1. Data Extraction from source

```
import pandas as pd
```

```
from google.colab import drive
drive.mount('/content/drive')
```

```
Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/content/driv
```

```
df = pd.read_csv("/content/drive/MyDrive/Forage/Financials_in_millions.csv")
df
```

	Company Name	Fiscal Year	Total Revenue	Net Income	Total Assets	Total Liabilities	Cash Flow From Operations
0	Microsoft	2024	245,122	88,136	512,163	243,686	118,548
1	Microsoft	2023	211,195	72,361	411,976	205,753	87,582
2	Microsoft	2022	198,270	72,738	364,840	198,298	89,035
3	Tesla	2024	97,690	7,153	122,070	48,390	14,923
4	Tesla	2023	96,773	14,974	106,618	43,009	13,256
5	Tesla	2022	81,462	12,587	82,338	36,440	14,724
6	Apple	2024	391,035	93,736	364,980	308,030	118,254
7	Apple	2023	383,285	96,995	352,583	290,437	110,543
8	Apple	2022	394,328	99,803	352,755	302,083	122,151

Next steps: Generate code with df | New interactive sheet

2. Clean Data for Analysis

```
# Define the columns to be cleaned and converted to numeric
financial_cols = ['Total Revenue', 'Net Income', 'Total Assets', 'Total Liabilities', 'Cash Flow From O

# Clean the data: remove commas and convert to float
for col in financial_cols:
    df[col] = df[col].astype(str).str.replace(',', '', regex=False).astype(float)
```

```
# Sort the DataFrame by Company Name and Fiscal Year for correct YOY calculation
df.sort_values(by=['Company Name', 'Fiscal Year'], inplace=True)
```

3. Year-over-year Growth Metrics

```
# Calculate percentage changes for key financial metrics
df['Revenue Growth (%)'] = df.groupby(['Company Name'])['Total Revenue'].pct_change() * 100
df['Net Income Growth (%)'] = df.groupby(['Company Name'])['Net Income'].pct_change() * 100
df['Assets Growth (%)'] = df.groupby(['Company Name'])['Total Assets'].pct_change() * 100
df['Operating Cash Flow Growth (%)'] = df.groupby(['Company Name'])['Cash Flow From Operations'].pct_ch

# Calculate additional financial ratios (The growth is not calculated here only the % of the year)
df['Profit Margin (%)'] = (df['Net Income'] / df['Total Revenue']) * 100
df['Debt to Assets Ratio'] = (df['Total Liabilities'] / df['Total Assets']) * 100
```

```
df['Return on Assets (%)'] = (df['Net Income'] / df['Total Assets']) * 100

# Display the enhanced dataframe
print("Enhanced Financial Data with Growth Metrics:")
print(df.round(2))
```

```
Enhanced Financial Data with Growth Metrics:
  Company Name  Fiscal Year  Total Revenue  Net Income  Total Assets  \
8        Apple         2022       394328.0     99803.0      352755.0
7        Apple         2023       383285.0     96995.0      352583.0
6        Apple         2024       391035.0     93736.0      364980.0
2    Microsoft         2022       198270.0     72738.0      364840.0
1    Microsoft         2023       211195.0     72361.0      411976.0
0    Microsoft         2024       245122.0     88136.0      512163.0
5        Tesla         2022        81462.0     12587.0       82338.0
4        Tesla         2023        96773.0     14974.0      106618.0
3        Tesla         2024        97690.0      7153.0      122070.0

   Total Liabilities  Cash Flow From Operations  Revenue Growth (%)  \
8           302083.0                   122151.0                 NaN
7           290437.0                   110543.0               -2.80
6           308030.0                   118254.0                2.02
2           198298.0                    89035.0                 NaN
1           205753.0                    87582.0                6.52
0           243686.0                   118548.0               16.06
5            36440.0                    14724.0                 NaN
4            43009.0                    13256.0               18.80
3            48390.0                    14923.0                0.95

   Net Income Growth (%)  Assets Growth (%)  Operating Cash Flow Growth (%)  \
8                    NaN                NaN                             NaN
7                  -2.81              -0.05                           -9.50
6                  -3.36               3.52                            6.98
2                    NaN                NaN                             NaN
1                  -0.52              12.92                           -1.63
0                  21.80              24.32                           35.36
5                    NaN                NaN                             NaN
4                  18.96              29.49                           -9.97
3                 -52.23              14.49                           12.58

   Profit Margin (%)  Debt to Assets Ratio  Return on Assets (%)
8              25.31                 85.64                 28.29
7              25.31                 82.37                 27.51
6              23.97                 84.40                 25.68
2              36.69                 54.35                 19.94
1              34.26                 49.94                 17.56
0              35.96                 47.58                 17.21
5              15.45                 44.26                 15.29
4              15.47                 40.34                 14.04
3               7.32                 39.64                  5.86
```

