EXPERIMENT-4 Implement programs to check stationary of a time series data.

AIM:

To implement programs to check stationary of a time series data.

PROCEDURE:

1. Import the necessary libraries.

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from statsmodels.tsa.stattools import adfuller, kpss
```

2. Load the time series dataset.

```
file_path = "C:/Users/Lenovo/Downloads/PRICE_AND_DEMAND_201801_NSW1.csv"
df = pd.read_csv(file_path, parse_dates=['SETTLEMENTDATE'], index_col='SETTLEMENTDATE')
```

3. Check for the stationarity of the time series data.

```
def kpss_test(series):
result = kpss(series.dropna(), regression='c', nlags="auto")
print("\nKPSS Test:")
print(f"Test Statistic: {result[0]:.4f}")
print(f"p-value: {result[1]:.4f}")
print(f"Critical Values: {result[3]}")
if result[1] < 0.05:
    print("Conclusion: Reject Null Hypothesis (Data is Non-Stationary)")
else:
    print("Conclusion: Fail to Reject Null (Data is Stationary)")
```

adf_test(series)

kpss_test(series)

```
ADF Test:
Test Statistic: -4.5267
p-value: 0.0002
Critical Values: {'1%': -3.434827656046504, '5%': -2.86351758903648, '10%'
: -2.5678228503262757}
Conclusion: Reject Null Hypothesis (Data is Stationary)

KPSS Test:
Test Statistic: 0.5265
p-value: 0.0357
Critical Values: {'10%': 0.347, '5%': 0.463, '2.5%': 0.574, '1%': 0.739}
Conclusion: Reject Null Hypothesis (Data is Non-Stationary)
```

RESULT:

Thus the program to check for stationarity of the time series data has been implemented

successfully and verified.