Matplotlib is a Python 2D plotting library that produces high-quality charts and figures, which helps us visualize extensive data to understand better. Pandas is a handy and useful data-structure tool for analyzing large and complex data.

Exercise 1: Read Total profit of all months and show it using a line plot

```
#df = pd.read_excel(r'Path where the Excel file is stored\File
name.xlsx')
#print(df)
```

```
import pandas as pd
import matplotlib.pyplot as plt
```

```
df = pd.read_csv("company_sales_data.csv")
```

```
df
```

```
    month_number  facecream  facewash  toothpaste  bathingsoap
shampoo  \
0              1       2500      1500        5200         9200
1200
1              2       2630      1200        5100         6100
2100
2              3       2140      1340        4550         9550
3550
3              4       3400      1130        5870         8870
1870
4              5       3600      1740        4560         7760
1560
5              6       2760      1555        4890         7490
1890
6              7       2980      1120        4780         8980
1780
7              8       3700      1400        5860         9960
2860
8              9       3540      1780        6100         8100
2100
9             10       1990      1890        8300        10300
2300
10            11       2340      2100        7300        13300
2400
11            12       2900      1760        7400        14400
1800

    moisturizer  total_units  total_profit
0          1500        21100        211000
1          1200        18330        183300
2          1340        22470        224700
3          1130        22270        222700
4          1740        20960        209600
```

```
5           1555         20140         201400
6           1120         29550         295500
7           1400         36140         361400
8           1780         23400         234000
9           1890         26670         266700
10          2100         41280         412800
11          1760         30020         300200
```

```
profitList = df ['total_profit'].tolist()
monthList  = df ['month_number'].tolist()
```

```
profitList
```

```
[211000,
 183300,
 224700,
 222700,
 209600,
 201400,
 295500,
 361400,
 234000,
 266700,
 412800,
 300200]
```

```
monthList
```

```
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12]
```

```
plt.plot(monthList, profitList, label = 'Month-wise Profit data of
last year')
plt.xlabel('Month number')
plt.ylabel('Profit in dollar')
plt.xticks(monthList)
plt.title('Company profit per month')
plt.yticks([100000, 200000, 300000, 400000, 500000])
plt.show()
```

Exercise 2: Get total profit of all months and show line plot with the following Style properties

Generated line plot must include following Style properties: –

Line Style dotted and Line-color should be red

Show legend at the lower right location.

X label name = Month Number

Y label name = Sold units number

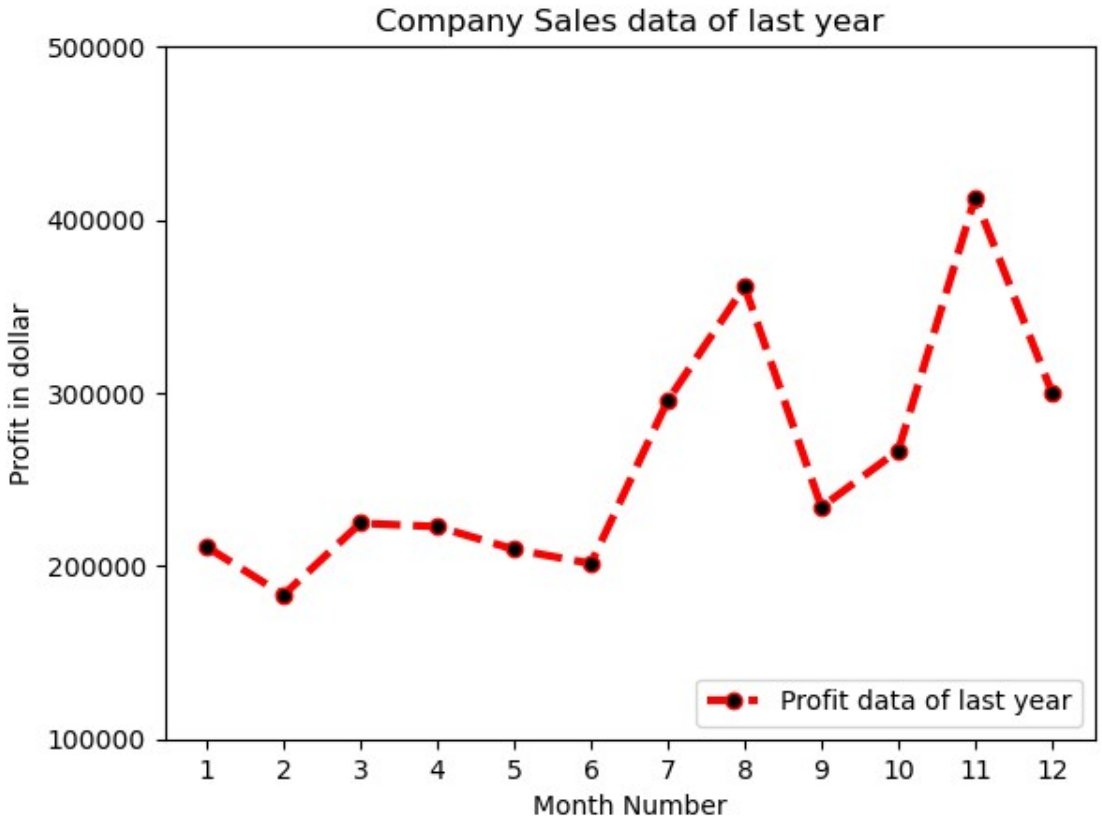
Add a circle marker.

