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EX:2

> Implement programs for visualizing
> time series data.

EX:2

Implement programs for visualizing time series d:

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```
from google.colab import files
```

```
uploaded = files.upload()
import pandas as pd
```

⤓ [Choose Files] No file chosen   Upload widget is only available when the cell has been executed in
the current browser session. Please rerun this cell to enable.
Saving Car Sales.xlsx - car_data - Copy.csv to Car Sales.xlsx - car_data - Copy.csv

```
import io
```

```
df = pd.read_csv(io.BytesIO(uploaded["Car Sales.xlsx - car_data - Copy.csv"]))
print(df)
```

⤓
```
               Car_id         Date Customer Name  Gender  Annual Income  \
0       C_CND_000001    1/2/2022      Geraldine    Male          13500
1       C_CND_000002    1/2/2022            Gia    Male        1480000
2       C_CND_000003    1/2/2022         Gianna    Male        1035000
3       C_CND_000004    1/2/2022        Giselle    Male          13500
4       C_CND_000005    1/2/2022          Grace    Male        1465000
...              ...         ...            ...     ...            ...
23901   C_CND_023902  12/31/2023         Martin    Male          13500
23902   C_CND_023903  12/31/2023          Jimmy  Female         900000
23903   C_CND_023904  12/31/2023           Emma    Male         705000
23904   C_CND_023905  12/31/2023       Victoire    Male          13500
23905   C_CND_023906  12/31/2023        Donovan    Male        1225000

                            Dealer_Name    Company       Model  \
0       Buddy Storbeck's Diesel Service Inc       Ford  Expedition
1                      C & M Motors Inc      Dodge     Durango
2                           Capitol KIA   Cadillac    Eldorado
3                 Chrysler of Tri-Cities     Toyota      Celica
4                     Chrysler Plymouth      Acura          TL
...                                  ...        ...         ...
23901                 C & M Motors Inc   Plymouth     Voyager
23902     Ryder Truck Rental and Leasing  Chevrolet       Prizm
23903             Chrysler of Tri-Cities        BMW        328i
23904                 Chrysler Plymouth  Chevrolet       Metro
23905                   Pars Auto Sales      Lexus       ES300

                       Engine Transmission      Color  Price ($)  \
```

```
0       DoubleÂ Overhead Camshaft        Auto      Black    26000
1       DoubleÂ Overhead Camshaft        Auto      Black    19000
2               Overhead Camshaft      Manual        Red    31500
3               Overhead Camshaft      Manual  Pale White   14000
4       DoubleÂ Overhead Camshaft        Auto        Red    24500
...                           ...         ...        ...     ...
23901           Overhead Camshaft      Manual        Red    12000
23902   DoubleÂ Overhead Camshaft        Auto      Black    16000
23903           Overhead Camshaft      Manual        Red    21000
23904   DoubleÂ Overhead Camshaft        Auto      Black    31000
23905   DoubleÂ Overhead Camshaft        Auto  Pale White   27500

        Dealer_No  Body Style     Phone Dealer_Region
0       06457-3834        SUV   8264678    Middletown
1       60504-7114        SUV   6848189        Aurora
2       38701-8047  Passenger   7298798    Greenville
3       99301-3882        SUV   6257557         Pasco
4       53546-9427  Hatchback   7081483    Janesville
...            ...        ...       ...           ...
23901   60504-7114  Passenger   8583598         Pasco
23902   06457-3834    Hardtop   7914229    Middletown
23903   99301-3882      Sedan   7659127    Scottsdale
23904   53546-9427  Passenger   6030764        Austin
23905   38701-8047    Hardtop   7020564    Middletown

[23906 rows x 16 columns]
```

```python
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns


# Sample time series data (replace with your actual data)
data = {'Year': [2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019],
        'Sales': [100, 120, 150, 130, 160, 180, 200, 220, 250, 230],
        'Profit': [20, 24, 30, 26, 32, 36, 40, 44, 50, 46],
        'Expenses': [80, 96, 120, 104, 128, 144, 160, 176, 200, 184],
        'Units_Sold': [500,600,750,650,800,900,1000,1100,1250,1150]}
df = pd.DataFrame(data)



