

```
In [1]: import matplotlib.pyplot as plt
import pandas as pd
import numpy as np
```

```
#Loading sales data
df = pd.read_csv("company_sales_data.csv")
```

```
In [2]: df.head()
```

|   | month_number | facecream | facewash | toothpaste | bathingsoap | shampoo | moisturizer | total_units | t |
|---|--------------|-----------|----------|------------|-------------|---------|-------------|-------------|---|
| 0 | 1            | 2500      | 1500     | 5200       | 9200        | 1200    | 1500        | 21100       |   |
| 1 | 2            | 2630      | 1200     | 5100       | 6100        | 2100    | 1200        | 18330       |   |
| 2 | 3            | 2140      | 1340     | 4550       | 9550        | 3550    | 1340        | 22470       |   |
| 3 | 4            | 3400      | 1130     | 5870       | 8870        | 1870    | 1130        | 22270       |   |
| 4 | 5            | 3600      | 1740     | 4560       | 7760        | 1560    | 1740        | 20960       |   |

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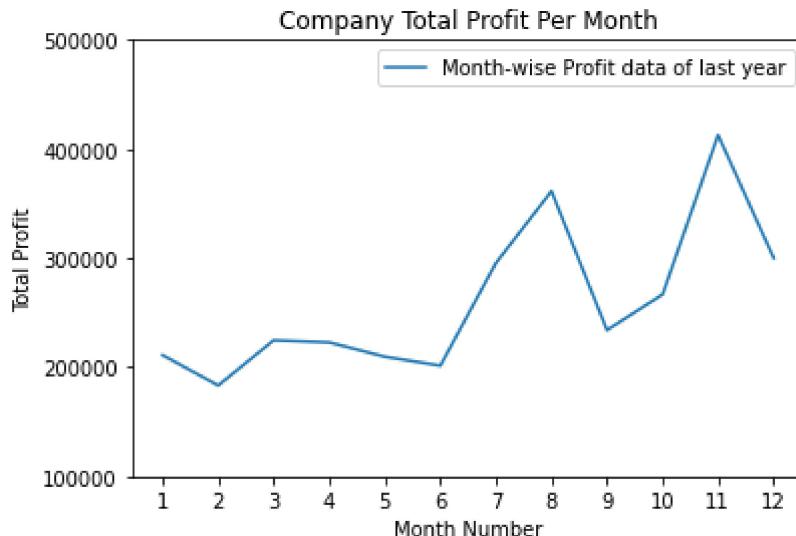
```
In [3]: df.tail()
```

|    | month_number | facecream | facewash | toothpaste | bathingsoap | shampoo | moisturizer | total_units |
|----|--------------|-----------|----------|------------|-------------|---------|-------------|-------------|
| 7  | 8            | 3700      | 1400     | 5860       | 9960        | 2860    | 1400        | 36140       |
| 8  | 9            | 3540      | 1780     | 6100       | 8100        | 2100    | 1780        | 23400       |
| 9  | 10           | 1990      | 1890     | 8300       | 10300       | 2300    | 1890        | 26670       |
| 10 | 11           | 2340      | 2100     | 7300       | 13300       | 2400    | 2100        | 41280       |
| 11 | 12           | 2900      | 1760     | 7400       | 14400       | 1800    | 1760        | 30020       |

◀ ▶

```
In [4]: #Exercise 1: Read Total profit of all months and show it using a line plot
%matplotlib inline
profitlist = df['total_profit'].tolist()
monthlist = df['month_number'].tolist()

plt.plot(monthlist,profitlist, label="Month-wise Profit data of last year")
plt.title("Company Total Profit Per Month")
plt.xlabel("Month Number")
plt.ylabel("Total Profit")
plt.xticks(monthlist)
plt.yticks([100000, 200000, 300000, 400000, 500000])
plt.legend()
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

## matplotlib inline

```
profitlist = df['total_profit'] monthlist = df['month_number']
```

```
plt.plot(monthlist, profitlist, marker="o", color="r", mfc="green", mec="k", linestyle="--",
 linewidth="3", label="profit data of last year") plt.title("Company Sales Data of last year")
plt.xlabel("Month Number") plt.ylabel("Sold Unit") plt.legend(loc="lower right") 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 ).

```
In [5]: monthlist = df[ 'month_number' ].tolist()
monthlist
```

