EXP:4 20/02/2025	Implementing to check stationary of a time series data

AIM:

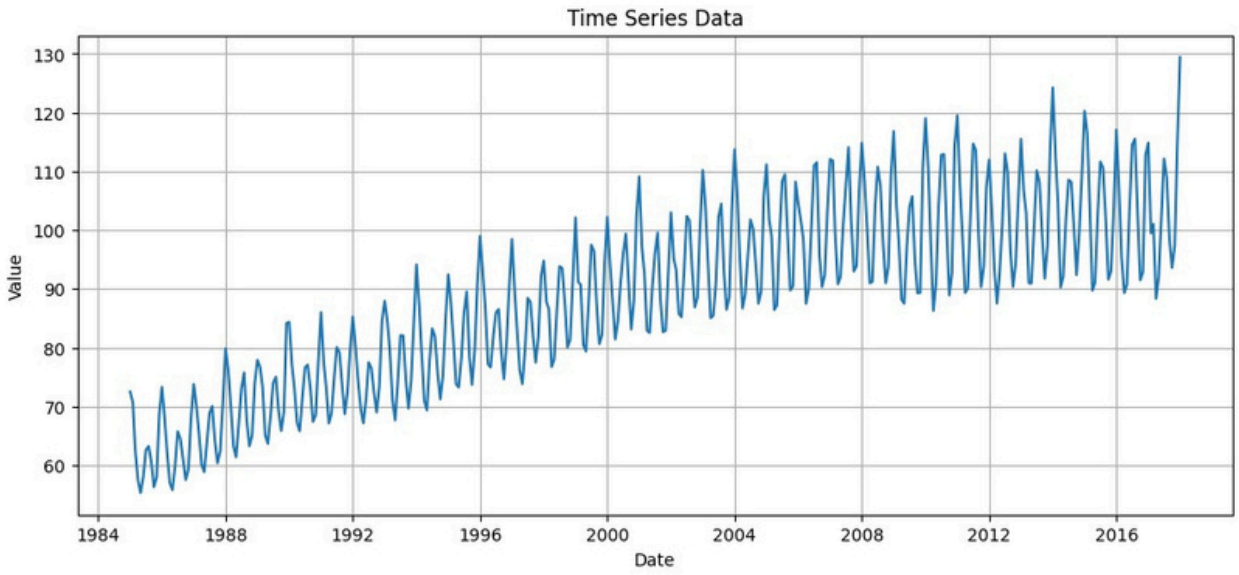
To Implement the program to check stationary of a time series data

PROCEDURE:

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

from google.colab import files
uploaded = files.upload("saleOfShampoo.csv")

file_name = list(uploaded.keys())[0]
df= pd.read_csv(file_name)

# Ensure the date column is in datetime format
df.iloc[:, 0] = pd.to_datetime(df.iloc[:, 0])
df.set_index(df.columns[0], inplace=True)

# Plot the time series
plt.figure(figsize=(12, 5))
plt.plot(df)
plt.title("Time Series Data")
plt.xlabel("Date")
plt.ylabel("Value")
plt.grid()
plt.show()
```

```
 # Perform Augmented Dickey-Fuller Test
def adf_test(series):
    result = adfuller(series.dropna()) # Drop NaN values if any
    labels = ['ADF Statistic', 'p-value', '# Lags Used', 'Number of
Observations Used']
    for label, value in zip(labels, result[:4]):
        print(f"{label}: {value}")

    if result[1] <= 0.05:
        print("The time series is stationary (reject H0).")
    else:
        print("The time series is non-stationary (fail to reject H0).")
```

OUTPUT:



ADF Statistic: -2.256990350047235
p-value: 0.1862146911658712
Lags Used: 15
Number of Observations Used: 381

```
The time series is non-stationary (fail to reject H0).
```

RESULT:

Thus the program has been executed successfully.