

MUSIC-PRODUCTS

SALES DATA

INTERPRETATION

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(12TH IP MATHS)

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SYNOPSIS

AIM: To create a tangible and useful IT application.

- **Understand data:** understand how data are generated, stored and managed in an organization or a business or a shop in real world.
- **Data collection:** storing data in a CSV file or a database table.
- **Import data in pandas:**
 - i) import data from a CSV file into a Dataframe
(pandas.read_csv())
 - ii) import a database table into a Dataframe
(pandas.read_sql())
- **Data visualization:** generate appropriate customized charts to visualize data for e.g. line plot, bar graph, scatter plot, box plot, pie chart, etc.
- **Data Analysis:** Analyze data using python libraries.

WORKING ENVIRONMENT

SOFTWARE –

PLATFORM → Microsoft windows 10 pro

PROGRAM → Spyder(python), Excel worksheet

LANGUAGE → Python

HARDWARE –

PROCESSOR → Intel Core i3

CLOCK SPEED → 2.66 GHz

RAM → 4 GB

HARD DISK CAPACITY → 182 GB

BIT SPECIFICATION → 64 bits

KEYBOARD → Lenovo ideapad 100

MOUSE → hp

DISPLAY DEVICE → Lenovo ideapad 100

SYSTEM ANALYSIS

This project is an initiative to capture and analyze the sales data of a business in a real world, selling basic commodities such as clothes, albums, instruments, etc. during an entire year. It maintains the number of units sold for each product in each month and the total profit incurred in a month. This data is then visualized and analyzed using different python libraries.

SYSTEM CHART

Create CSV file(Comma Separated Values File) for the sales data of the products of a music company, saved in ".csv".

[illegible]

PROGRAMS & OUTPUTS

(1)

To import pandas, numpy and matplotlib; and import the CSV file into dataframe using file address in python.

PROGRAM:

```
csv project.py x
1  import pandas as pd
2  import matplotlib.pyplot as plt
3  import numpy as np
4
5  df=pd.read_csv('D:\python files\csvproject.csv')
6
7  month=df['month']
8  album=df['albums']
9  speaker=df['speakers']
10 poster=df['posters']
11 instrument=df['instruments']
12 cloth=df['clothes']
13 avg_quantity=df['avg_quantity']
14 total_price=df['total_price']
15 sale=df['sale']
16
```

OUTPUT:

```
Console 1/A x Console 2/A x
Python 3.8.5 (default, Sep 3 2020, 21:29:08) [MSC v.1916 64 bit (AMD64)]
Type "copyright", "credits" or "license" for more information.

IPython 7.19.0 -- An enhanced Interactive Python.

In [1]: runfile('C:/Users/Owner/Desktop/csv project.py', wdir='C:/Users/Owner/Desktop')
```

(2)

To create main menu for sales data for user to choose an option to understand the data.

PROGRAM:

```
csv project.py* x
97
98
99 def mainmenu():
100     choice = ()
101     while choice != 4:
102         print('\n-----')
103         print(' SALES DATA - MAIN MENU')
104         print('-----')
105         print(' 1. display data')
106         print(' 2.data visualization')
107         print(' 3.data analysis')
108         print(' 4.exit')
109         choice = int(input('\n choose an option from the menu -> '))
110         if choice == 1:
111             print(' display data')
112             print(df)
113             print(df.columns)
114         elif choice == 2:
115             submenu2()
116         elif choice == 3:
117             submenu3()
118         else:
119             print('invalid')
120     mainmenu()
121
122
```

OUTPUT:

```
Console 1/A x Console 2/A x
Python 3.8.5 (default, Sep 3 2020, 21:29:08) [MSC v.1916 64 bit (AMD64)]
Type "copyright", "credits" or "license" for more information.

IPython 7.19.0 -- An enhanced Interactive Python.

In [1]: runfile('C:/Users/Owner/Desktop/csv project.py', wdir='C:/Users/Owner/Desktop')

-----
SALES DATA - MAIN MENU
-----
1. display data
2.data visualization
3.data analysis
4.exit

choose an option from the menu -> |
```


(3)

Choose option 1; to display data as in CSV file in the dataframe from the main menu option.

PROGRAM:

```
csv project.py x
1  import pandas as pd
2  import matplotlib.pyplot as plt
3  import numpy as np
4
5  df=pd.read_csv('D:\python files\csvproject.csv')
6
7  month=df['month']
8  album=df['albums']
9  speaker=df['speakers']
10 poster=df['posters']
11 instrument=df['instruments']
12 cloth=df['clothes']
13 avg_quantity=df['avg_quantity']
14 total_price=df['total_price']
15 sale=df['sale']
16
```

OUTPUT:

```
Console 1/A x Console 2/A x
choose an option from the menu -> 1
display data
  month  albums  speakers  posters  ...  clothes  avg_quantity  total_price  sale
0   jan    1100     1000     200  ...     330         5         24600   low
1   feb    2200     1300     900  ...     340         4         41700   low
2   mar    3300     7800     200  ...     560         5         92800  good
3   apr    4400     5300     300  ...     750         5         82200  good
4   may    5500     2800     400  ...     560         6        114000  good
5   jun    6600     1600     600  ...     790         3         14200   low
6   jul    7700     7500     300  ...     220         6        141000  good
7   aug    8800     1900     500  ...     110         5         95000  good
8   sep    9900     4300     400  ...     220         4         69200  good
9   oct    1000     1200     700  ...     900         3         31500   low
10  nov    1100     2700     300  ...    3300         5         69500  good
11  dec    1200     2900     500  ...    4600         4         50000   low

[12 rows x 9 columns]
Index(['month', 'albums', 'speakers', 'posters', 'instruments', 'clothes',
      'avg_quantity', 'total_price', 'sale'],
      dtype='object')
```

(4)

Choose option 2; to understand and display the data visually with bar graphs, scatter chart and line graph.

Select the type of chart from the data visualization menu with the respective options.

PROGRAM:

```
csv project.py x
17
18
19 def submenu2():
20     ch2 = 0
21     while ch2 != 3:
22         print('\n-----')
23         print(' DATA VISUALIZATION MENU ')
24         print('-----')
25         print('1. Multi-Bar graph : month wise - total profit')
26         print('2. scatter chart : average no. of products sold each month')
27         print('3. line graph : product profits every month ')
28         ch2 = int(input('\nchoose a option for data visualization :'))
```

OUTPUT:

```
Console 1/A x Console 2/A x
-----
SALES DATA - MAIN MENU
-----
1. display data
2.data visualization
3.data analysis
4.exit

choose an option from the menu -> 2

-----
DATA VISUALIZATION MENU
-----
1. Multi-Bar graph : month wise - total profit
2. scatter chart : average no. of products sold each month
3. line graph : product profits every month

choose a option for data visualization :|
```

(i) → To display BAR CHART: (option 1)

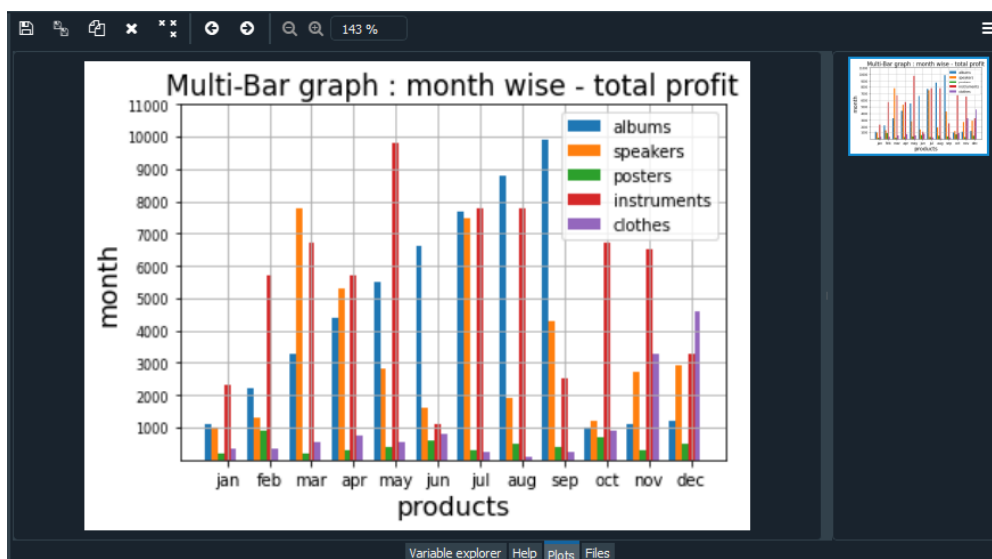
PROGRAM:

```
csv project.py x
17
18
19 def submenu2():
20     ch2 = 0
21     while ch2 != 3:
22         print('\n-----')
23         print(' DATA VISUALIZATION MENU ')
24         print('-----')
25         print('1. Multi-Bar graph : month wise - total profit')
26         print('2. scatter chart : average no. of products sold each month')
27         print('3. line graph : product profits every month ')
28         ch2 = int(input('\nchoose a option for data visualization :'))
29         if ch2 == 1:
30             x1 = np.arange(1,13,1)
31             x2 = x1 + 0.15
32             x3 = x2 + 0.15
33             x4 = x3 + 0.15
34             x5 = x4 + 0.15
35             plt.bar(x1, album, tick_label=month,width=0.15,label='albums')
36             plt.bar(x2, speaker, tick_label=month,width=0.15,label='speakers')
37             plt.bar(x3, poster, tick_label=month, width=0.15,label='posters')
38             plt.bar(x4, instrument, tick_label=month, width=0.15,label='instruments')
39             plt.bar(x5, cloth, tick_label=month, width=0.15, label='clothes')
40             plt.xticks(x4,labels = month, fontsize=10)
41             plt.yticks(np.arange(1000,12000,1000),fontsize=8)
42             plt.xlabel('products',fontsize=16)
43             plt.ylabel('month',fontsize=16)
44             plt.legend()
45             plt.grid(True)
46             plt.title('Multi-Bar graph : month wise - total profit',fontsize=17)
47             plt.show()
```

OUTPUT:

```
-----
DATA VISUALIZATION MENU
-----
1. Multi-Bar graph : month wise - total profit
2. scatter chart : average no. of products sold each month
3. line graph : product profits every month

choose a option for data visualization :1
```



(ii) → To display SCATTER CHART: (option 2)

PROGRAM:

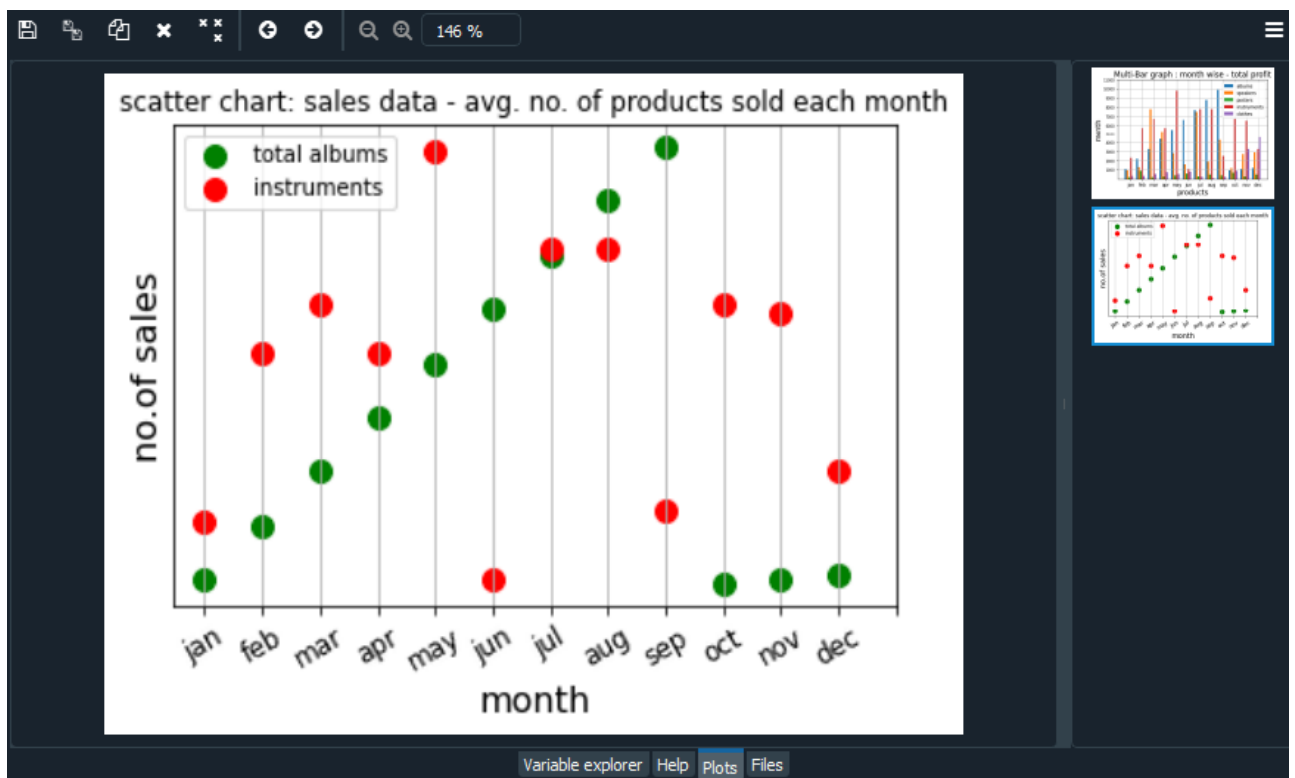
```
48         elif ch2 == 2:
49             plt.scatter(month,album,s=100,c='g',label='total albums')
50             plt.scatter(month,instrument,s=100,c='r',label='instruments')
51             plt.xticks(np.arange(0,13,1),fontsize=12,rotation=30)
52             plt.yticks(np.arange(500,1000,500),fontsize=8,rotation=30)
53             plt.xlabel('month',fontsize=16)
54             plt.ylabel('no.of sales',fontsize=16)
55             plt.legend(loc='upper left')
56             plt.title('scatter chart: sales data - avg. no. of products sold each month')
57             plt.grid(True)
58             plt.show()
```

OUTPUT:

DATA VISUALIZATION MENU

1. Multi-Bar graph : month wise - total profit
2. scatter chart : average no. of products sold each month
3. line graph : product profits every month

choose a option for data visualization :2



(iii) → To display LINE GRAPH: (option 3)

PROGRAM:

```
59     elif ch2 == 3:
60         plt.plot(month,album,label='albums')
61         plt.plot(month,speaker,label='speakers')
62         plt.plot(month,poster,label='posters')
63         plt.plot(month,instrument,label='instruments')
64         plt.plot(month,cloth,label='clothes')
65         plt.xticks(np.arange(0,13,1),fontsize=12,rotation=30)
66         plt.yticks(np.arange(500,10000,500),fontsize=8,rotation=30)
67         plt.xlabel('month',fontsize=16)
68         plt.ylabel('products',fontsize=16)
69         plt.legend(loc='upper left')
70         plt.title('line graph: sales data - product profit per month',fontsize=16)
71         plt.grid(True)
72         plt.show()
73     else:
74         print('invalid')
75
```

OUTPUT:

```
-----
DATA VISUALIZATION MENU
-----
1. Multi-Bar graph : month wise - total profit
2. scatter chart : average no. of products sold each month
3. line graph : product profits every month

choose a option for data visualization :3
```



(5)

Choose option 3; to analyze the data using python libraries and functions, by selecting options in the data analysis menu.

PROGRAM:

```
75
76 def submenu3():
77     ch1 = 0
78     while ch1 != 3:
79         print('\n-----')
80         print(' DATA ANALYSIS MENU ')
81         print('-----')
82         print('1. find the maximum, minimum profit made from all the sales')
83         print('2. find the sum of all the profits made in the year')
84         print('3. display the sales for 3 months with highest sales')
85         ch1 = int(input('\n choose an option for data analysis :'))
86         if ch1 == 1:
87             print('maximum,minimum profit made from all the sales')
88             print('highest sale-->')
89             print(df.total_price.max())
90             print('lowest sale-->')
91             print(df.total_price.min())
92         elif ch1== 2:
93             print('sum of all the profits made in the year-->')
94             print(df.total_price.sum())
95             print()
96         elif ch1 == 3:
97             print('sales for 3 months with highest sales')
98             print(df.sort_values('total_price',ascending = False).head(3) )
99         else:
100             print('invalid')
101
```

OUTPUT:

```
-----
SALES DATA - MAIN MENU
-----
1. display data
2.data visualization
3.data analysis
4.exit

choose an option from the menu -> 3
```

```
-----  
DATA ANALYSIS MENU  
-----
```

1. find the maximum, minimum profit made from all the sales
2. find the sum of all the profits made in the year
3. display the sales for 3 months with highest sales

```
choose an option for data analysis :1  
maximum,minimum profit made from all the sales  
highest sale-->  
141000  
lowest sale-->  
14200
```

```
-----  
DATA ANALYSIS MENU  
-----
```

1. find the maximum, minimum profit made from all the sales
2. find the sum of all the profits made in the year
3. display the sales for 3 months with highest sales

```
choose an option for data analysis :2  
sum of all the profits made in the year-->  
825700
```

```
-----  
DATA ANALYSIS MENU  
-----
```

1. find the maximum, minimum profit made from all the sales
2. find the sum of all the profits made in the year
3. display the sales for 3 months with highest sales

```
choose an option for data analysis :3  
sales for 3 months with highest sales
```

	month	albums	speakers	posters	...	clothes	avg_quantity	total_price	sale
6	jul	7700	7500	300	...	220	6	141000	good
4	may	5500	2800	400	...	560	6	114000	good
7	aug	8800	1900	500	...	110	5	95000	good

```
[3 rows x 9 columns]
```

(6)

Choose option 4; to exit the program.

```
-----  
SALES DATA - MAIN MENU  
-----  
1. display data  
2.data visualization  
3.data analysis  
4.exit  
  
choose an option from the menu -> 4  
invalid  
  
In [2]:
```


CONCLUSION

It is very important to keep track of the data and information of a company/business for its future success.

Hence, analyzing and visualizing the data helps the company/business for better planning and development.

BIBLIOGRAPHY

Informatics practices with python
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