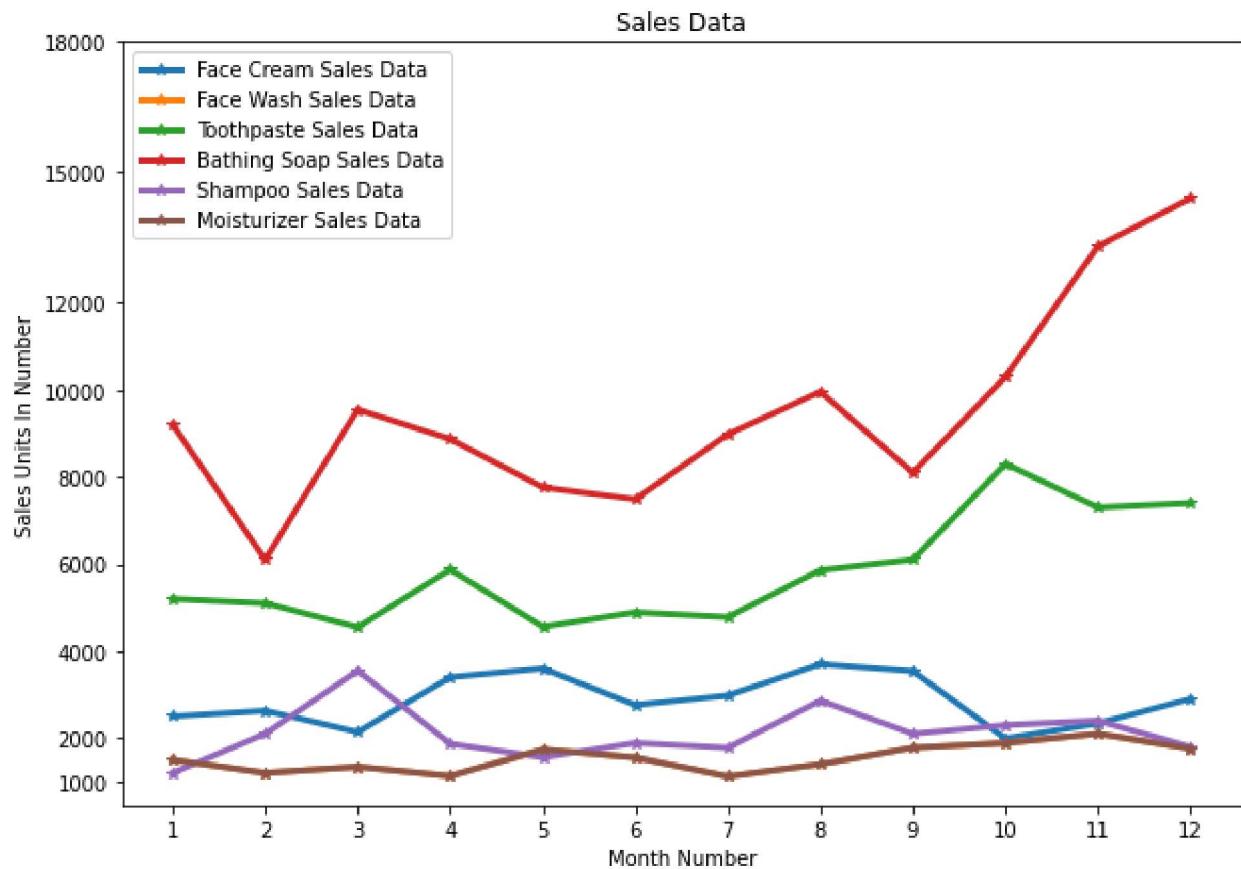
```
Out[5]: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12]
```

```
In [6]: facecreamsalesdata = df[ 'facecream' ].tolist()
facewashesalesdata = df[ 'facewash' ].tolist()
toothpastesalesdata = df[ 'toothpaste' ].tolist()
bathingsoapsalesdata = df[ 'bathingsoap' ].tolist()
shampoosalesdata = df[ 'shampoo' ].tolist()
moisturizersalesdata = df[ 'moisturizer' ].tolist()

plt.figure(figsize=(10,7))
plt.plot(monthlist, facecreamsalesdata, marker="*", label="Face Cream Sales Data", line
plt.plot(monthlist, facewashesalesdata, marker="*", label="Face Wash Sales Data", linewi
plt.plot(monthlist, toothpastesalesdata, marker="*", label="Toothpaste Sales Data", lin
```

```
plt.plot(monthlist, bathingsoapsalesdata, marker="*", label="Bathing Soap Sales Data",
plt.plot(monthlist, shampoosalesdata, marker="*", label="Shampoo Sales Data", linewidth=2)
plt.plot(monthlist, moisturizersalesdata, marker="*", label="Moisturizer Sales Data", linewidth=2)

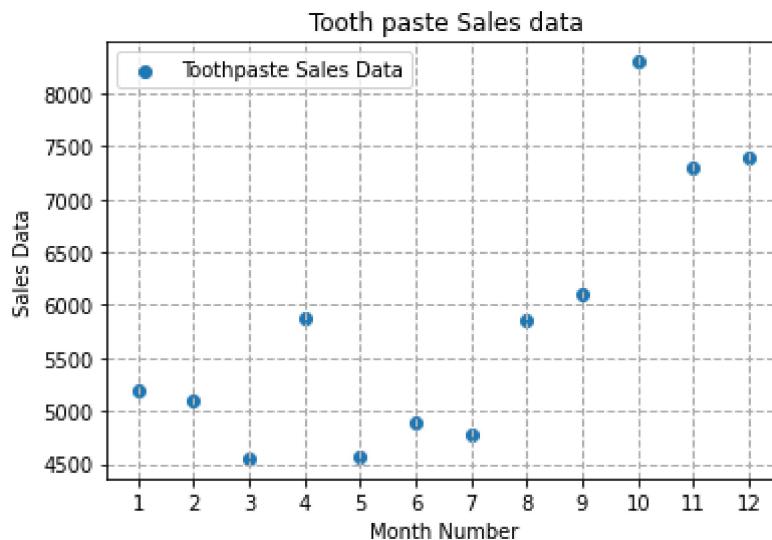
plt.xlabel("Month Number")
plt.ylabel("Sales Units In Number")
plt.title("Sales Data")
plt.xticks(monthlist)
plt.yticks([1000, 2000, 4000, 6000, 8000, 10000, 12000, 15000, 18000])
plt.legend()
plt.show()
```