Line marker color as read

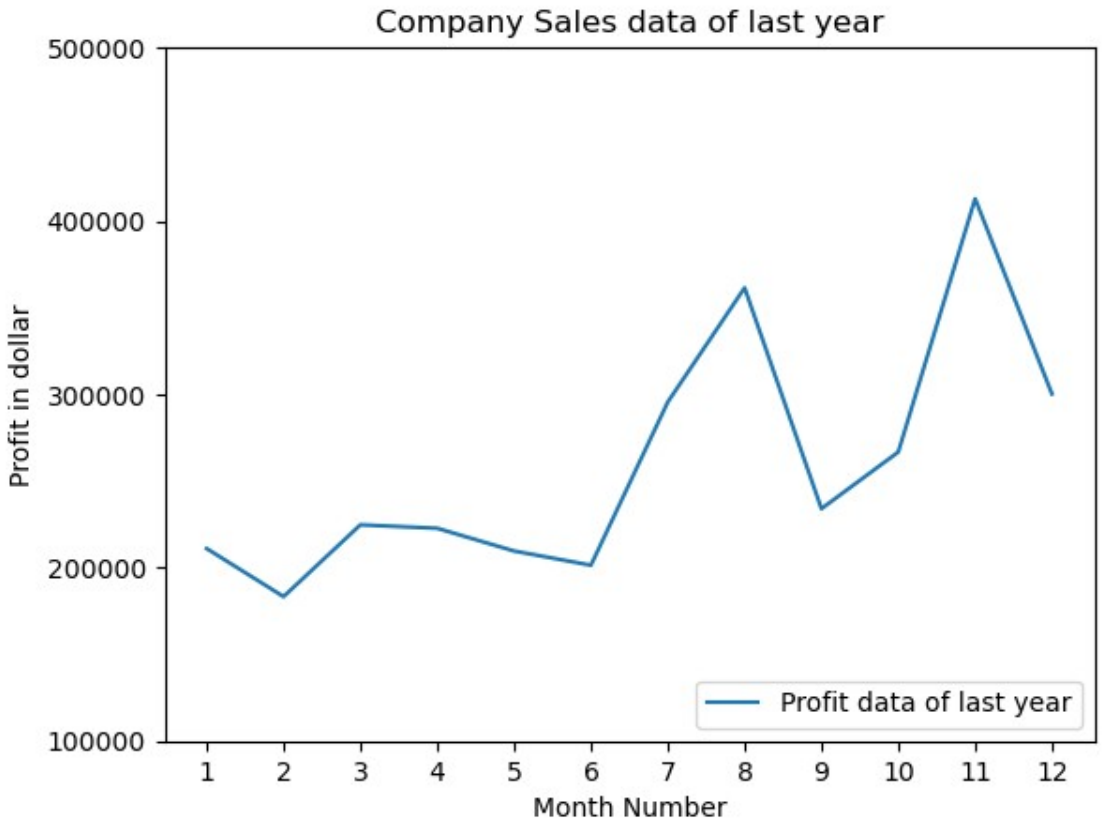
Line width should be 3

```
plt.plot(monthList, profitList, label = 'Profit data of last year',
      color='r', marker='o', markerfacecolor='k',
      linestyle='--', linewidth=3)

plt.xlabel('Month Number')
plt.ylabel('Profit in dollar')
plt.legend(loc='lower right')
```

```
plt.title('Company Sales data of last year')
plt.xticks(monthList)
plt.yticks([100000, 200000, 300000, 400000, 500000])
plt.show()
```




```
plt.plot(monthList, profitList, label = 'Profit data of last year')

plt.xlabel('Month Number')
plt.ylabel('Profit in dollar')
plt.legend(loc='lower right')
plt.title('Company Sales data of last year')
plt.xticks(monthList)
plt.yticks([100000, 200000, 300000, 400000, 500000])
plt.show()
```

