Date: 31/01/2025 **EXP No:2**

Implement programs for visualizing time series data.

Aim:

To implement programs for visualizing time series data.

Objective:

The process is to analyze and give visualization of different time series data.

Background:

1. **Time series Data:** sequence of data points collected or recorded at successive time intervals
2. **Importance of Visualizations**. Visualizing time series data helps in identifying trends, patterns and anomalies
3. **Tools for Visualizations :** Various programming languages and libraries such as python with matplotlib, seaborn and pandas
4. **Challenges in Time Series Analysis :** Handling missing data, dealing with seasonality and ensuring data consistency are key challenges in time series analysis.
5. **Applications of time series Visualizations :** Time series visualizations is applied in multiple fields such as stock price prediction, health monitoring, traffic forecasting

Scope:

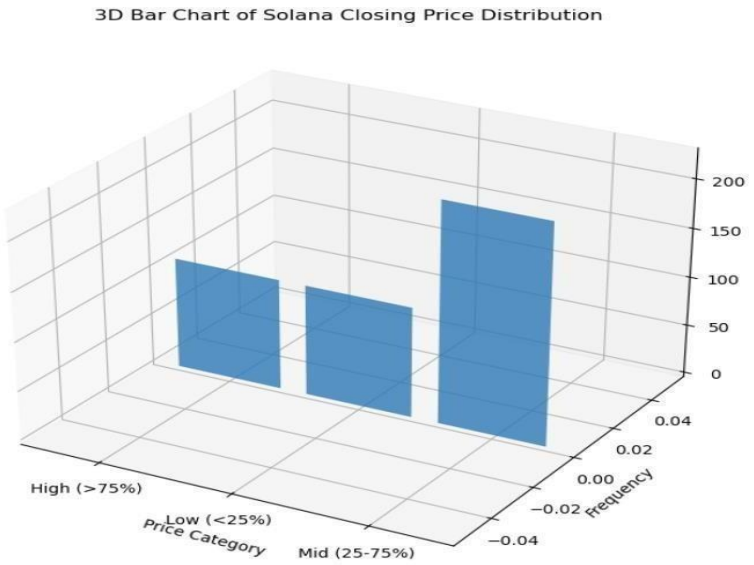
1. Enhancing data Interpretation,
2. Facilitating Predictive Analysis

Code:

```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import numpy as np
from mpl_toolkits.mplot3d import Axes3D

# Load the dataset
file_path = r"C:\Users\Lenovo\Downloads\coin_Solana.csv"
df = pd.read_csv(file_path)

# Convert Date column to datetime
df['Date'] = pd.to_datetime(df['Date'])

# Sorting by Date
df = df.sort_values(by='Date')

# Visualization 1: 3D Bar Chart for Closing Price Distribution
closing_price_ranges = ["Low (<25%)", "Mid (25-75%)", "High (>75%)"]
percentiles = np.percentile(df['Close'], [25, 75])
labels = []
for price in df['Close']:
    if price < percentiles[0]:
```

```
        labels.append(closing_price_ranges[0])
    elif price > percentiles[1]:
        labels.append(closing_price_ranges[2])
    else:
        labels.append(closing_price_ranges[1])
unique_labels, counts = np.unique(labels, return_counts=True)
fig = plt.figure(figsize=(8, 8))
ax = fig.add_subplot(111, projection='3d')
ax.bar(unique_labels, counts, zs=0, zdir='y', alpha=0.8)
ax.set_xlabel("Price Category")
ax.set_ylabel("Frequency")
ax.set_zlabel("Count")
ax.set_title("3D Bar Chart of Solana Closing Price Distribution")
plt.show()
```

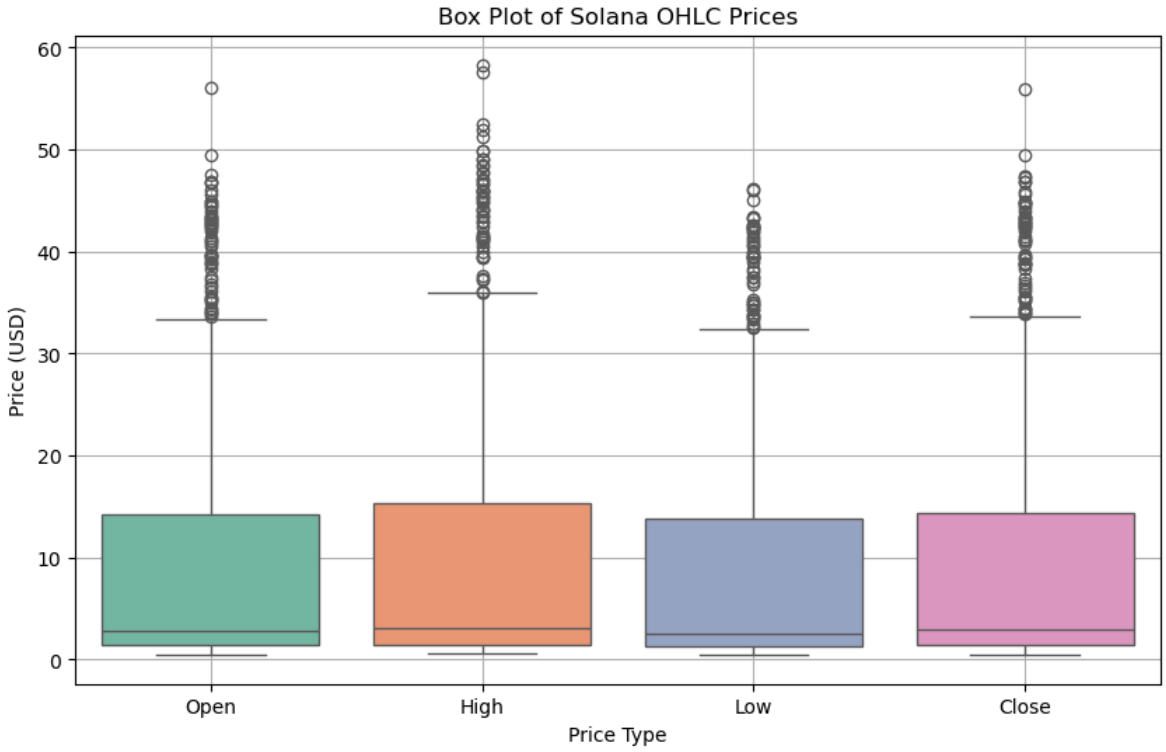
Output:



 # Visualization 2: Box Plot for OHLC Prices

```
plt.figure(figsize=(10, 6))
sns.boxplot(data=df[['Open', 'High', 'Low', 'Close']], palette="Set2")
plt.xlabel("Price Type")
plt.ylabel("Price (USD)")
plt.title("Box Plot of Solana OHLC Prices")
plt.grid()
plt.show()
```

Output:



 # Visualization 3: Histogram of Closing Prices

```
plt.figure(figsize=(10, 5)
sns.histplot(df['Close'], bins=30, kde=True, color='purple')
plt.xlabel("Closing Price (USD)")
plt.ylabel("Frequency")
plt.title("Distribution of Solana Closing Prices")
plt.grid()
plt.show()
```

Output:

 # Visualization 4: Scatter Plot of Volume vs. Closing Price

plt.figure(figsize=(10, 5))

plt.scatter(df['Volume'], df['Close'], alpha=0.5, color='red')

plt.xlabel("Trading Volume")

plt.ylabel("Closing Price (USD)")

plt.title("Trading Volume vs. Closing Price")

plt.xscale('log') # Log scale for better visualization

plt.grid()

plt.show()

Output:

 # Visualization 5: Heatmap for Correlation Between

Features plt.figure(figsize=(8, 6))

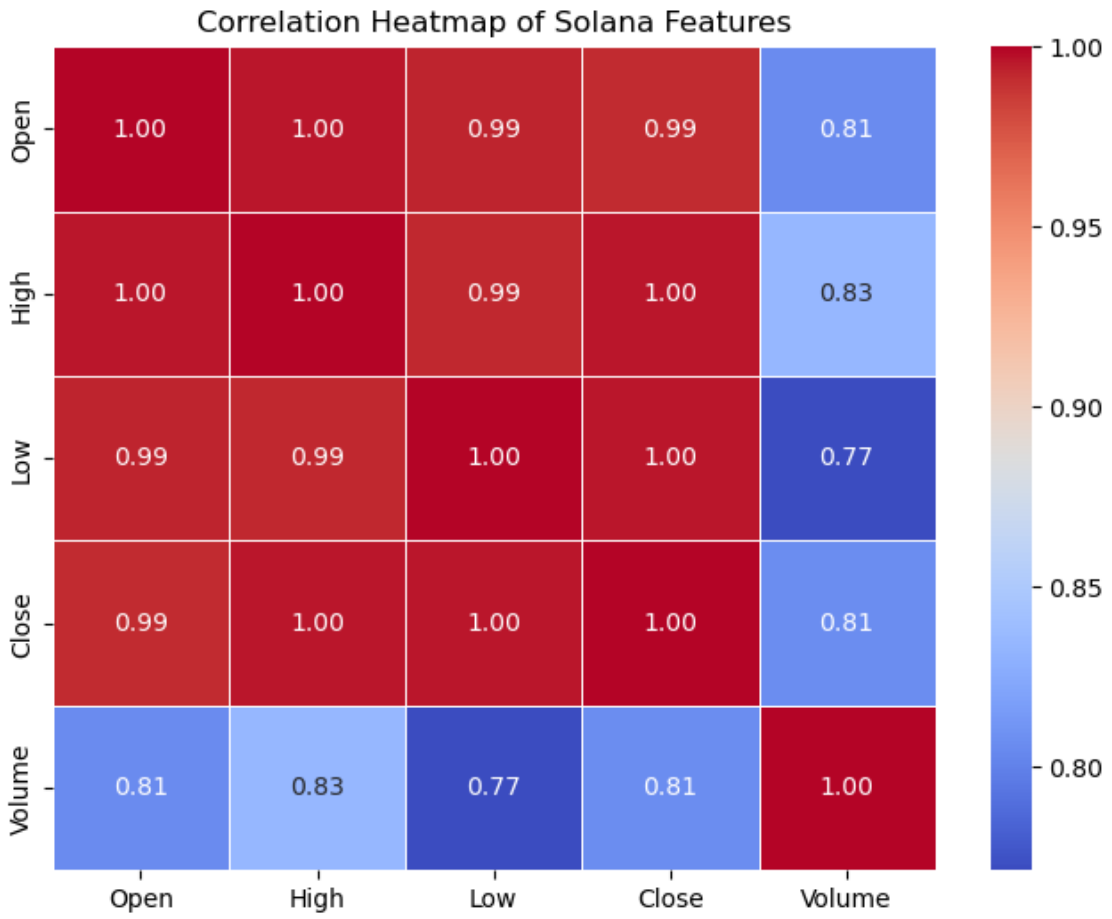
corr = df[['Open', 'High', 'Low', 'Close', 'Volume']].corr()

sns.heatmap(corr, annot=True, cmap='coolwarm', fmt='.2f', linewidths=0.5)

plt.title("Correlation Heatmap of Solana Features")

plt.show()

Output:



Result:

Thus the program to implement different visualization techniques has been implemented