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

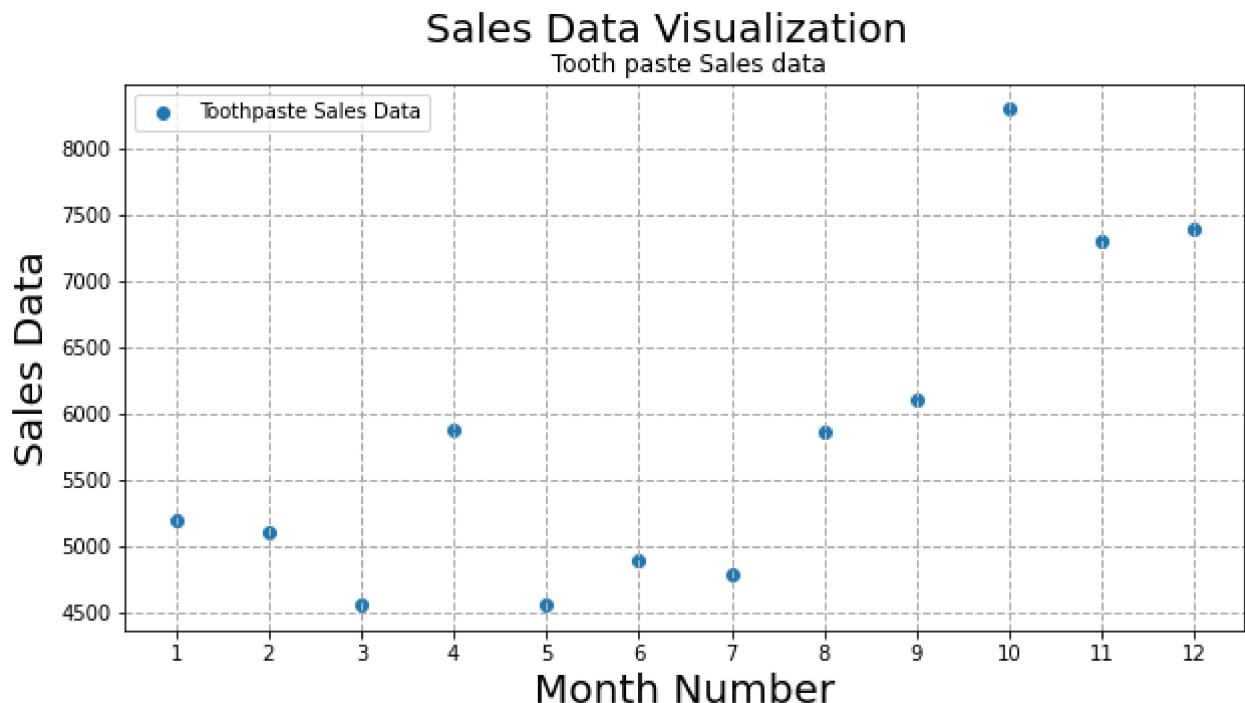
In [7]:

