	Company	Year	Total Revenue	Net Income	Total Assets	Total Liabilities	Cash Flow from Operating Expenses	Revenue Growth (%)	Net Income Growth (%)	Assets Growth (%)	Liabilities Growth (%)	Cash Flow from Operations Growth (%)
0	Microsoft	2024	245122	88136	512163	243686	118548	0.000000	0.000000	0.000000	0.000000	0.000000
1	Microsoft	2023	211915	72361	411976	205753	87582	-13.547132	-17.898475	-19.561546	-15.566344	-26.121065
2	Microsoft	2022	198270	72738	364840	198298	89035	-6.438902	0.520999	-11.441443	-3.623276	1.659017
3	Tesla	2024	97690	7153	122070	48390	14923	0.000000	0.000000	0.000000	0.000000	0.000000
4	Tesla	2023	96773	14974	106618	43009	13256	-0.938684	109.338739	-12.658311	-11.120066	-11.170676
5	Tesla	2022	81462	12556	82338	36440	14724	-15.821562	-16.147990	-22.772890	-15.273547	11.074231
6	Apple	2024	391035	93736	364980	308030	118254	0.000000	0.000000	0.000000	0.000000	0.000000
7	Apple	2023	383285	96995	352583	290437	110543	-1.981920	3.476786	-3.396624	-5.711457	-6.520710
8	Apple	2022	394328	99803	352755	302083	122151	2.881146	2.894995	0.048783	4.009820	10.500891

In [38]:
```
df['Revenue Growth (%)'].fillna(0, inplace=True)
df['Net Income Growth (%)'].fillna(0, inplace=True)
df['Assets Growth (%)'].fillna(0, inplace=True)
df['Liabilities Growth (%)'].fillna(0, inplace=True)
df['Cash Flow from Operations Growth (%)'].fillna(0, inplace=True)
```

In [39]:
```
df
```

Out[39]:

	Company	Year	Total Revenue	Net Income	Total Assets	Total Liabilities	Cash Flow from Operating Expenses	Revenue Growth (%)	Net Income Growth (%)	Assets Growth (%)	Liabilities Growth (%)	Cash Flow from Operations Growth (%)
0	Microsoft	2024	245122	88136	512163	243686	118548	0.000000	0.000000	0.000000	0.000000	0.000000
1	Microsoft	2023	211915	72361	411976	205753	87582	-13.547132	-17.898475	-19.561546	-15.566344	-26.121065
2	Microsoft	2022	198270	72738	364840	198298	89035	-6.438902	0.520999	-11.441443	-3.623276	1.659017
3	Tesla	2024	97690	7153	122070	48390	14923	0.000000	0.000000	0.000000	0.000000	0.000000
4	Tesla	2023	96773	14974	106618	43009	13256	-0.938684	109.338739	-12.658311	-11.120066	-11.170676
5	Tesla	2022	81462	12556	82338	36440	14724	-15.821562	-16.147990	-22.772890	-15.273547	11.074231
6	Apple	2024	391035	93736	364980	308030	118254	0.000000	0.000000	0.000000	0.000000	0.000000
7	Apple	2023	383285	96995	352583	290437	110543	-1.981920	3.476786	-3.396624	-5.711457	-6.520710
8	Apple	2022	394328	99803	352755	302083	122151	2.881146	2.894995	0.048783	4.009820	10.500891

In [55]:
```
summary = df.groupby('Company', as_index=False).agg({
    'Revenue Growth (%)': 'mean',
    'Net Income Growth (%)': 'mean',
    'Assets Growth (%)': 'mean',
    'Liabilities Growth (%)': 'mean',
    'Cash Flow from Operations Growth (%)': 'mean'
})
print("Overall Growth for Microsoft, Tesla and Apple annually from 2025-2023")
summary
```

```
**Overall Growth for Microsoft, Tesla and Apple annually from 2025-2023**
```

Out[55]:

	Company	Revenue Growth (%)	Net Income Growth (%)	Assets Growth (%)	Liabilities Growth (%)	Cash Flow from Operations Growth (%)
0	Apple	0.299742	2.123927	-1.115947	-0.567212	1.326727
1	Microsoft	-6.662011	-5.792492	-10.334330	-6.396540	-8.154016
2	Tesla	-5.586748	31.063583	-11.810400	-8.797871	-0.032149

In [53]:
```
summary[growth_columns] = summary[growth_columns].round(2) #changing all the data to 2 decimal place
summary
```

Out[53]:

	Company	Revenue Growth (%)	Net Income Growth (%)	Assets Growth (%)	Liabilities Growth (%)	Cash Flow from Operations Growth (%)
0	Apple	0.30	2.12	-1.12	-0.57	1.33
1	Microsoft	-6.66	-5.79	-10.33	-6.40	-8.15
2	Tesla	-5.59	31.06	-11.81	-8.80	-0.03

In [56]:
```
# Microsoft: Ocerall decline across the financial metrics
#Tesla: Net income has the highest growth while others metrics have decreased
# Apple: Revenue and Net income as grew  sligthly while assets and liabilites decreased a little
```