In [110…
```
import pandas as pd
import os
```

Exploratory Data Analysis (EDA) of Financial Reports

This notebook performs an exploratory data analysis on the financial data of Apple, Microsoft, and Tesla. The steps include:

- Loading the data
- Viewing basic information and summary statistics
- Checking for missing values
- Visualizing key metrics such as net income and growth
- Drawing insights from the data

Data Sources and Structure

We use three Excel files containing financial data for Apple, Microsoft, and Tesla. Each file contains key metrics such as net income and other financial indicators.

Load Data

We will load the Excel files for Apple, Microsoft, and Tesla using pandas.

In [111…
```
os.getcwd()
```

Out[111…
```
'/home/pawan/Dev/INTERNSHIPS/forage-BCGx'
```

In [112…
```
os.chdir('/home/pawan/Dev/INTERNSHIPS/forage-BCGx')
```

In [113…
```
appl = pd.read_excel('data/appl_10k.xlsx', sheet_name ='s1')
msft = pd.read_excel('data/msft_10k.xlsx', sheet_name ='Sheet1')
tesla = pd.read_excel('data/tesla_10k.xlsx', sheet_name ='Sheet1')
```

Preview Data

Let's view the first few rows of each dataset to understand their structure.

In [114…
```
# Display first 5 rows of each dataset
print('Apple Data:')
display(appl.head())
print('Microsoft Data:')
display(msft.head())
print('Tesla Data:')
display(tesla.head())
```

```
Apple Data:
```

	Financial Metric	Fiscal Year 2024	Fiscal Year 2023	Fiscal Year 2022
0	Total Revenue	383286	394328	394328
1	Net Income	96995	99803	99803
2	Total Assets	352583	352583	352755
3	Total Liabilities	290437	290437	285138
4	Cash Flow from Operating Activities	110543	110543	110543

```
Microsoft Data:
```

	Financial Figure	Fiscal Year 2025	Fiscal Year 2024	Fiscal Year 2023
0	Total Revenue	264000	245000	211000
1	Net Income	93000	79000	72000
2	Total Assets	484000	454000	411000
3	Total Liabilities	209000	199000	187000
4	Cash Flow from Operating Activities	117000	104000	88000

```
Tesla Data:
```

	Financial Metric	Fiscal Year 2024	Fiscal Year 2023	Fiscal Year 2022
0	Total Revenue	97690	96773	81462
1	Net Income	7153	14974	12587
2	Total Assets	122070	106618	82338
3	Total Liabilities	48390	43009	36440
4	Cash Flow from Operating Activities	14923	13256	14724

Summary Statistics

Let's view basic summary statistics for each dataset to understand the distribution of the financial metrics.

In [115…

```
# Summary statistics for each dataset
print('Apple Summary:')
display(appl.describe())
print('Microsoft Summary:')
display(msft.describe())
print('Tesla Summary:')
display(tesla.describe())
```

```
Apple Summary:
```

	Fiscal Year 2024	Fiscal Year 2023	Fiscal Year 2022
count	5.000000	5.000000	5.000000
mean	246768.800000	249538.800000	248513.400000
std	134842.651135	136926.371248	136583.476685
min	96995.000000	99803.000000	99803.000000
25%	110543.000000	110543.000000	110543.000000
50%	290437.000000	290437.000000	285138.000000
75%	352583.000000	352583.000000	352755.000000
max	383286.000000	394328.000000	394328.000000

```
Microsoft Summary:
```

	Fiscal Year 2025	Fiscal Year 2024	Fiscal Year 2023
count	5.000000	5.000000	5.00000
mean	233400.000000	216200.000000	193800.00000
std	156199.551856	149237.059741	135597.56635
min	93000.000000	79000.000000	72000.00000
25%	117000.000000	104000.000000	88000.00000
50%	209000.000000	199000.000000	187000.00000
75%	264000.000000	245000.000000	211000.00000
max	484000.000000	454000.000000	411000.00000

```
Tesla Summary:
```

	Fiscal Year 2024	Fiscal Year 2023	Fiscal Year 2022
count	5.000000	5.000000	5.000000
mean	58045.200000	54926.000000	45510.200000
std	50531.297784	44434.784702	34506.573695
min	7153.000000	13256.000000	12587.000000
25%	14923.000000	14974.000000	14724.000000
50%	48390.000000	43009.000000	36440.000000
75%	97690.000000	96773.000000	81462.000000
max	122070.000000	106618.000000	82338.000000

Missing Value Analysis

Let's check for missing values in each dataset to ensure data quality.

