notebook

July 10, 2024

[1]:
```
import pandas as pd
```

[2]:
```
df = pd.read_csv("10K.csv")
```

[3]:
```
df.shape
```

[3]:
```
(9, 7)
```

[4]:
```
df
```

[4]:

	Company	Year	Total Revenue	Net Income	Total Assets	Total Liabilities	Cash Flow
0	Microsoft	2023	211,915,000,000	72,361,000,000	411,976,000,000	205,753,000,000	87,582,000,000
1	Microsoft	2022	198,270,000,000	72,738,000,000	364,840,000,000	198,298,000,000	89,035,000,000
2	Microsoft	2021	168,088,000,000	61,271,000,000	333,779,000,000	191,791,000,000	76,740,000,000
3	Tesla	2023	96,773,000,000	14,974,000,000	106,618,000,000	43,009,000,000	13,256,000,000
4	Tesla	2022	81,462,000,000	12,587,000,000	82,338,000,000	36,440,000,000	14,724,000,000
5	Tesla	2021	53,823,000,000	5,644,000,000	62,131,000,000	30,548,000,000	11,497,000,000
6	Apple	2023	383,285,000,000	96,995,000,000	352,583,000,000	290,437,000,000	110,543,000,000
7	Apple	2022	394,328,000,000	99,803,000,000	352,755,000,000	302,083,000,000	122,151,000,000
8	Apple	2021	365,817,000,000	94,680,000,000	351,022,000,000	287,912,000,000	104,038,000,000

[5]:
```
df.describe()
```

[5]:

	Year
count	9.000000
mean	2022.000000
std	0.866025

```
min    2021.000000
25%    2021.000000
50%    2022.000000
75%    2023.000000
max    2023.000000
```

[6]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 9 entries, 0 to 8
Data columns (total 7 columns):
 #   Column             Non-Null Count  Dtype 
---  ------             --------------  ----- 
 0   Company            9 non-null      object
 1   Year               9 non-null      int64 
 2   Total Revenue      9 non-null      object
 3   Net Income         9 non-null      object
 4   Total Assets       9 non-null      object
 5   Total Liabilities  9 non-null      object
 6   Cash Flow          9 non-null      object
dtypes: int64(1), object(6)
memory usage: 636.0+ bytes
```

Typecasting Object to Int

[7]:
```
def con_dtype(val):

    val = val.replace(",","")
    return int(val)

con_dtype("10,000,000")
```

[7]:
```
10000000
```

[8]:
```
exception = ["Company","Year"]
for i in df.columns:
    if i not in exception:
        df[i] = df[i].apply(con_dtype)
```

[9]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 9 entries, 0 to 8
Data columns (total 7 columns):
 #   Column             Non-Null Count  Dtype 
---  ------             --------------  ----- 
 0   Company            9 non-null      object
 1   Year               9 non-null      int64 
 2   Total Revenue      9 non-null      int64 
```

```
 3   Net Income          9 non-null      int64
 4   Total Assets        9 non-null      int64
 5   Total Liabilities   9 non-null      int64
 6   Cash Flow           9 non-null      int64
dtypes: int64(6), object(1)
memory usage: 636.0+ bytes
```

[10]:
```
df = df.sort_values(['Company','Year'],ascending=True).groupby('Company').head()
df
```

[10]:

	Company	Year	Total Revenue	Net Income	Total Assets	Total Liabilities	Cash Flow
8	Apple	2021	365817000000	94680000000	351022000000	287912000000	104038000000
7	Apple	2022	394328000000	99803000000	352755000000	302083000000	122151000000
6	Apple	2023	383285000000	96995000000	352583000000	290437000000	110543000000
2	Microsoft	2021	168088000000	61271000000	333779000000	191791000000	76740000000
1	Microsoft	2022	198270000000	72738000000	364840000000	198298000000	89035000000
0	Microsoft	2023	211915000000	72361000000	411976000000	205753000000	87582000000
5	Tesla	2021	53823000000	5644000000	62131000000	30548000000	11497000000
4	Tesla	2022	81462000000	12587000000	82338000000	36440000000	14724000000
3	Tesla	2023	96773000000	14974000000	106618000000	43009000000	13256000000

Total Revenue:

[11]:
```
revenue = pd.DataFrame()
revenue['Company'] = df['Company']
revenue['Year'] = df['Year']
revenue['Total Revenue'] = df['Total Revenue']
revenue['Revenue Growth (%)'] = df.groupby(['Company'])['Total Revenue'].
 ↪pct_change() * 100
revenue
```

[11]:

	Company	Year	Total Revenue	Revenue Growth (%)
8	Apple	2021	365817000000	NaN
7	Apple	2022	394328000000	7.793788
6	Apple	2023	383285000000	-2.800461
2	Microsoft	2021	168088000000	NaN
1	Microsoft	2022	198270000000	17.956071

```
0  Microsoft  2023   211915000000            6.882030
5      Tesla  2021    53823000000                 NaN
4      Tesla  2022    81462000000           51.351653
3      Tesla  2023    96773000000           18.795267
```

- All the three companies had an increase in total revenue from the year 2021 to 2022.
- The growth of revenue slowed for Microsoft and Tesla in the year 2023 while Apple growth of revenue decreased to negative for 2023.

