Pandas + Matplotlib

COMPANY DATA

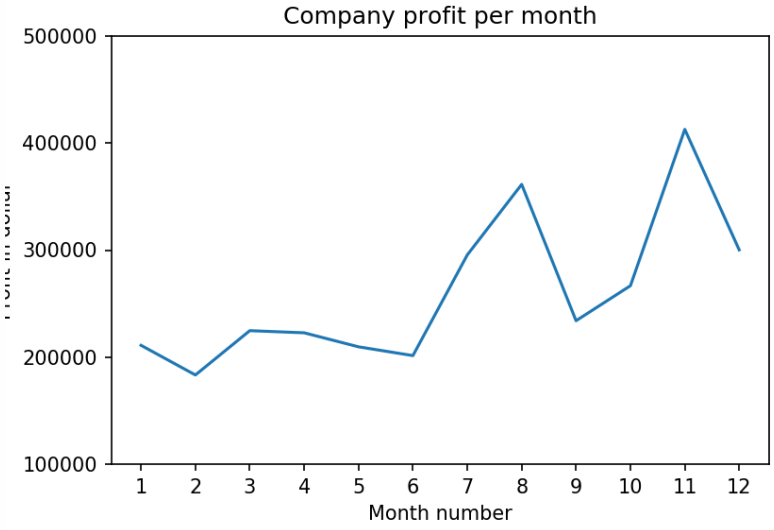
This exercise contains ten questions. The solution is provided for each issue. Each question includes a specific Matplotlib topic you need to learn. When you complete each question, you get more familiar with Data visualization using matplotlib.

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

Total profit data provided for each month. Generated line plot must include the following properties: –

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

df = pd.read_csv("D:\\Python\\Articles\\matplotlib\\sales_data.csv")
profitList = df ['total_profit'].tolist()
monthList  = df ['month_number'].tolist()
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()
```



The Line plot should look something like this.

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: –

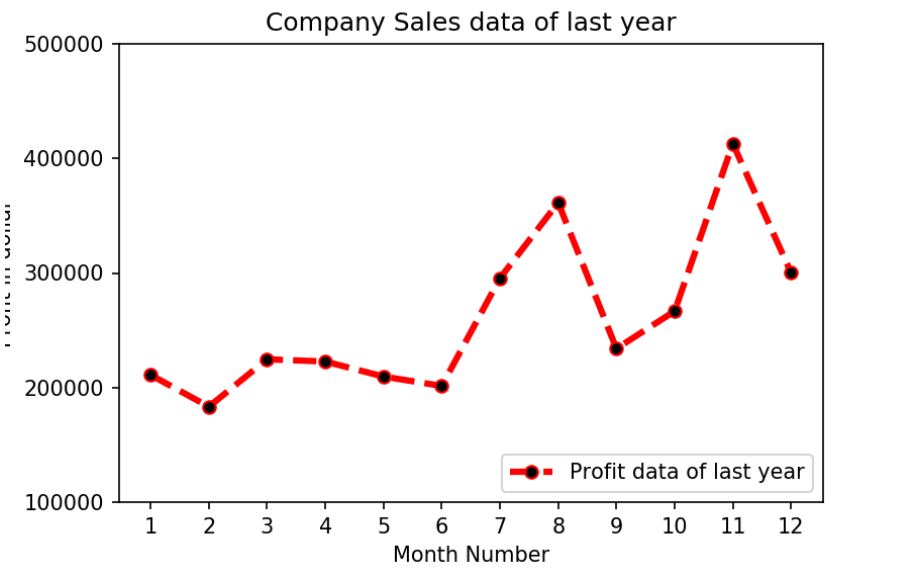
- Line Style dotted and Line-color should be red
- Show legend at the lower right location.
- X label name = Month Number
- Y label name = Sold units number
- Add a circle marker.
- Line marker color as read
- Line width should be 3

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

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()
```

