EX:No.2 DATE: 25/01/2	**Implement programs for visualizing time series data.**

AIM:

To Implement programs for visualizing time series data.

ALGORITHM:

1. Load the Dataset
2. Convert data Column to Datetime Format
3. Calculate Average AQI Per Country
4. Display the Top 10 Most Polluted Countries
5. Analyze AQI Trends for a Specific Country
6. Plot the AQI Trend for the Selected Country
7. Generate and Display 5 Visualizations
8. End the Program

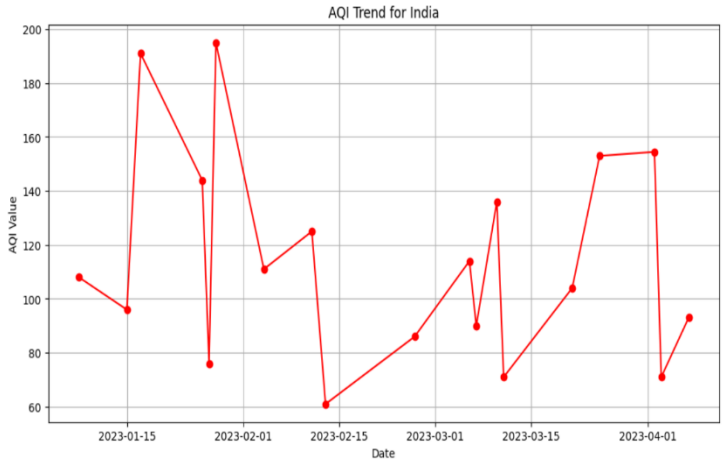
CODE:

```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
file_path = "data_date.csv"  # Update with the correct file path
df = pd.read_csv(file_path)
df['Date'] = pd.to_datetime(df['Date'])
aqi_avg = df.groupby("Country")['AQI Value'].mean().sort_values(ascending=False)
print("Top 10 most polluted countries:")
print(aqi_avg.head(10))
country = "India"
df_country = df[df['Country'] == country].groupby("Date")['AQI Value'].mean()
plt.figure(figsize=(12, 6))
plt.plot(df_country, marker='o', linestyle='-', color='r')
plt.title(f"AQI Trend for {country}")
plt.xlabel("Date")
```

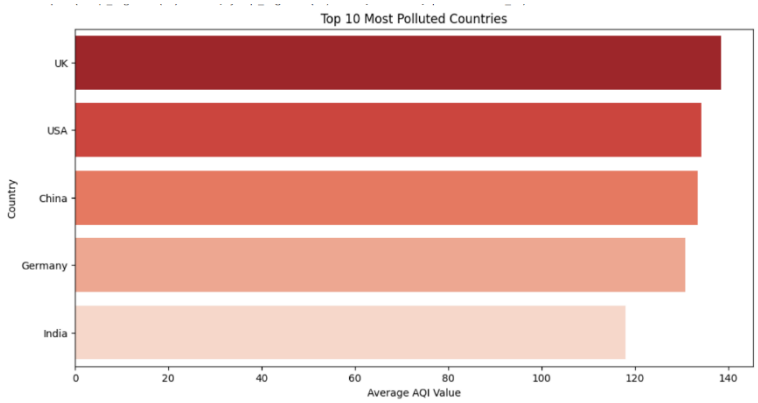
```
plt.ylabel("AQI Value")
plt.grid()
plt.show()
plt.figure(figsize=(12, 6))
sns.barplot(x=aqi_avg.head(10).values, y=aqi_avg.head(10).index, hue=None, palette="Reds_r")
plt.title("Top 10 Most Polluted Countries")
plt.xlabel("Average AQI Value")
plt.ylabel("Country")
plt.show()
plt.figure(figsize=(12, 6))
sns.histplot(df['AQI Value'], bins=30, kde=True, color='purple')
plt.title("AQI Value Distribution")
plt.xlabel("AQI Value")
plt.ylabel("Frequency")
plt.show()
plt.figure(figsize=(14, 6))
sns.boxplot(x='Country', y='AQI Value', data=df[df['Country'].isin(aqi_avg.head(10).index)],
hue=None, palette="coolwarm")
plt.title("AQI Value Distribution for Top 10 Polluted Countries")
plt.xlabel("Country")
plt.ylabel("AQI Value")
plt.show()
df_country_monthly = df[df['Country'] == country].resample('M', on='Date')['AQI Value'].mean()
plt.figure(figsize=(12, 6))
plt.plot(df_country_monthly, marker='s', linestyle='-', color='b')
plt.title(f"Monthly AQI Trend for {country}")
plt.xlabel("Date")
plt.ylabel("AQI Value")
plt.grid()
plt.show()
```

OUTPUT:

```
Top 10 most polluted countries:
Country
UK          138.434783
USA         134.277778
China       133.400000
Germany     130.846154
India       118.000000
Name: AQI Value, dtype: float64
```

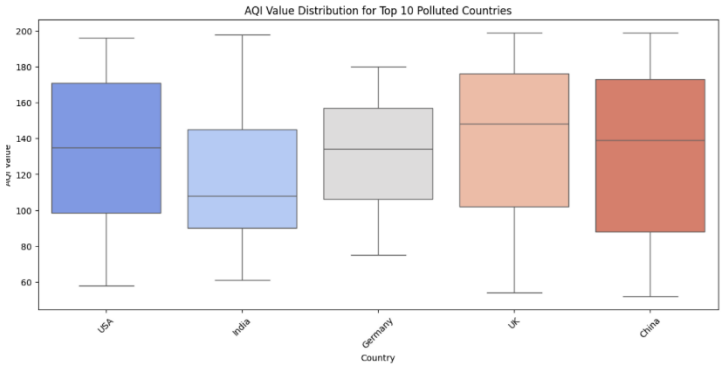


Plot 1: AQI trend for a specific country (e.g., India)

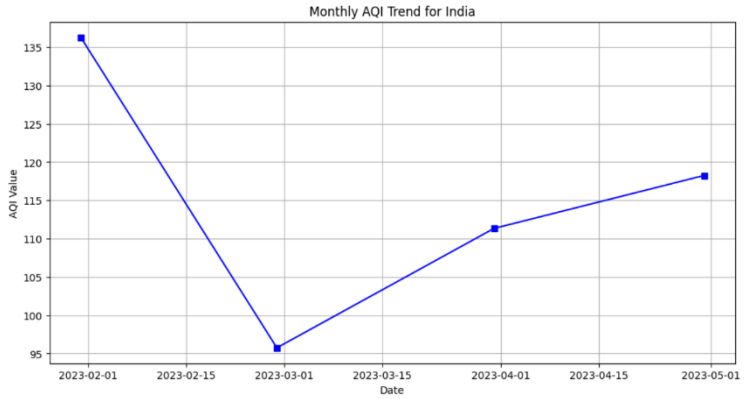


Plot 2: Top 10 most polluted countries

Plot 3: AQI distribution across all countries



Plot 4: Box plot of AQI values per country



Plot 5: Monthly AQI trend for the selected country

RESULT:

Thus the program has been completed and verified successfully.