# 1. Line Plot
plt.figure(figsize=(10, 6))
plt.plot(df['Year'], df['Sales'], label='Sales')
plt.plot(df['Year'], df['Profit'], label='Profit')  # Example: Adding another line
plt.xlabel('Year')
plt.ylabel('Value')
plt.title('Sales and Profit Over Time')
plt.legend()
plt.grid(True)
plt.show()

# 2. Scatter Plot
plt.figure(figsize=(10, 6))
```
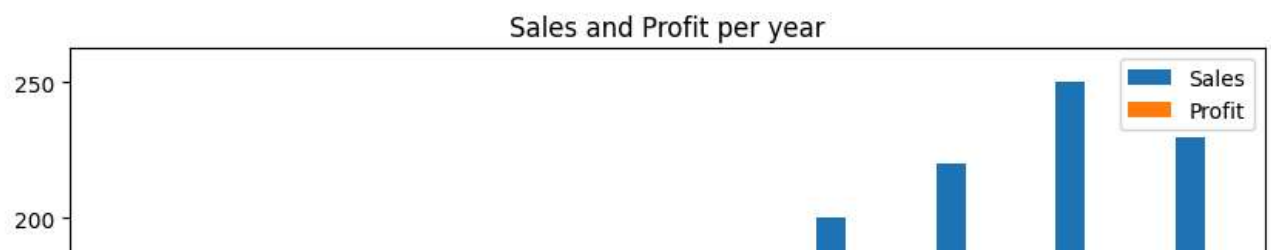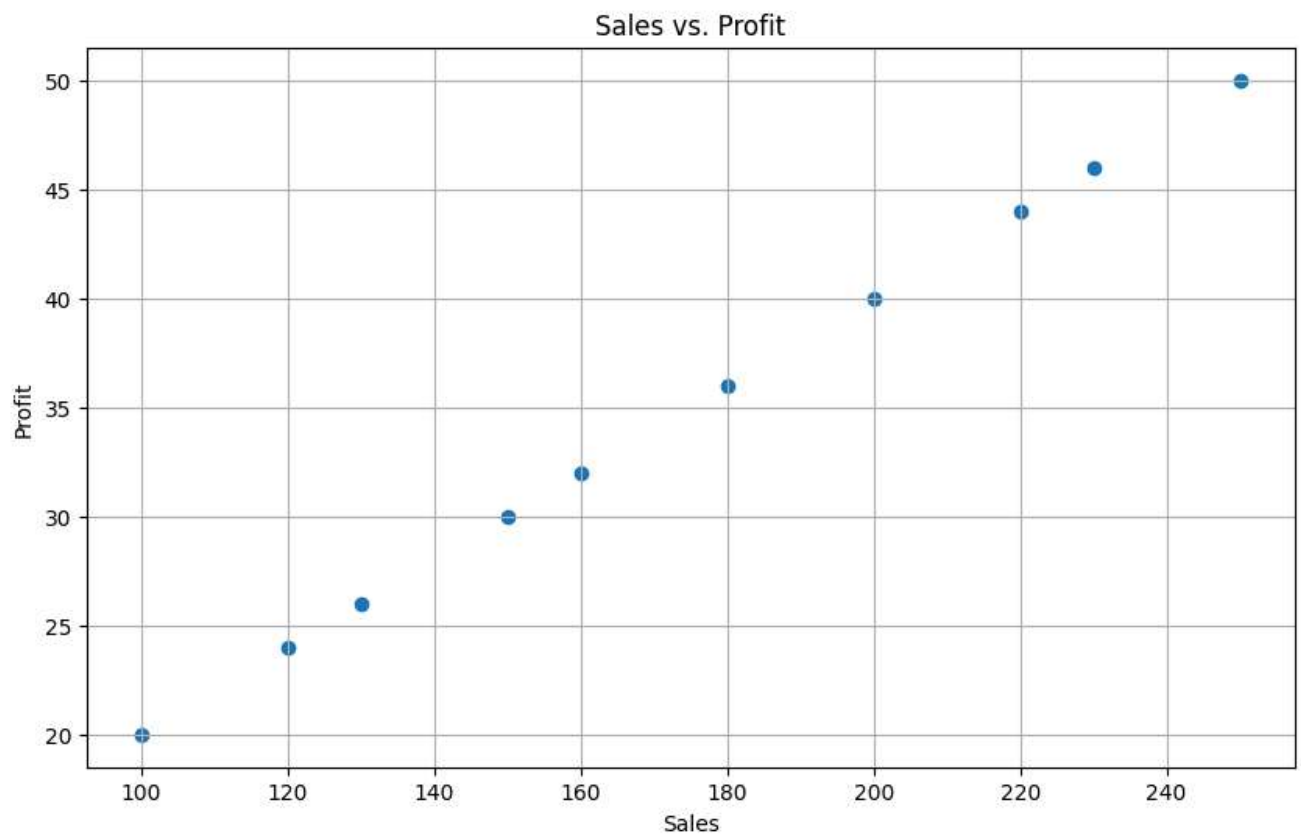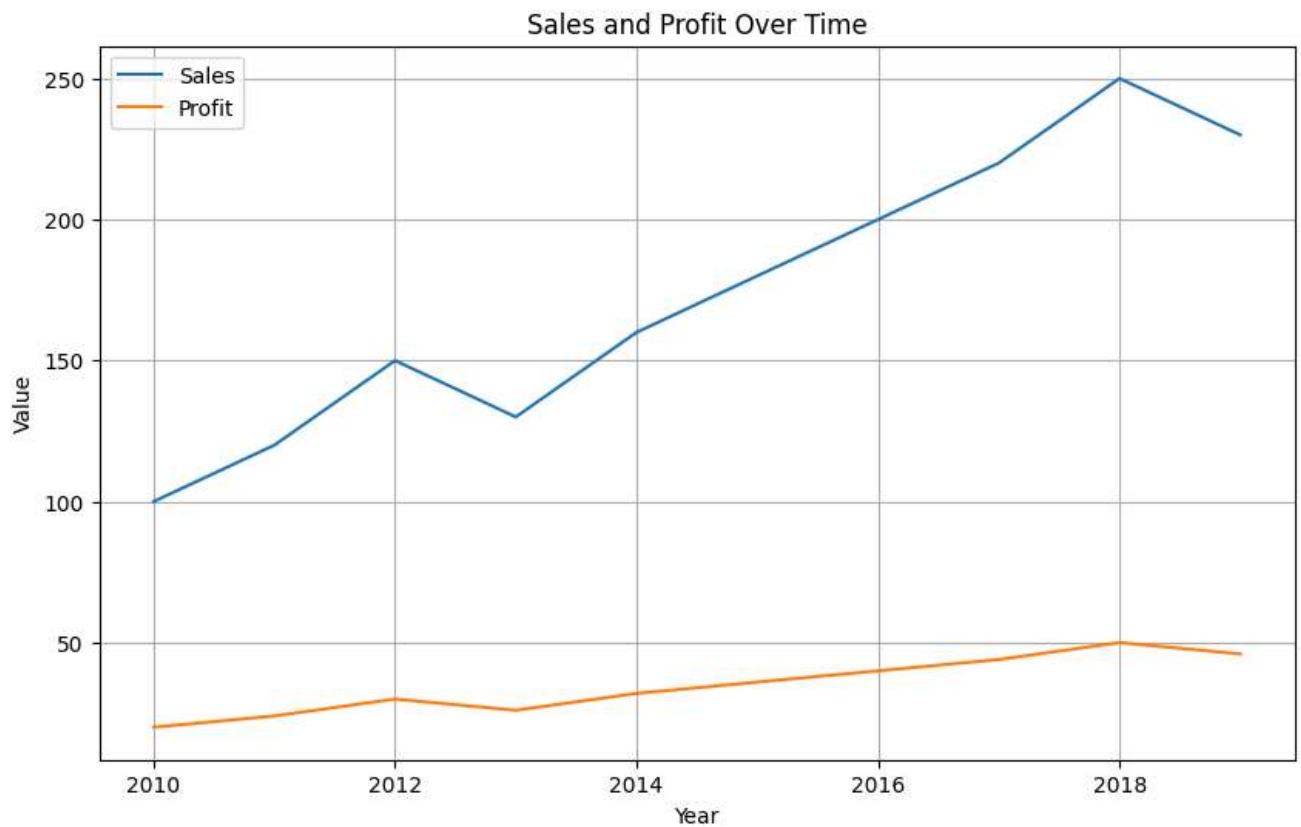