EX.No:3 DATE: 25/01/2	**Implement Program To Check Stationary of A Time Series**

AIM:

To analyze the stationarity of a time series dataset using the Augmented Dickey-Fuller (ADF) test and visualize the data.

ALGORITHM:

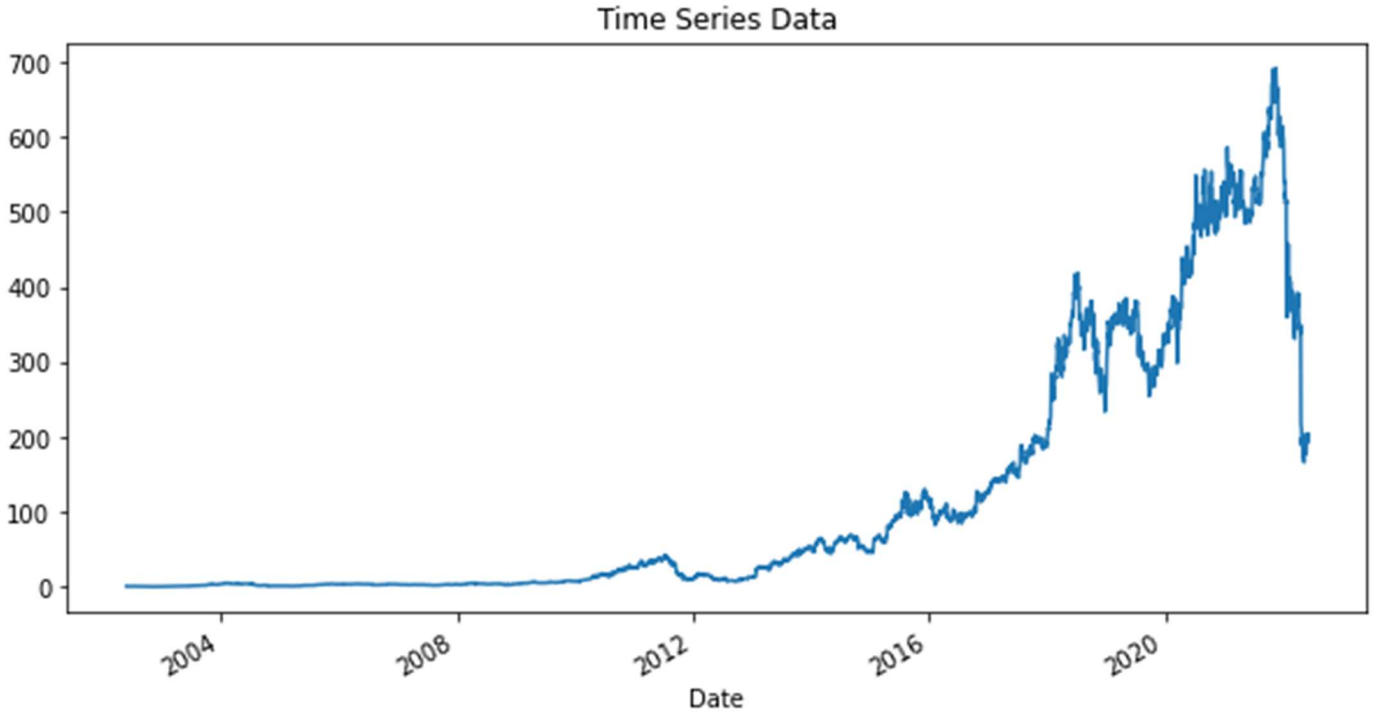
1. Load and preprocess the dataset by converting the date column to a datetime format and setting it as the index.
2. Perform the Augmented Dickey-Fuller (ADF) test to check the stationarity of the time series data.
3. Interpret ADF test results using statistical values such as the ADF statistic and p-value.
4. Visualize the original time series to understand trends and patterns over time.
5. Identify the presence of trends or seasonality that may affect stationarity.
6. Provide insights for further time series modeling, such as whether differencing or transformations are required.

CODE:

```
import pandas as pd
import matplotlib.pyplot as plt
from statsmodels.tsa.stattools import adfuller

# Load dataset
file_path = "C:\\Users\\exam\\Downloads\\NFLX.csv"
df = pd.read_csv(file_path, parse_dates=['Date'], index_col='Date')

# Select the time series column (assuming 'Close' price is the relevant series)
time_series = df['Close']

# Perform ADF test
def adf_test(series):
    result = adfuller(series, autolag='AIC')
    print("ADF Statistic:", result[0])
    print("p-value:", result[1])
    print("Critical Values:")
    for key, value in result[4].items():
        print(f"   {key}: {value}")
    if result[1] <= 0.05:
        print("Conclusion: The data is stationary.")
    else:
        print("Conclusion: The data is not stationary.")

# Plot time series
time_series.plot(title="Time Series Data", figsize=(10,5))
```

```
plt.show()

# Run ADF test
adf_test(time_series)
```

OUTPUT:



RESULT:

Thus the program has been completed and verified successfully.