



Marwadi University
Faculty of Engineering & Technology
Department of Information and Communication Technology

Subject: Programming With Python (01CT1309)

Aim: Practical based on Data Visualization with Plotly

Experiment No: 24

Date: Enrollment No: 92400133037

Aim: Practical based on Data Visualization with Plotly

IDE:

Installation

```
pip install plotly pandas
```

Creating a Sample Dataset

```
import pandas as pd
```

```
import plotly.express as px
```

Creating a Sample Dataset

```
# Sample data
```

```
data = {
```

```
    'Product': ['A', 'B', 'C', 'D', 'E'],
```

```
    'Sales': [100, 200, 150, 300, 250],
```

```
    'Profit': [30, 70, 50, 120, 90]
```

```
}
```

```
df = pd.DataFrame(data)
```

Creating Basic Visualizations

Bar Chart

```
# Bar chart for Sales
```

A bar chart is great for comparing quantities across categories.

```
fig = px.bar(df, x='Product', y='Sales', title='Sales by Product')
```

```
fig.show()
```

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```
lab24 > barChart.py > ...
1 import pandas as pd
2 import plotly.express as px
3 data = [
4     'Product': ['A','B','C','D','E'],
5     'Sales': [100,200,150,300,250],
6     'Profit': [30,70,50,120,90]
7 ]
8 df=pd.DataFrame(data)
9 fig=px.bar(df,x='Product',y='Sales',title='Sales by Product')
10 fig.show()
11
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

TERMINAL

```
PS G:\sem-3\python_lab> python -u "g:\sem-3\python_lab\lab24\barChart.py"
PS G:\sem-3\python_lab>
```



Line Chart

A line chart can help visualize trends over time or categories.

Line chart for Profit

```
fig = px.line(df, x='Product', y='Profit', title='Profit by Product')
```

```
fig.show()
```

```
lab24 > barChart.py > ...
1 import pandas as pd
2 import plotly.express as px
3 data = [
4     'Product': ['A','B','C','D','E'],
5     'Sales': [100,200,150,300,250],
6     'Profit': [30,70,50,120,90]
7 ]
8 df=pd.DataFrame(data)
9 fig=px.bar(df,x='Sales',y='Profit',title='Sales by Product')
10 fig.show()
11 fig = px.line(df, x='Product', y='Profit', title='Profit by Product')
12 fig.show()
13
14
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

TERMINAL

```
PS G:\sem-3\python_lab> python -u "g:\sem-3\python_lab\lab24\barChart.py"
PS G:\sem-3\python_lab>
```



Scatter Plot

A scatter plot is useful for examining the relationship between two numerical variables.

Scatter plot for Sales vs. Profit

```
fig = px.scatter(df, x='Sales', y='Profit', color='Product', title='Sales vs. Profit')
```



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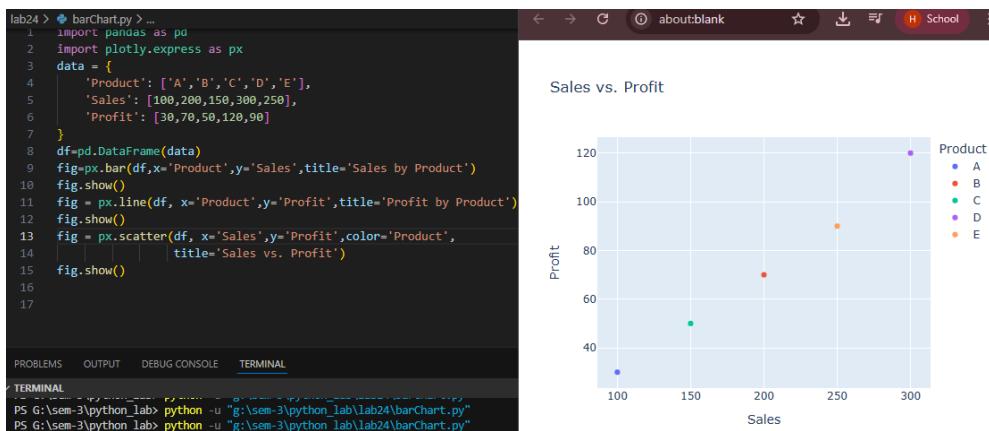
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`fig.show()`



The screenshot shows a Jupyter Notebook interface. On the left, the code cell contains the following Python script:

```

lab24 > barChart.py > ...
1 import pandas as pd
2 import plotly.express as px
3 data = {
4     'Product': ['A', 'B', 'C', 'D', 'E'],
5     'Sales': [100, 200, 150, 300, 250],
6     'Profit': [30, 70, 50, 120, 90]
7 }
8 df=pd.DataFrame(data)
9 fig=px.bar(df,x='Product',y='Sales',title='Sales by Product')
10 fig.show()
11 fig=px.line(df, x='Product',y='Profit',title='Profit by Product')
12 fig.show()
13 fig = px.scatter(df, x='Sales',y='Profit',color='Product',
14                  title="Sales vs. Profit")
15 fig.show()
16
17

```

Below the code cell, the terminal window shows the command used to run the script:

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
TERMINAL
PS G:\sem-3\python_lab> python -u "g:\sem-3\python_lab\lab24\barChart.py"
PS G:\sem-3\python_lab> python -u "g:\sem-3\python_lab\lab24\barChart.py"

```

On the right, the browser window displays three plots generated by Plotly:

- Sales by Product:** A bar chart with Sales on the x-axis (ranging from 100 to 300) and Profit on the y-axis (ranging from 30 to 120). The bars are colored by Product (A: blue, B: red, C: green, D: purple, E: orange).
- Profit by Product:** A line chart showing Profit increasing from Product A to Product E.
- Sales vs. Profit:** A scatter plot with Sales on the x-axis (ranging from 100 to 300) and Profit on the y-axis (ranging from 40 to 120). The points are colored by Product (A: blue, B: red, C: green, D: purple, E: orange).

