EX.NO:8	Analyzing and visualizing time-series trends from datasets such as COVID-19 case statistics
DATE:	

AIM:

To analyze and visualize time-series data.

ALGORITHM:

1. Import necessary libraries
2. Load date-wise COVID-19 data from CSV using pandas
3. Convert Date to datetime, set as index, and (optionally) resample
4. Plot trends with matplotlib.

PROGRAM CODE :

EXAMPLE 1 : Using CSV file

```
import pandas as pd
import matplotlib.pyplot as plt
df = pd.read_csv("covid.csv", parse_dates=['Date'], index_col='Date')
df['Cases'].plot(label='Daily Cases')
df['Cases'].rolling(7).mean().plot(label='7-Day Average')
plt.legend()
plt.title("COVID-19 Trend")
plt.show()
```

EXAMPLE 2 : Using Raw data

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

# Sample COVID-19 time-series dataset (simulated)
data = { 'Date': pd.date_range(start='2021-01-01', periods=30, freq='D'),
   'Daily_Cases': [
      100, 120, 130, 125, 140, 150, 180,
      160, 170, 165, 200, 210, 220, 230,
      250, 240, 260, 280, 300, 290, 320,
      310, 330, 350, 370, 360, 380, 390,
      400, 420
   ]
}
```

```
df = pd.DataFrame(data)
df['7_day_avg'] = df['Daily_Cases'].rolling(window=7).mean()
 # 7-day moving average

# Plotting
plt.figure(figsize=(12, 6))
sns.lineplot(x='Date', y='Daily_Cases', data=df, label='Daily Cases')
sns.lineplot(x='Date', y='7_day_avg', data=df, label='7-Day Average', color='red')
plt.title('COVID-19 Daily Cases (with 7-Day Moving Average)')
plt.xlabel('Date')
plt.ylabel('Number of Cases')
plt.xticks(rotation=45)
plt.grid(True)
plt.legend()
plt.tight_layout()
plt.show()
```

RESULT:

Thus, python program is successfully implemented to analyze and visualize time-series trends from datasets such as COVID-19 case statistics.

EXERCISE:

1. Load a CSV file named stock_prices.csv containing columns like Date, Company, Open, Close, High, Low, Volume. Filter the data for a specific company (e.g., "Apple"), convert Date to datetime, and plot the closing price trend over time.
2. Given a dataset weather_data.csv with columns Date, City, Temperature, Humidity, Rainfall, filter the data for a city (e.g., "Delhi"), and plot the monthly average temperature trend over a year using a line chart.
3. Load a time-series dataset energy_consumption.csv with Timestamp, Region, Energy_ Consumed(kWh).Convert the timestamp, resample the data weekly, and plot the weekly average energy consumption for a region.
4. From a dataset air_quality.csv containing Date, City, PM2.5, PM10, NO2, analyze the AQI trend for a city (e.g., "Chennai").
   Plot the PM2.5 concentration over time and mark the days when it exceeded the safe limit (e.g., 100 μg/m³).
5. Using web_traffic.csv with columns Date, Page_Views, Users, Sessions, plot the daily page views over time.
   Calculate and plot the 7-day rolling average and identify periods of spikes or drops in traffic.