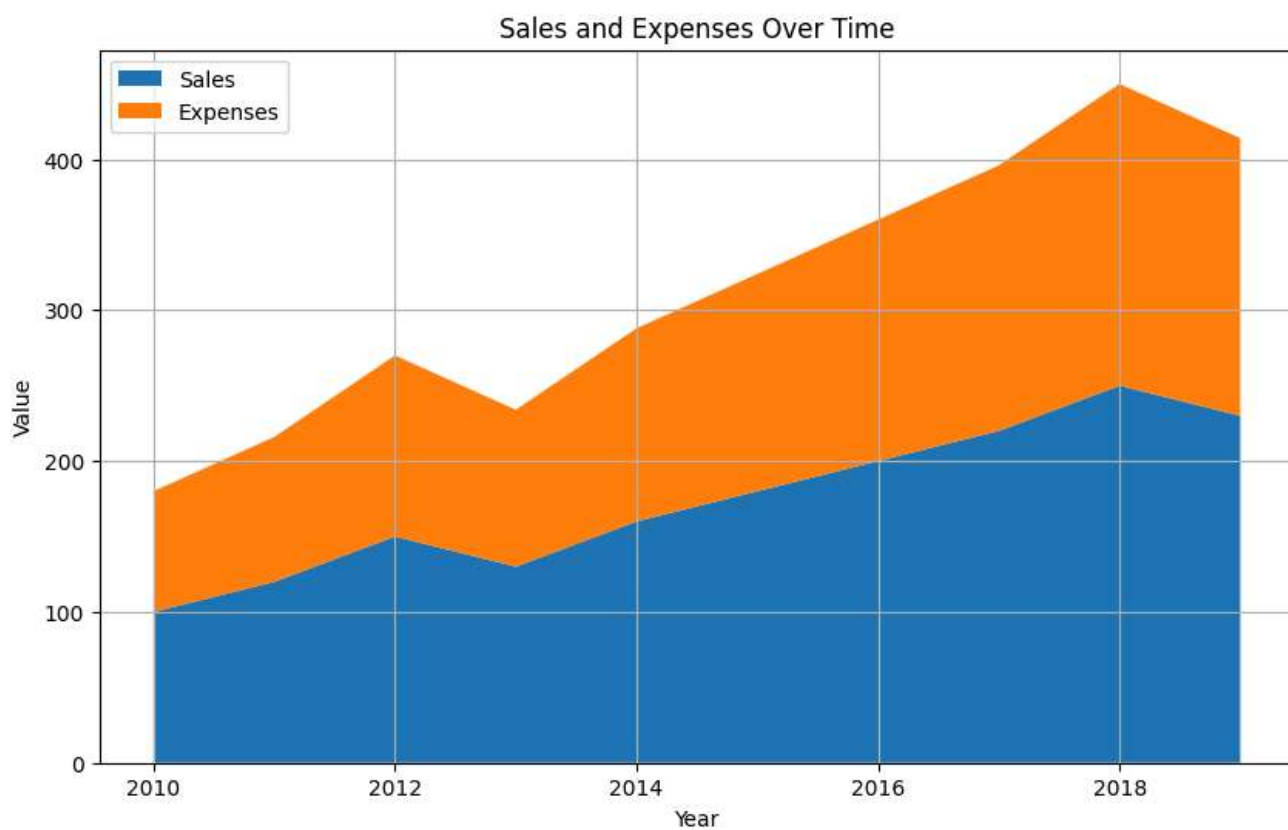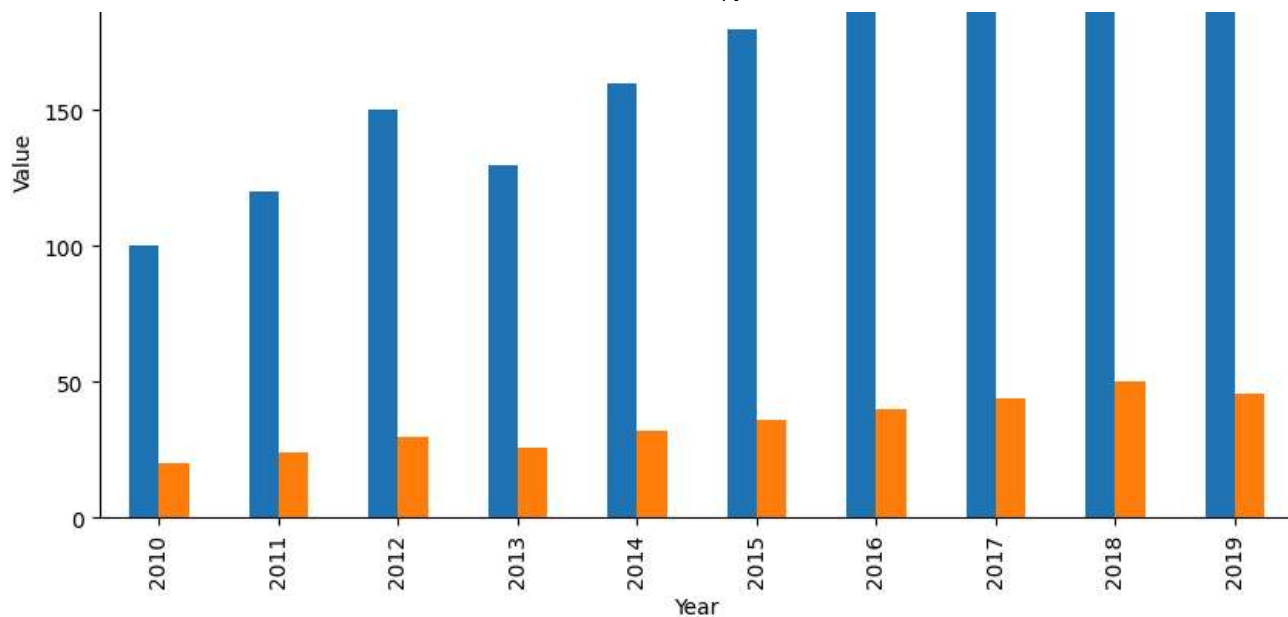
```python
plt.scatter(df['Sales'], df['Profit'])
plt.xlabel('Sales')
plt.ylabel('Profit')
plt.title('Sales vs. Profit')
plt.grid(True)
plt.show()