Net Income:

[12]:
```
income = pd.DataFrame(columns=['Company','Year','Net Income','Net Income Growth␣
 ↪(%)'])
income['Company'] = df['Company']
income['Year'] = df['Year']
income['Net Income'] = df['Net Income']
income['Net Income Growth (%)'] = df.groupby(['Company'])['Net Income'].
 ↪pct_change() * 100
income
```

[12]:
```
     Company  Year   Net Income  Net Income Growth (%)
8      Apple  2021  94680000000                    NaN
7      Apple  2022  99803000000               5.410858
6      Apple  2023  96995000000              -2.813543
2  Microsoft  2021  61271000000                    NaN
1  Microsoft  2022  72738000000              18.715216
0  Microsoft  2023  72361000000              -0.518299
5      Tesla  2021   5644000000                    NaN
4      Tesla  2022  12587000000             123.015592
3      Tesla  2023  14974000000              18.964010
```

- All the three companies had an increase in net income from the year 2021 to 2022.
- Net income growth decreased for Apple and Microsoft in the year 2023 while Tesla had an increase in net income growth.

Assets:

[13]:
```
assets = pd.DataFrame(columns=['Company','Year','Total Assets','Total Assets␣
 ↪Growth (%)'])
assets['Company'] = df['Company']
assets['Year'] = df['Year']
assets['Total Assets'] = df['Total Assets']
assets['Total Assets Growth (%)'] = df.groupby(['Company'])['Total Assets'].
 ↪pct_change() * 100
assets
```

[13]:
```
     Company  Year  Total Assets  Total Assets Growth (%)
8      Apple  2021  351022000000                      NaN
```

7	Apple	2022	352755000000	0.493701
6	Apple	2023	352583000000	-0.048759
2	Microsoft	2021	333779000000	NaN
1	Microsoft	2022	364840000000	9.305858
0	Microsoft	2023	411976000000	12.919636
5	Tesla	2021	62131000000	NaN
4	Tesla	2022	82338000000	32.523217
3	Tesla	2023	106618000000	29.488207

- `All the three companies` had an `increase` in `total assets` from the year `2021 to 2022` with `Apple` having very `minimal growth` of `~0.5%`.
- The `growth of total assets slowed down` for `Tesla` in the year `2023` while it continued to `increase` for `Microsoft`. Meanwhile, `Apple` had a very `slight decrease` in `total assets` for 2023

Liability:

[14]:
```
liability = pd.DataFrame(columns=['Company','Year','Total Liabilities','Total␣
 ↪Liabilities Growth (%)'])
liability['Company'] = df['Company']
liability['Year'] = df['Year']
liability['Total Liabilities'] = df['Total Liabilities']
liability['Total Liabilities Growth (%)'] = df.groupby(['Company'])['Total␣
 ↪Liabilities'].pct_change() * 100
liability
```

[14]:

	Company	Year	Total Liabilities	Total Liabilities Growth (%)
8	Apple	2021	287912000000	NaN
7	Apple	2022	302083000000	4.921990
6	Apple	2023	290437000000	-3.855232
2	Microsoft	2021	191791000000	NaN
1	Microsoft	2022	198298000000	3.392756
0	Microsoft	2023	205753000000	3.759493
5	Tesla	2021	30548000000	NaN
4	Tesla	2022	36440000000	19.287678
3	Tesla	2023	43009000000	18.026894

- `All the three companies` had an `increase` in `total liabilities` from the year `2021 to 2022`.
- The `growth of total liabilities slowed down` for `Tesla` in the year `2023` while it continued to `increase` for `Microsoft`. Meanwhile, `Apple` had a `considerable decrease` in `total liabilities` for 2023.

Cashflow:

[15]:
```
cashflow = pd.DataFrame(columns=['Company','Year','Cash Flow','Cash Flow Growth␣
 ↪(%)'])
cashflow['Company'] = df['Company']
cashflow['Year'] = df['Year']
```

```
cashflow['Cash Flow'] = df['Cash Flow']
cashflow['Cash Flow Growth (%)'] = df.groupby(['Company'])['Cash Flow'].
 ↪pct_change() * 100
cashflow
```

[15]:

	Company	Year	Cash Flow	Cash Flow Growth (%)
8	Apple	2021	104038000000	NaN
7	Apple	2022	122151000000	17.409985
6	Apple	2023	110543000000	-9.502992
2	Microsoft	2021	76740000000	NaN
1	Microsoft	2022	89035000000	16.021631
0	Microsoft	2023	87582000000	-1.631942
5	Tesla	2021	11497000000	NaN
4	Tesla	2022	14724000000	28.068192
3	Tesla	2023	13256000000	-9.970117

- All the three companies had an increase in operations cash flow from the year 2021 to 2022.
- The cash flow rate decreased for all three companies in the year 2023 with Microsoft having the least decrease.