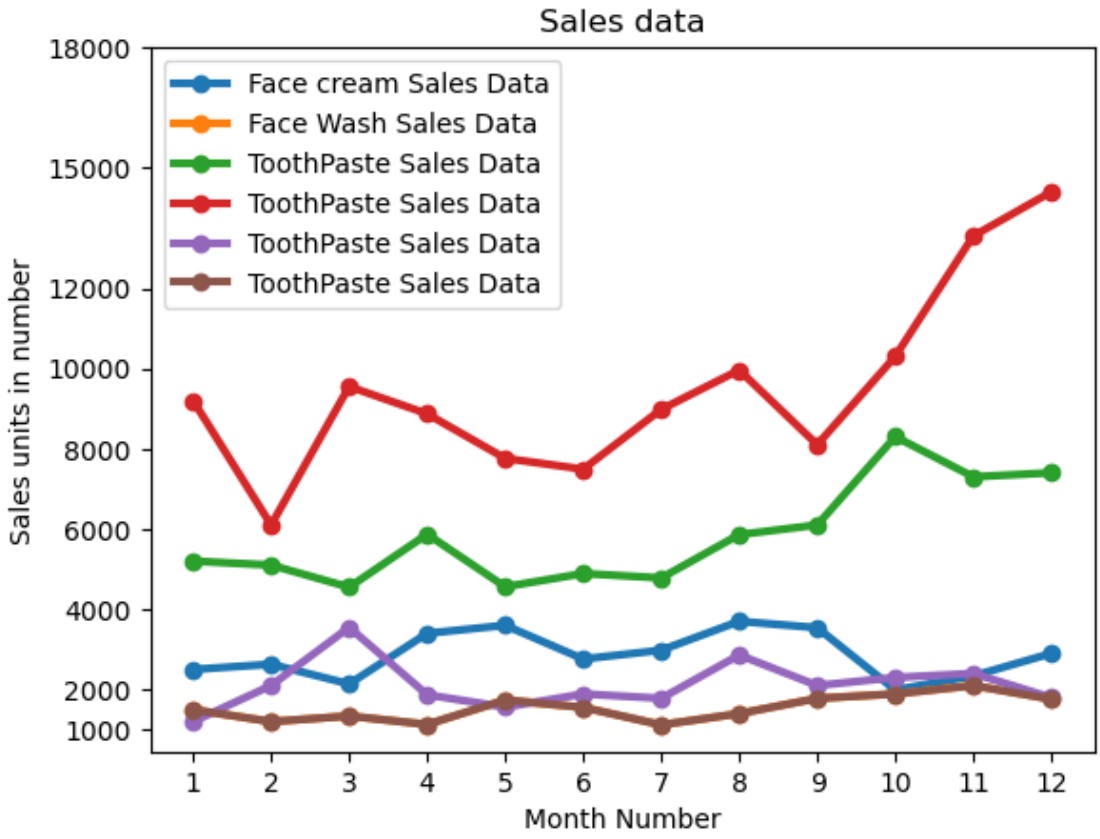


Exercise 3: Read all product sales data and show it using a multiline plot

Display the number of units sold per month for each product using multiline plots. (i.e., Separate Plotline for each product).