The line plot should look something like this-



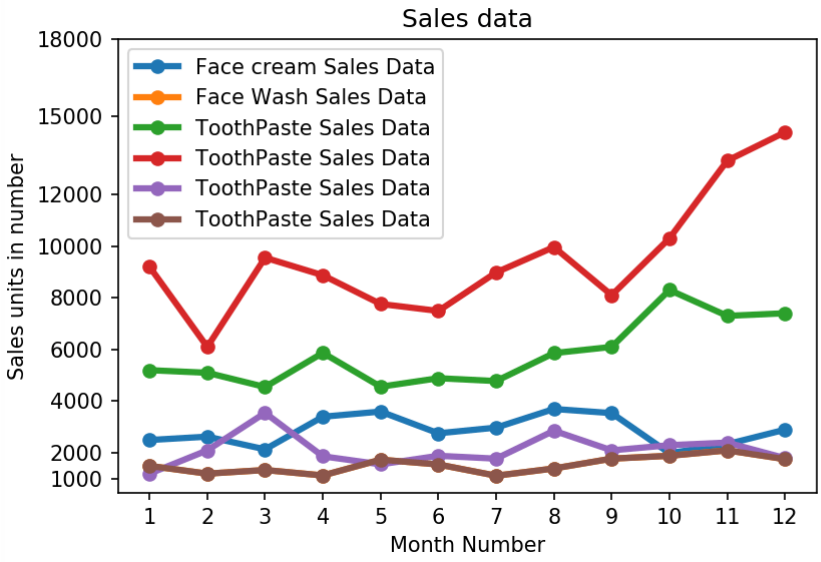
Exercise 3: Read all product sales data and show it using a multiline plot

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()
```



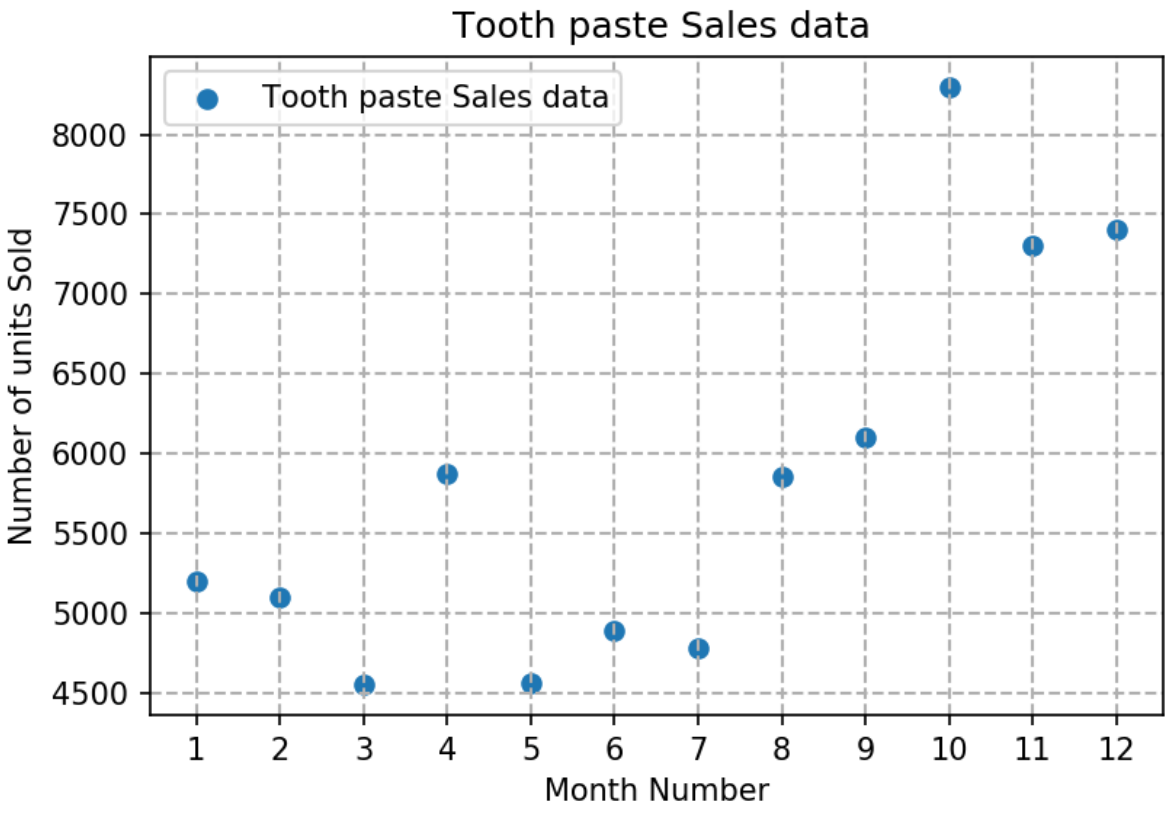
The graph should look something like this.

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()
```

Also, add a grid in the plot. gridline style should “–“.

The graph should look something like this-



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

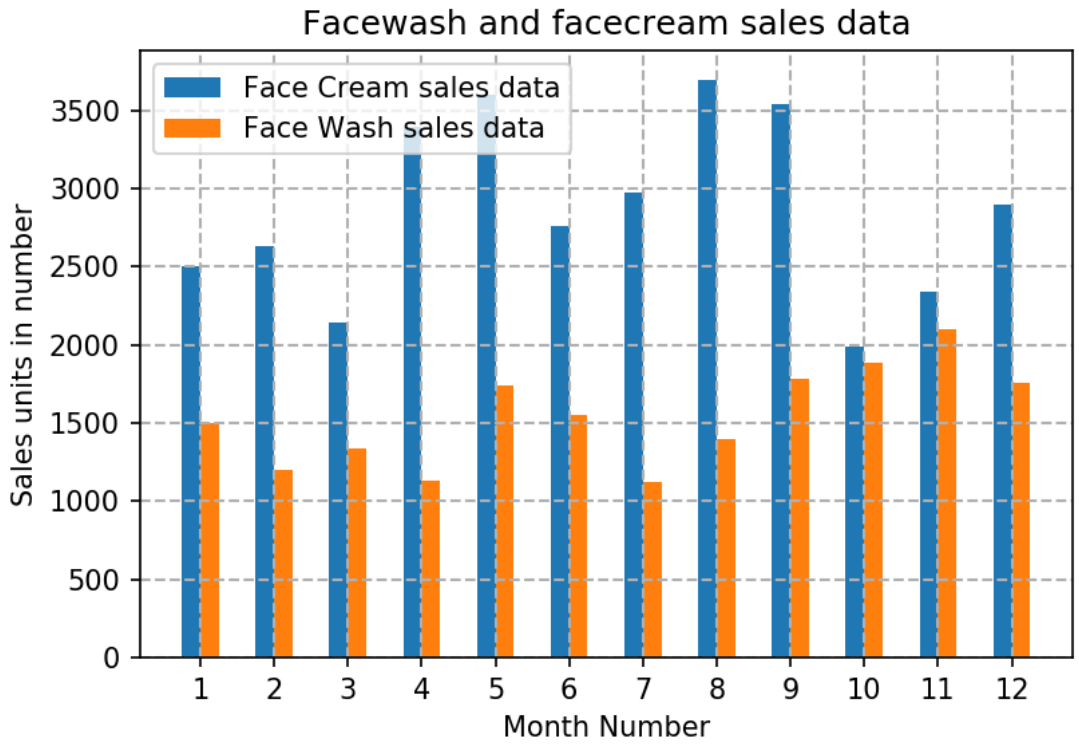
The bar chart should display the number of units sold per month for each product. Add a separate bar for each product in the same chart.

```
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()
```

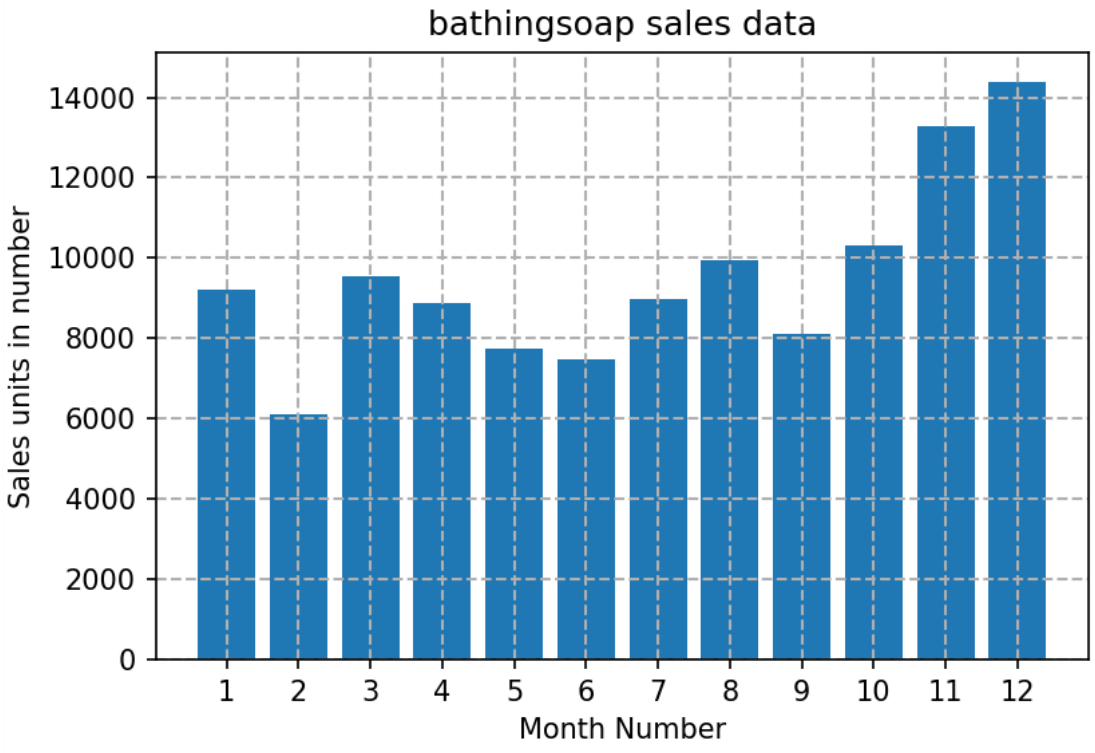
The graph should look something like this-



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

```
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('D:\Python\Articles\matplotlib\sales_data_of_bathingsoap.png',
dpi=150)
plt.show()
```

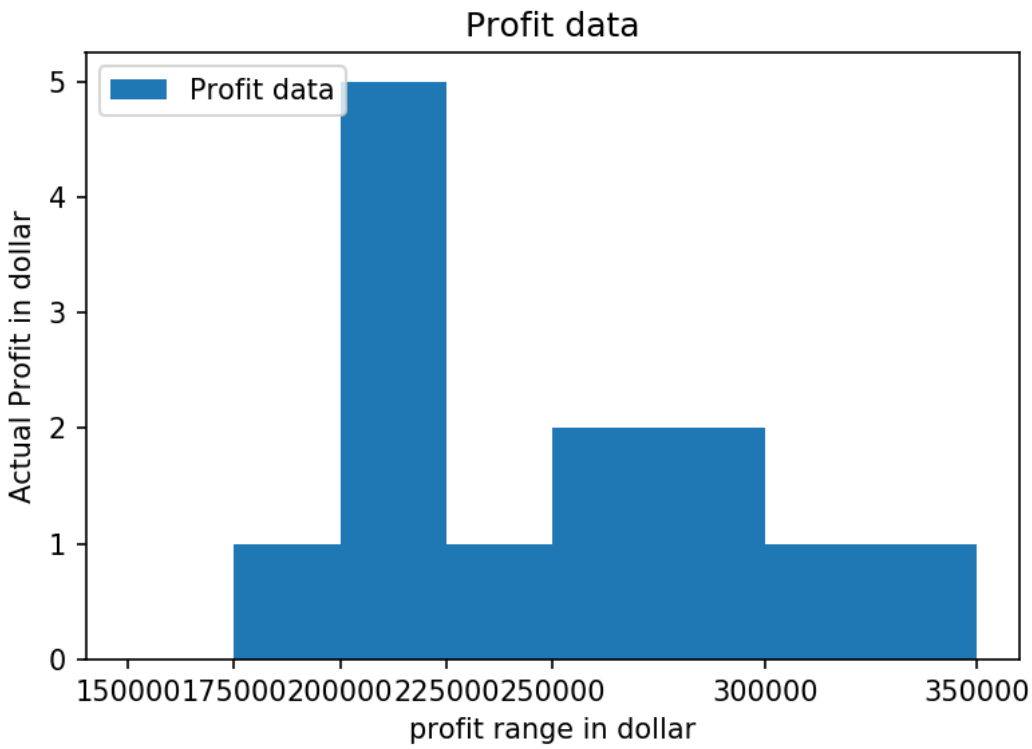
The bar chart should look like this.



Exercise 7: Read the total profit of each month and show it using the histogram to see the most common profit ranges

```
profitList = df ['total_profit'].tolist()
labels = ['low', 'average', 'Good', 'Best']
profit_range = [150000, 175000, 200000, 225000, 250000, 300000, 350000]
plt.hist(profitList, profit_range, label = 'Profit data')
plt.xlabel('profit range in dollar')
plt.ylabel('Actual Profit in dollar')
plt.legend(loc='upper left')
plt.xticks(profit_range)
plt.title('Profit data')
plt.show()
```

The histogram should look like this.



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

Note: 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()
```

The Pie chart should look like this.

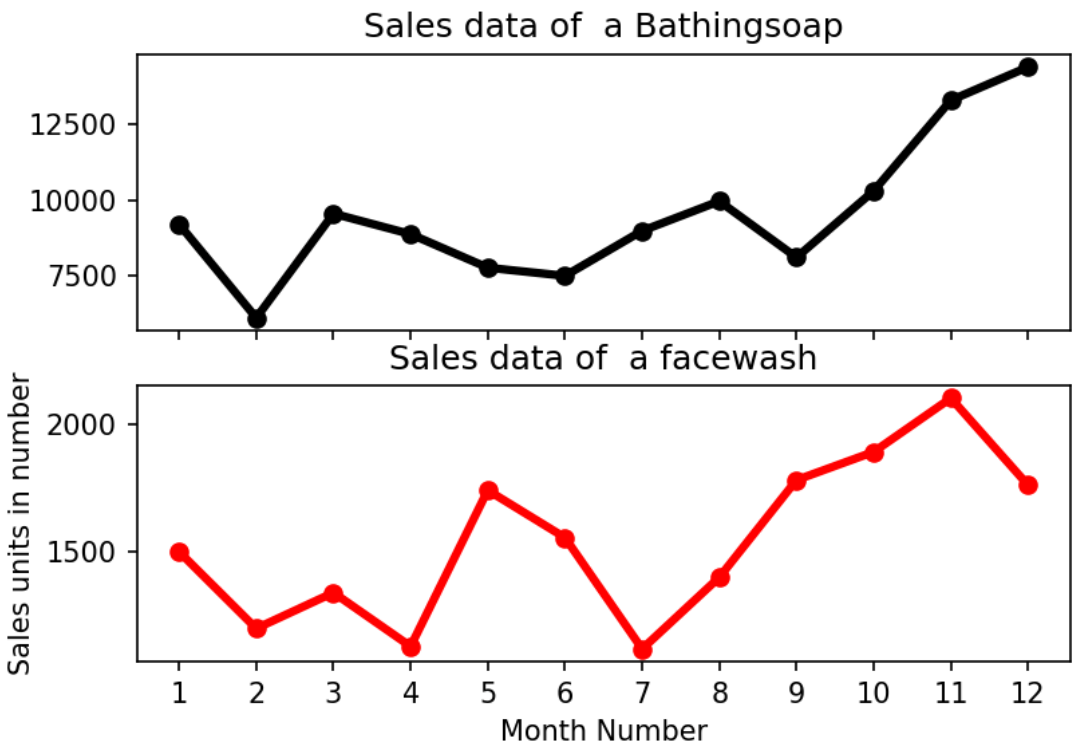
Exercise 9: Read Bathing soap facewash of all months and display it using the Subplot

```
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()
```

The Subplot should look like this.



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()
```

The Stack plot should look like this.