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



Exercise 4: Read toothpaste sales data of each month and show it using a scatter plot by setting up `figuresize` & `fontsize`

```
In [8]:  
monthlist = df['month_number'].tolist()  
toothpastesalesdata = df['toothpaste'].tolist()  
fig = plt.figure(figsize=(10,5))  
fig.suptitle('Sales Data Visualization', fontsize=20)  
plt.scatter(monthlist, toothpastesalesdata, label="Toothpaste Sales Data")  
plt.xlabel("Month Number", fontsize=20)  
plt.ylabel("Sales Data", fontsize=20)  
plt.title(' Tooth paste Sales data')  
plt.legend(loc = "upper left")  
plt.xticks(monthlist)  
plt.grid(True, linestyle="--", linewidth=1)  
plt.show()
```



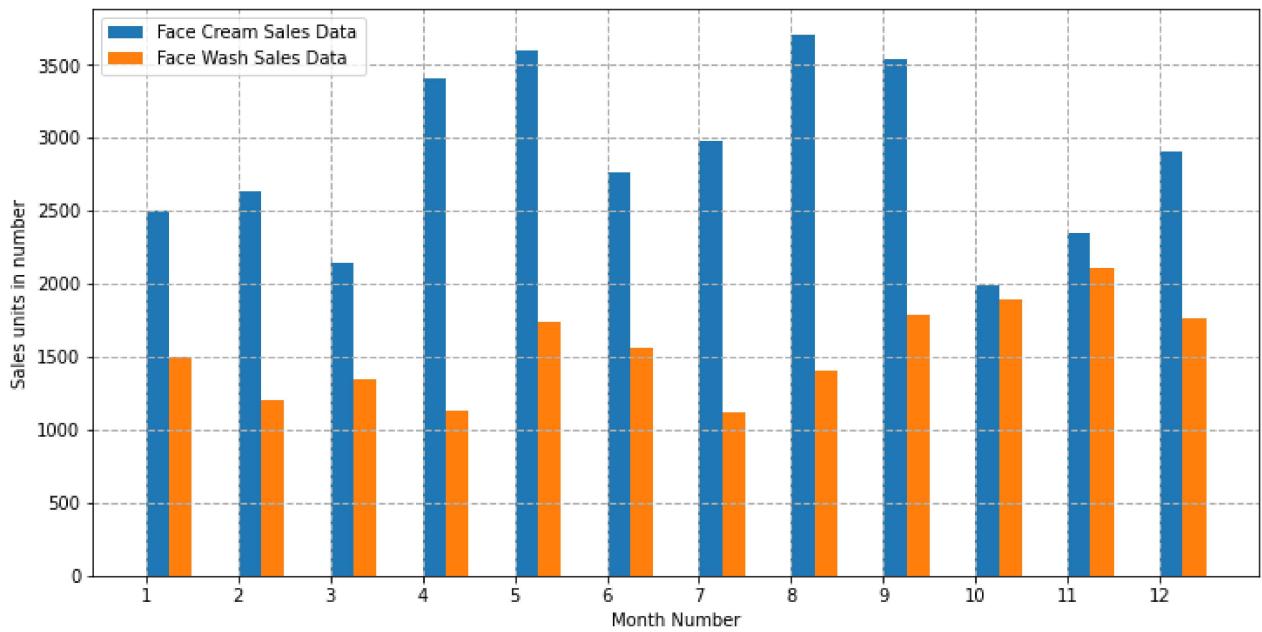
Exercise 5: Read face cream and facewash product sales data and show it using the bar chart The bar

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

In [9]:

```
monthlist = df['month_number'].tolist()
facecreamsalesdata = df['facecream'].tolist()
facewashesalesdata = df['facewash'].tolist()
plt.figure(figsize=(12,6))
plt.bar([a for a in monthlist], facecreamsalesdata, width=0.25, label="Face Cream Sales")
plt.bar([a+0.25 for a in monthlist], facewashesalesdata, width=0.25, label="Face Wash Sales")
plt.legend(loc="upper left")
plt.xlabel("Month Number")
plt.ylabel("Sales units in number")
plt.title('Facewash and facecream sales data', fontsize=20)
plt.xticks(monthlist)
plt.grid(True, linewidth=1, linestyle="--")
plt.show()
```