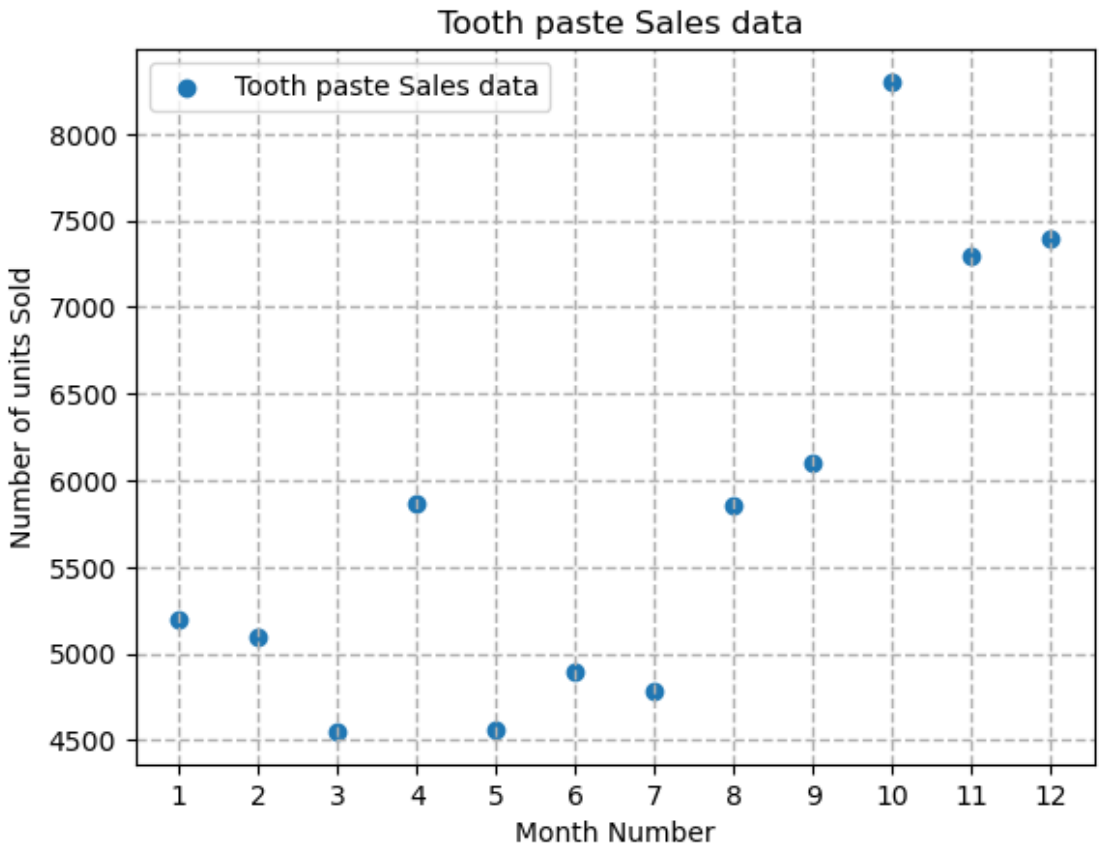
```
monthList  = df ['month_number'].tolist()
faceCremSalesData   = df ['facecream'].tolist()
faceWashSalesData   = df ['facewash'].tolist()
toothPasteSalesData = df ['toothpaste'].tolist()
bathingsoapSalesData   = df ['bathingsoap'].tolist()
shampooSalesData   = df ['shampoo'].tolist()
moisturizerSalesData = df ['moisturizer'].tolist()

plt.plot(monthList, faceCremSalesData,   label = 'Face cream Sales
Data', marker='o', linewidth=3)
plt.plot(monthList, faceWashSalesData,   label = 'Face Wash Sales
Data',  marker='o', linewidth=3)
plt.plot(monthList, toothPasteSalesData, label = 'ToothPaste Sales
Data', marker='o', linewidth=3)
plt.plot(monthList, bathingsoapSalesData, label = 'ToothPaste Sales
Data', marker='o', linewidth=3)
plt.plot(monthList, shampooSalesData, label = 'ToothPaste Sales Data',
marker='o', linewidth=3)
plt.plot(monthList, moisturizerSalesData, label = 'ToothPaste Sales
Data', marker='o', linewidth=3)
```

```
plt.xlabel('Month Number')
plt.ylabel('Sales units in number')
plt.legend(loc='upper left')
plt.xticks(monthList)
plt.yticks([1000, 2000, 4000, 6000, 8000, 10000, 12000, 15000, 18000])
plt.title('Sales data')
plt.show()
```