# 3. Bar Chart (grouped)
df.plot(x='Year', y=['Sales', 'Profit'], kind='bar', figsize=(10,6))
plt.xlabel("Year")
plt.ylabel("Value")
plt.title("Sales and Profit per year")
plt.show()

# 4. Area Plot
plt.figure(figsize=(10, 6))
plt.stackplot(df['Year'], df['Sales'], df['Expenses'], labels=['Sales', 'Expenses']) # Examp
plt.xlabel('Year')
plt.ylabel('Value')
plt.title('Sales and Expenses Over Time')
plt.legend()
plt.grid(True)
plt.show()

# 5. Seaborn Lineplot with multiple variables
plt.figure(figsize=(10,6))
sns.lineplot(x='Year', y='value', hue='variable', data=pd.melt(df, id_vars=['Year'], value_v
plt.xlabel('Year')
plt.ylabel('Value')
plt.title('Sales, Profit, and Expenses Over Time (Seaborn)')
plt.grid(True)
plt.show()
```
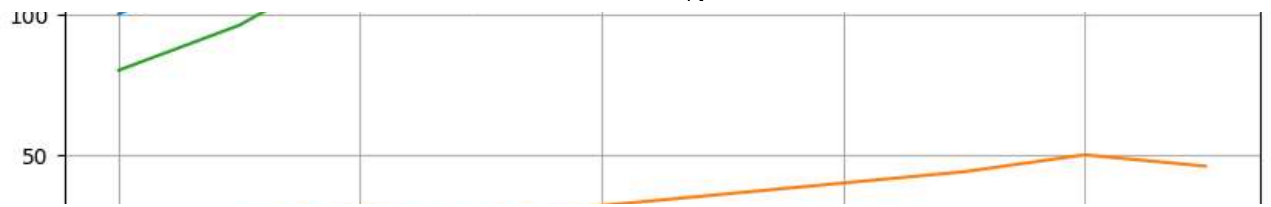
Sales and Profit Over Time

Sales vs. Profit

Sales and Profit per year

Sales and Expenses Over Time

Sales, Profit, and Expenses Over Time (Seaborn)

6. Histogram