In [116…

```
# Check for missing values in each dataset
print('Apple Missing Values:')
display(appl.isnull().sum())
print('Microsoft Missing Values:')
display(msft.isnull().sum())
print('Tesla Missing Values:')
display(tesla.isnull().sum())
```

```
Apple Missing Values:
```

```
Financial Metric    0
Fiscal Year 2024    0
Fiscal Year 2023    0
Fiscal Year 2022    0
dtype: int64
Microsoft Missing Values:
Financial Figure    0
Fiscal Year 2025    0
Fiscal Year 2024    0
Fiscal Year 2023    0
dtype: int64
Tesla Missing Values:
Financial Metric    0
Fiscal Year 2024    0
Fiscal Year 2023    0
Fiscal Year 2022    0
dtype: int64
```

Net Growth Increment % and Income Analysis

We will calculate the net growth increment percentage and income for Apple, Microsoft, and Tesla, and visualize these metrics using bar charts for comparison.

Visual Analysis of Key Metrics

We will visualize net income and growth metrics for each company to compare their financial performance.

In [117…

```
# Display column names and first few rows to identify metric column
print('Apple columns:', appl.columns.tolist())
display(appl.head())
print('Microsoft columns:', msft.columns.tolist())
display(msft.head())
print('Tesla columns:', tesla.columns.tolist())
display(tesla.head())
```

```
Apple columns: ['Financial Metric', 'Fiscal Year 2024', 'Fiscal Year 2023', 'Fiscal Ye
ar 2022']
```

	Financial Metric	Fiscal Year 2024	Fiscal Year 2023	Fiscal Year 2022
0	Total Revenue	383286	394328	394328
1	Net Income	96995	99803	99803
2	Total Assets	352583	352583	352755
3	Total Liabilities	290437	290437	285138
4	Cash Flow from Operating Activities	110543	110543	110543

```
Microsoft columns: ['Financial Figure', 'Fiscal Year 2025', 'Fiscal Year 2024', 'Fisca
l Year 2023']
```

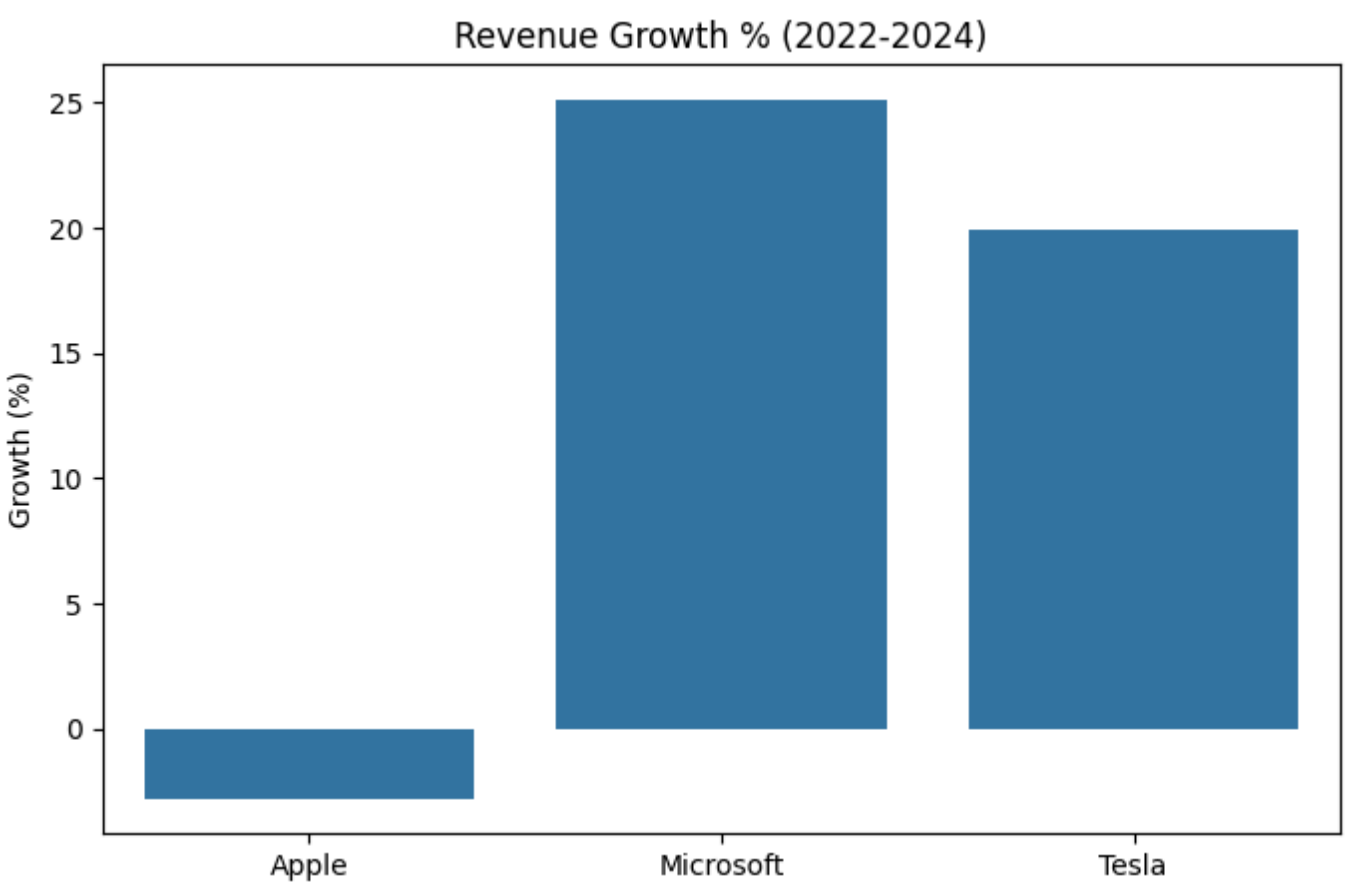
	Financial Figure	Fiscal Year 2025	Fiscal Year 2024	Fiscal Year 2023
0	Total Revenue	264000	245000	211000
1	Net Income	93000	79000	72000
2	Total Assets	484000	454000	411000
3	Total Liabilities	209000	199000	187000
4	Cash Flow from Operating Activities	117000	104000	88000