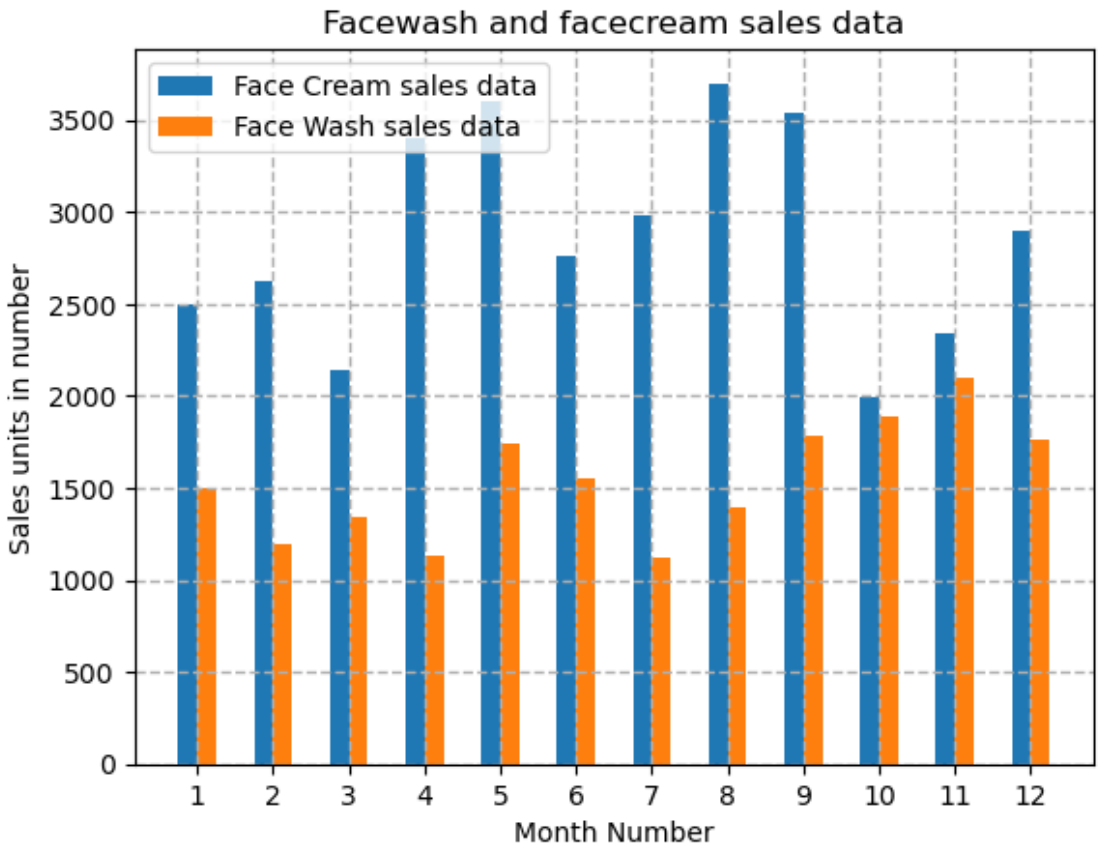
Exercise 4: Read toothpaste sales data of each month and show it using a scatter plot

```
monthList  = df ['month_number'].tolist()
toothPasteSalesData = df ['toothpaste'].tolist()
plt.scatter(monthList, toothPasteSalesData, label = 'Tooth paste Sales
data')
plt.xlabel('Month Number')
plt.ylabel('Number of units Sold')
plt.legend(loc='upper left')
plt.title(' Tooth paste Sales data')
plt.xticks(monthList)
plt.grid(True, linewidth= 1, linestyle="--")
plt.show()
```



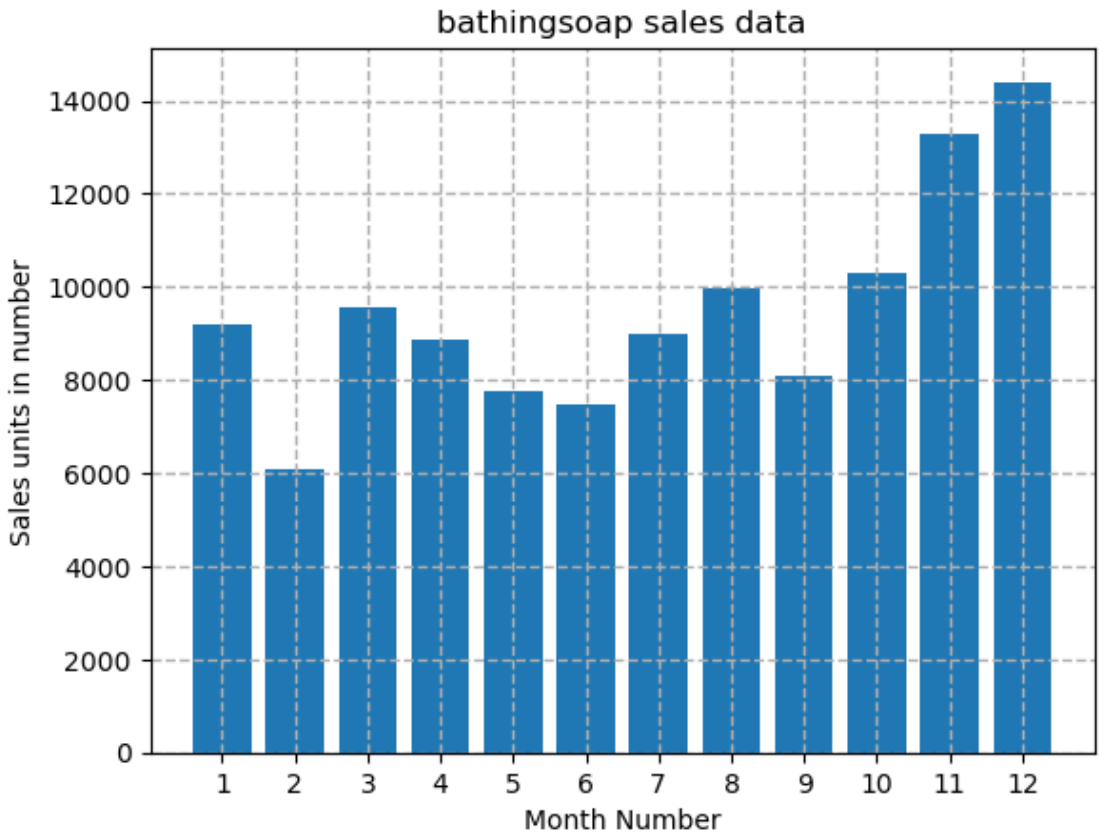
Exercise 5: Read face cream and facewash product sales data and show it using the bar chart

```
monthList  = df ['month_number'].tolist()
faceCremSalesData   = df ['facecream'].tolist()
faceWashSalesData   = df ['facewash'].tolist()

plt.bar([a-0.25 for a in monthList], faceCremSalesData, width= 0.25,
label = 'Face Cream sales data', align='edge')
plt.bar([a+0.25 for a in monthList], faceWashSalesData, width= -0.25,
label = 'Face Wash sales data', align='edge')
plt.xlabel('Month Number')
plt.ylabel('Sales units in number')
plt.legend(loc='upper left')
plt.title(' Sales data')

plt.xticks(monthList)
plt.grid(True, linewidth= 1, linestyle="--")
plt.title('Facewash and facecream sales data')
plt.show()
```



Exercise 6: Read sales data of bathing soap of all months and show it using a bar chart. Save this plot to your hard disk