4. Company Perfomance Analysis

```
# Latest year performance (2024)
latest_data = df[df['Fiscal Year'] == 2024].copy()
latest_data = latest_data.sort_values('Total Revenue', ascending=False)

print("\n2024 Financial Performance Summary:")
print(latest_data[['Company Name', 'Total Revenue', 'Net Income', 'Profit Margin (%)', 'Return on Assets
```

```
2024 Financial Performance Summary:
  Company Name  Total Revenue  Net Income  Profit Margin (%)  \
6        Apple       391035.0     93736.0              23.97
0    Microsoft       245122.0     88136.0              35.96
3        Tesla        97690.0      7153.0               7.32

   Return on Assets (%)
6                 25.68
0                 17.21
3                  5.86
```

5. Multi-Year Trend Analysis

```
# Create a pivot table for better trend visualization
revenue_trends = df.pivot(index='Fiscal Year', columns='Company Name', values='Total Revenue')
income_trends = df.pivot(index='Fiscal Year', columns='Company Name', values='Net Income')

print("\nRevenue Trends (in millions):")
print(revenue_trends)

print("\nNet Income Trends (in millions):")
print(income_trends)
```

```
Revenue Trends (in millions):
Company Name     Apple  Microsoft    Tesla
Fiscal Year
2022          394328.0   198270.0  81462.0
2023          383285.0   211195.0  96773.0
2024          391035.0   245122.0  97690.0

Net Income Trends (in millions):
Company Name    Apple  Microsoft    Tesla
Fiscal Year
2022          99803.0    72738.0  12587.0
2023          96995.0    72361.0  14974.0
2024          93736.0    88136.0   7153.0
```

6. Growth Rate Comparison

```
# Calculate average growth rates by company
growth_summary = df.groupby('Company Name').agg({
    'Revenue Growth (%)': 'mean',
    'Net Income Growth (%)': 'mean',
    'Assets Growth (%)': 'mean',
    'Operating Cash Flow Growth (%)': 'mean'
}).round(2)

print("\nAverage Annual Growth Rates by Company (%):")
print(growth_summary)
```

```
Average Annual Growth Rates by Company (%):
              Revenue Growth (%)  Net Income Growth (%)  Assets Growth (%)  \
Company Name
Apple                      -0.39                  -3.09               1.73
Microsoft                  11.29                  10.64              18.62
Tesla                       9.87                 -16.63              21.99

              Operating Cash Flow Growth (%)
Company Name
Apple                                  -1.26
Microsoft                              16.86
Tesla                                   1.30
```

7. Financial Health Indicator

```
# Financial health analysis
health_metrics = df.groupby('Company Name').agg({
    'Profit Margin (%)': 'mean',
    'Debt to Assets Ratio': 'mean',
    'Return on Assets (%)': 'mean'
}).round(2)

print("\nAverage Financial Health Metrics by Company:")
print(health_metrics)
```

```
Average Financial Health Metrics by Company:
              Profit Margin (%)  Debt to Assets Ratio  Return on Assets (%)
Company Name
Apple                     24.86                 84.14                 27.16
Microsoft                 35.63                 50.62                 18.24
Tesla                     12.75                 41.41                 11.73
```

8. Summary of findings

Revenue Performance

- **Apple** maintains the highest revenue base (~$389M average) but showed a slight decline in 2023 before recovering in 2024
- **Microsoft** demonstrates strong, consistent revenue growth with a 16% increase from 2023 to 2024
- **Tesla** shows moderate revenue growth but at a slower pace compared to the other companies

Profitability Analysis

- **Microsoft** shows impressive net income growth of 21.8% in 2024, reaching $88.1M
- **Apple** maintains strong profitability but experienced a slight decline in net income from 2022-2024
- **Tesla** shows significant volatility in net income, with a dramatic 52% decline in 2024 despite revenue growth

Financial Health

- **Microsoft** demonstrates excellent profit margins (~35%) and strong operational cash flow growth
- **Apple** maintains solid profitability but shows higher debt-to-assets ratio (~84%)
- **Tesla** has the lowest profit margins (~11%) and shows inconsistent cash flow patterns

Asset Growth & Efficiency

- **Microsoft** shows the strongest asset growth, expanding its asset base by 24% in 2024
- **All companies** maintained positive return on assets, with Microsoft leading at approximately 19%
- Tesla shows the most aggressive asset growth but with lower returns on those assets

Key Observations

1. Microsoft is experiencing the strongest overall growth across all metrics
2. **Apple** maintains market leadership in revenue but shows signs of growth plateauing
3. **Tesla** demonstrates the most volatility, with significant swings in profitability despite steady revenue growth

All companies maintained positive operational cash flow, indicating healthy core business operations