Facewash and facecream sales data

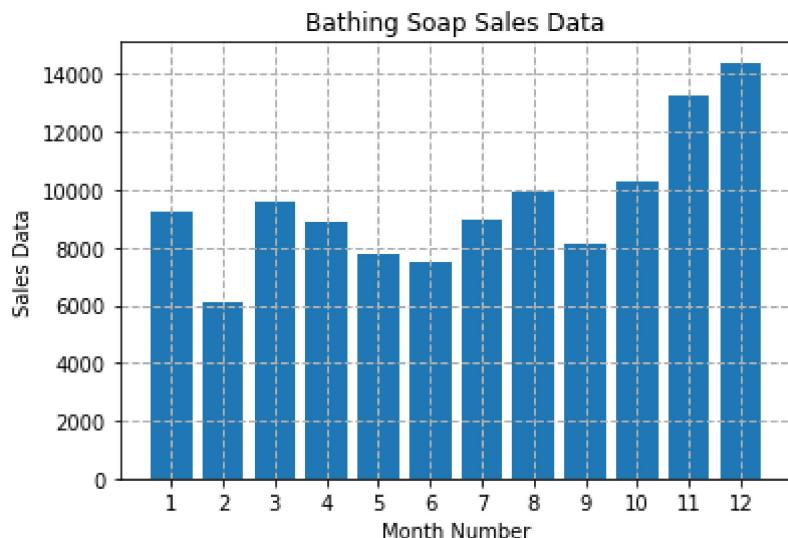


Exercise 6: Read sales data of bathing soap of all months and show it using a bar chart. Save this plot to your hard disk

In [10]:

```
monthlist = df['month_number'].tolist()
bathingsoapsalesdata = df['bathingsoap'].tolist()

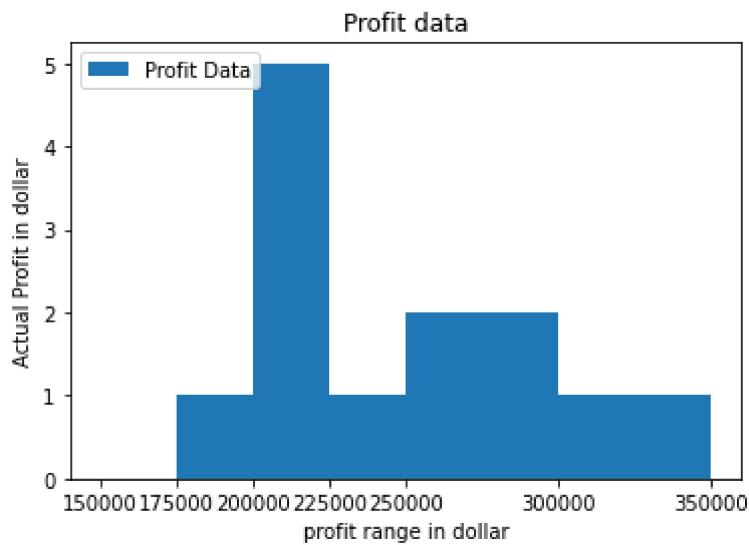
plt.bar(monthlist, bathingsoapsalesdata)
plt.title("Bathing Soap Sales Data")
plt.xlabel("Month Number")
plt.ylabel("Sales Data")
plt.xticks(monthlist)
plt.grid(True, linewidth=1, linestyle="--")
plt.savefig("bathingsoapsalesdata.png", dpi=150)
plt.show()
```



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

In [11]:

```
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()
```

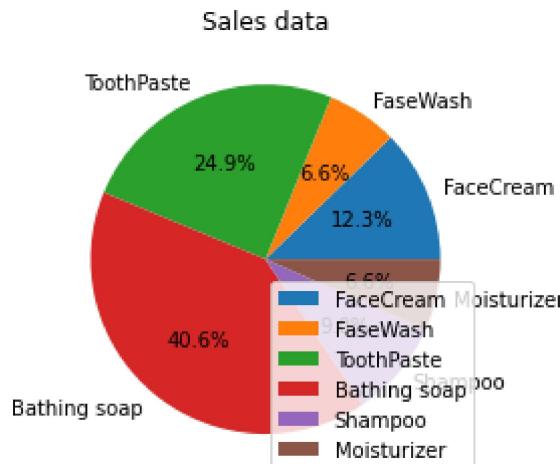


Exercise 8: Calculate total sale data for last year for each product and show it using a Pie chart Note:  
In Pie chart display Number of units sold per year for each product in percentage.