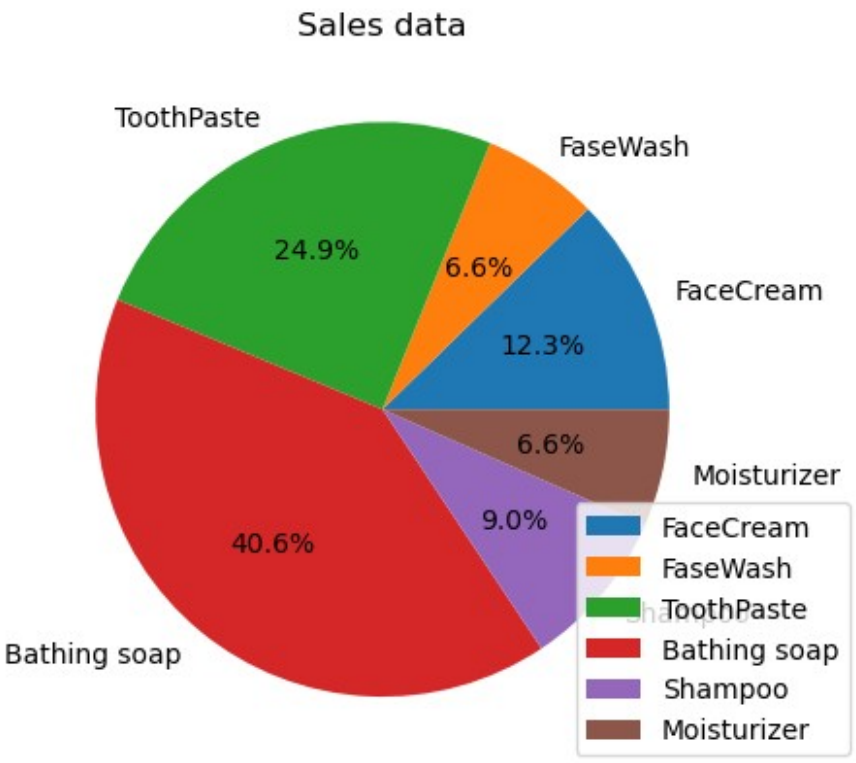
```
import pandas as pd
import matplotlib.pyplot as plt

df = pd.read_csv("company_sales_data.csv")
monthList  = df ['month_number'].tolist()
bathingsoapSalesData   = df ['bathingsoap'].tolist()
plt.bar(monthList, bathingsoapSalesData)
plt.xlabel('Month Number')
plt.ylabel('Sales units in number')
plt.title(' Sales data')
plt.xticks(monthList)
plt.grid(True, linewidth= 1, linestyle="--")
plt.title('bathingsoap sales data')
plt.savefig('sales_data_of_bathingsoap.png', dpi=150)
plt.show()
```



Exercise 8: Calculate total sale data for last year for each product and show it using a Pie chart

In Pie chart display Number of units sold per year for each product in percentage.

```
monthList  = df ['month_number'].tolist()

labels = ['FaceCream', 'FaseWash', 'ToothPaste', 'Bathing soap',
'Shampoo', 'Moisturizer']
salesData   = [df ['facecream'].sum(), df ['facewash'].sum(), df
['toothpaste'].sum(),
         df ['bathingsoap'].sum(), df ['shampoo'].sum(), df
['moisturizer'].sum()]
plt.axis("equal")
plt.pie(salesData, labels=labels, autopct='%1.1f%%')
plt.legend(loc='lower right')
plt.title('Sales data')
plt.show()
```



Exercise 9: Read Bathing soap facewash of all months and display it using the Subplot

```
monthList  = df ['month_number'].tolist()
bathingsoap   = df ['bathingsoap'].tolist()
faceWashSalesData   = df ['facewash'].tolist()

f, axarr = plt.subplots(2, sharex=True)
axarr[0].plot(monthList, bathingsoap, label = 'Bathingsoap Sales
Data', color='k', marker='o', linewidth=3)
axarr[0].set_title('Sales data of  a Bathingsoap')
axarr[1].plot(monthList, faceWashSalesData, label = 'Face Wash Sales
Data', color='r', marker='o', linewidth=3)
axarr[1].set_title('Sales data of  a facewash')

plt.xticks(monthList)
plt.xlabel('Month Number')
plt.ylabel('Sales units in number')
plt.show()
```

Exercise Question 10: Read all product sales data and show it using the stack plot

```
monthList  = df ['month_number'].tolist()

faceCremSalesData   = df ['facecream'].tolist()
faceWashSalesData   = df ['facewash'].tolist()
toothPasteSalesData = df ['toothpaste'].tolist()
bathingsoapSalesData   = df ['bathingsoap'].tolist()
shampooSalesData   = df ['shampoo'].tolist()
moisturizerSalesData = df ['moisturizer'].tolist()

plt.plot([],[],color='m', label='face Cream', linewidth=5)
plt.plot([],[],color='c', label='Face wash', linewidth=5)
plt.plot([],[],color='r', label='Tooth paste', linewidth=5)
plt.plot([],[],color='k', label='Bathing soap', linewidth=5)
plt.plot([],[],color='g', label='Shampoo', linewidth=5)
plt.plot([],[],color='y', label='Moisturizer', linewidth=5)

plt.stackplot(monthList, faceCremSalesData, faceWashSalesData,
toothPasteSalesData,
              bathingsoapSalesData, shampooSalesData,
moisturizerSalesData,
              colors=['m','c','r','k','g','y'])
```

```
plt.xlabel('Month Number')
plt.ylabel('Sales unints in Number')
plt.title('Alll product sales data using stack plot')
plt.legend(loc='upper left')
plt.show()
```