Customizing Visualizations

Plotly allows for extensive customization. Let's enhance our bar chart with more features.

Enhanced Bar chart

```

fig = px.bar(df, x='Product', y='Sales',
              title='Sales by Product',
              color='Profit', # Color by Profit
              text='Sales') # Show sales value on bars

```

Customize layout

```

fig.update_layout(xaxis_title='Product',
                  yaxis_title='Sales',
                  legend_title='Profit',
                  template='plotly_dark') # Change template

fig.show()

```

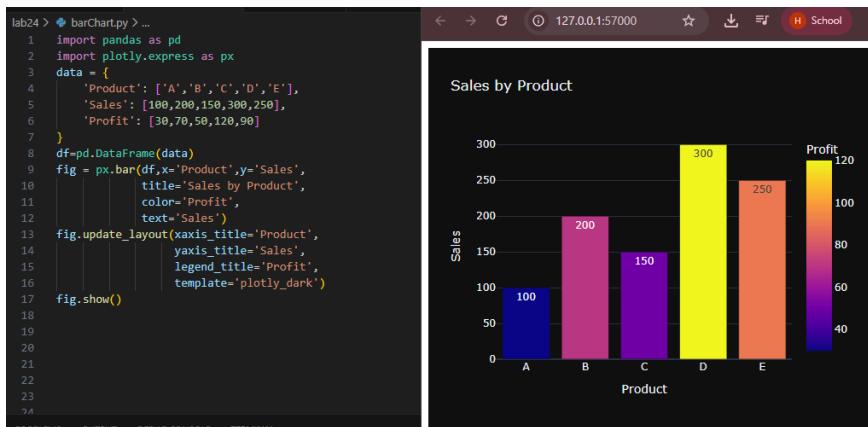
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Exporting Visualizations

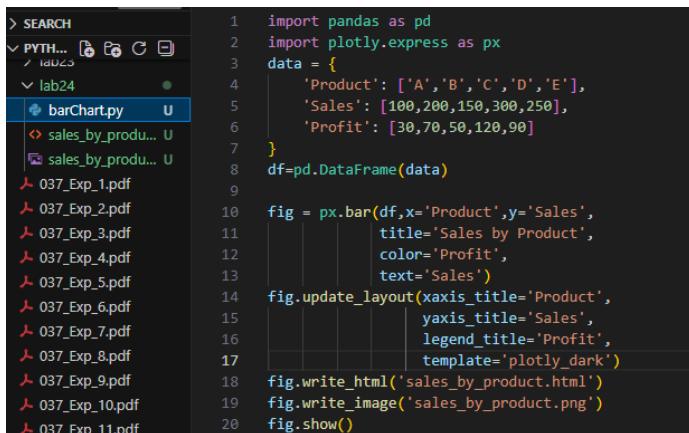
Plotly figures as static images or HTML files.

Save the figure as an HTML file

```
fig.write_html('sales_by_product.html')
```

Save the figure as a PNG file (you may need to install kaleido)

```
fig.write_image('sales_by_product.png')
```



The figure shows the completed Python code for generating a bar chart and saving it as an HTML and PNG file. The code is identical to the one shown in the previous figure, with additional lines for writing the figure to HTML and image files.

```

> SEARCH
> PYTH... ⓘ ⓘ ⓘ ⓘ
> lab24
  ⬤ barChart.py U
  ⬤ sales_by_produc... U
  ⬤ sales_by_produc... U
  ↳ 037_Exp_1.pdf
  ↳ 037_Exp_2.pdf
  ↳ 037_Exp_3.pdf
  ↳ 037_Exp_4.pdf
  ↳ 037_Exp_5.pdf
  ↳ 037_Exp_6.pdf
  ↳ 037_Exp_7.pdf
  ↳ 037_Exp_8.pdf
  ↳ 037_Exp_9.pdf
  ↳ 037_Exp_10.pdf
  ↳ 037_Exp_11.pdf
1 import pandas as pd
2 import plotly.express as px
3 data = [
4     'Product': ['A','B','C','D','E'],
5     'Sales': [100,200,150,300,250],
6     'Profit': [30,70,50,120,90]
7 ]
8 df=pd.DataFrame(data)
9 fig = px.bar(df,x='Product',y='Sales',
10             title='Sales by Product',
11             color='Profit',
12             text='Sales')
13 fig.update_layout(xaxis_title='Product',
14                   yaxis_title='Sales',
15                   legend_title='Profit',
16                   template='plotly_dark')
17 fig.write_html('sales_by_product.html')
18 fig.write_image('sales_by_product.png')
19 fig.show()
20

```

GITHUB LINK:

https://github.com/Heer972005/Python_Lab