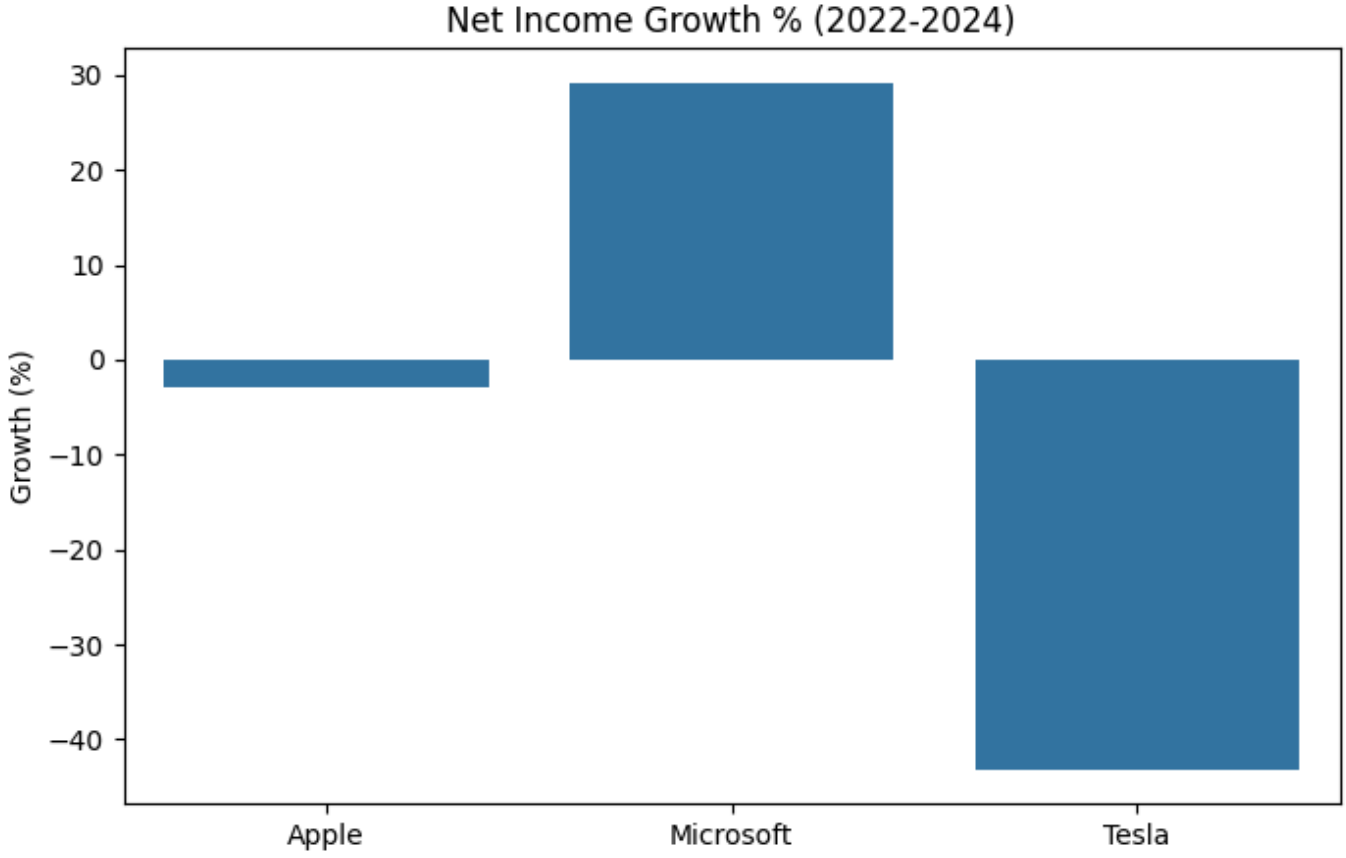
```
Tesla columns: ['Financial Metric', 'Fiscal Year 2024', 'Fiscal Year 2023', 'Fiscal Ye
ar 2022']
```

	Financial Metric	Fiscal Year 2024	Fiscal Year 2023	Fiscal Year 2022
0	Total Revenue	97690	96773	81462
1	Net Income	7153	14974	12587
2	Total Assets	122070	106618	82338
3	Total Liabilities	48390	43009	36440
4	Cash Flow from Operating Activities	14923	13256	14724

In [118…

```python
# Auto-detect the metric column and calculate growth % and net income % for all compa
def find_metric_col(df):
    for col in df.columns:
        if any(x in col.lower() for x in ['metric', 'financial']):
            return col
    return df.columns[0]  # fallback

metric_col_appl = find_metric_col(appl)
metric_col_msft = find_metric_col(msft)
metric_col_tesla = find_metric_col(tesla)

def get_metric(df, metric, metric_col):
    row = df[df[metric_col] == metric]
    return row.iloc[0, 1:].astype(float)

appl_revenue = get_metric(appl, 'Total Revenue', metric_col_appl)
appl_net_income = get_metric(appl, 'Net Income', metric_col_appl)
msft_revenue = get_metric(msft, 'Total Revenue', metric_col_msft)
msft_net_income = get_metric(msft, 'Net Income', metric_col_msft)
tesla_revenue = get_metric(tesla, 'Total Revenue', metric_col_tesla)
tesla_net_income = get_metric(tesla, 'Net Income', metric_col_tesla)

years = appl.columns[1:]  # assumes years are columns 2,3,4

def calc_growth(series):
    return ((series.iloc[0] - series.iloc[-1]) / series.iloc[-1]) * 100

appl_revenue_growth = calc_growth(appl_revenue)
msft_revenue_growth = calc_growth(msft_revenue)
tesla_revenue_growth = calc_growth(tesla_revenue)

appl_net_income_growth = calc_growth(appl_net_income)
msft_net_income_growth = calc_growth(msft_net_income)
tesla_net_income_growth = calc_growth(tesla_net_income)

companies = ['Apple', 'Microsoft', 'Tesla']
revenue_growth = [appl_revenue_growth, msft_revenue_growth, tesla_revenue_growth]
net_income_growth = [appl_net_income_growth, msft_net_income_growth, tesla_net_income

plt.figure(figsize=(8,5))
sns.barplot(x=companies, y=revenue_growth)
plt.title('Revenue Growth % (2022-2024)')
plt.ylabel('Growth (%)')
plt.show()

plt.figure(figsize=(8,5))
sns.barplot(x=companies, y=net_income_growth)
plt.title('Net Income Growth % (2022-2024)')
plt.ylabel('Growth (%)')
plt.show()
```


Revenue Growth % (2022-2024)
Growth (%)
25
20
15
10
5
0
Apple
Microsoft
Tesla


Net Income Growth % (2022-2024)
Growth (%)
30
20
10
0
−10
−20
−30
−40
Apple
Microsoft
Tesla