In [12]:

```
monthList = df ['month_number'].tolist()
labels = ['FaceCream', 'FaseWash', 'ToothPaste', 'Bathing soap', 'Shampoo', 'Moisturize'
salesData = [df ['facecream'].sum(), df ['facewash'].sum(), df ['toothpaste'].sum(),
            df ['bathingsoap'].sum(), df ['shampoo'].sum(), df ['moisturizer'].sum()]
```

```
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

In [21]:

```
monthlist = df['month_number'].tolist()
bathingsoapsalesdata = df['bathingsoap'].tolist()
facewashesalesdata = df['facewash'].tolist()

f,axarr = plt.subplots(2, sharex=True)
axarr[0].plot(monthlist,bathingsoapsalesdata, label="BathingSoap Sales Data", marker="o")
axarr[0].set_title("Sales data of Bathingsoap")
axarr[1].plot(monthlist, facewashesalesdata, label="Facewash Sales Data", marker="o", color="red")
axarr[1].set_title('Sales Data of 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

In [27]:

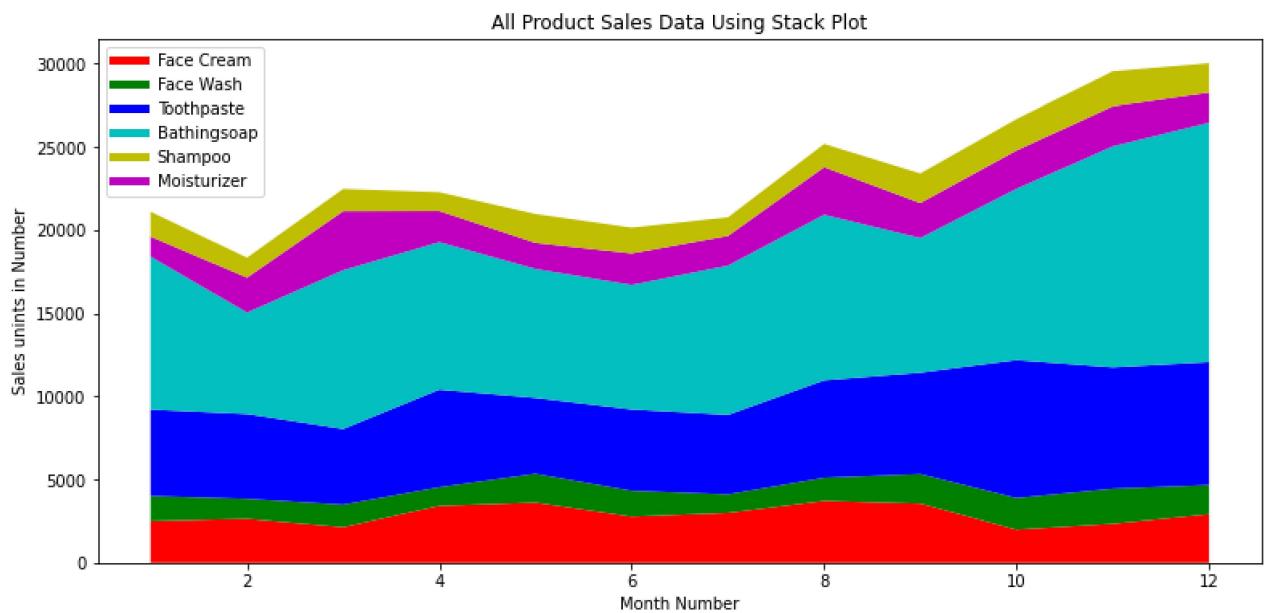
```
monthlist = df['month_number'].tolist()
```

```
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.figure(figsize=(13,6))
plt.plot([],[], color='r', label="Face Cream", linewidth=5)
plt.plot([],[],color='g', label="Face Wash", linewidth=5)
plt.plot([],[],color='b', label="Toothpaste", linewidth=5)
plt.plot([],[],color="c", label="Bathingsoap", linewidth=5)
plt.plot([],[], color="y", label="Shampoo", linewidth=5)
plt.plot([],[],color="m", label="Moisturizer", linewidth=5)

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

plt.xlabel('Month Number')
plt.ylabel('Sales units in Number')
plt.title("All Product Sales Data Using Stack Plot")
plt.legend(loc="upper left")
plt.show()
```



In [ ]: