7.Implement program for decomposing time series data into trend and seasonality.

AIM:

To implement programs for decomposing time series data into trend and seasonality.

PROCEDURE:

1.Import the necessary libraries:

import pandas as pd

import matplotlib.pyplot as plt

from statsmodels.tsa.seasonal import seasonal_decompose

2. Load dataset:

url = "/PRICE_AND_DEMAND_201801_NSW1.csv"

3. Read the CSV file without parsing dates initially:

df = pd.read_csv(url)

4. Print the column names to check for typos or case sensitivity issues:

print(df.columns)

5. Assuming the actual column name is 'SETTLEMENTDATE' based on the dataset:

df['SETTLEMENTDATE'] = pd.to_datetime(df['SETTLEMENTDATE'])

df = df.set_index('SETTLEMENTDATE')

6. Ensure the data is a time series:

```
series = df['TOTALDEMAND']
```

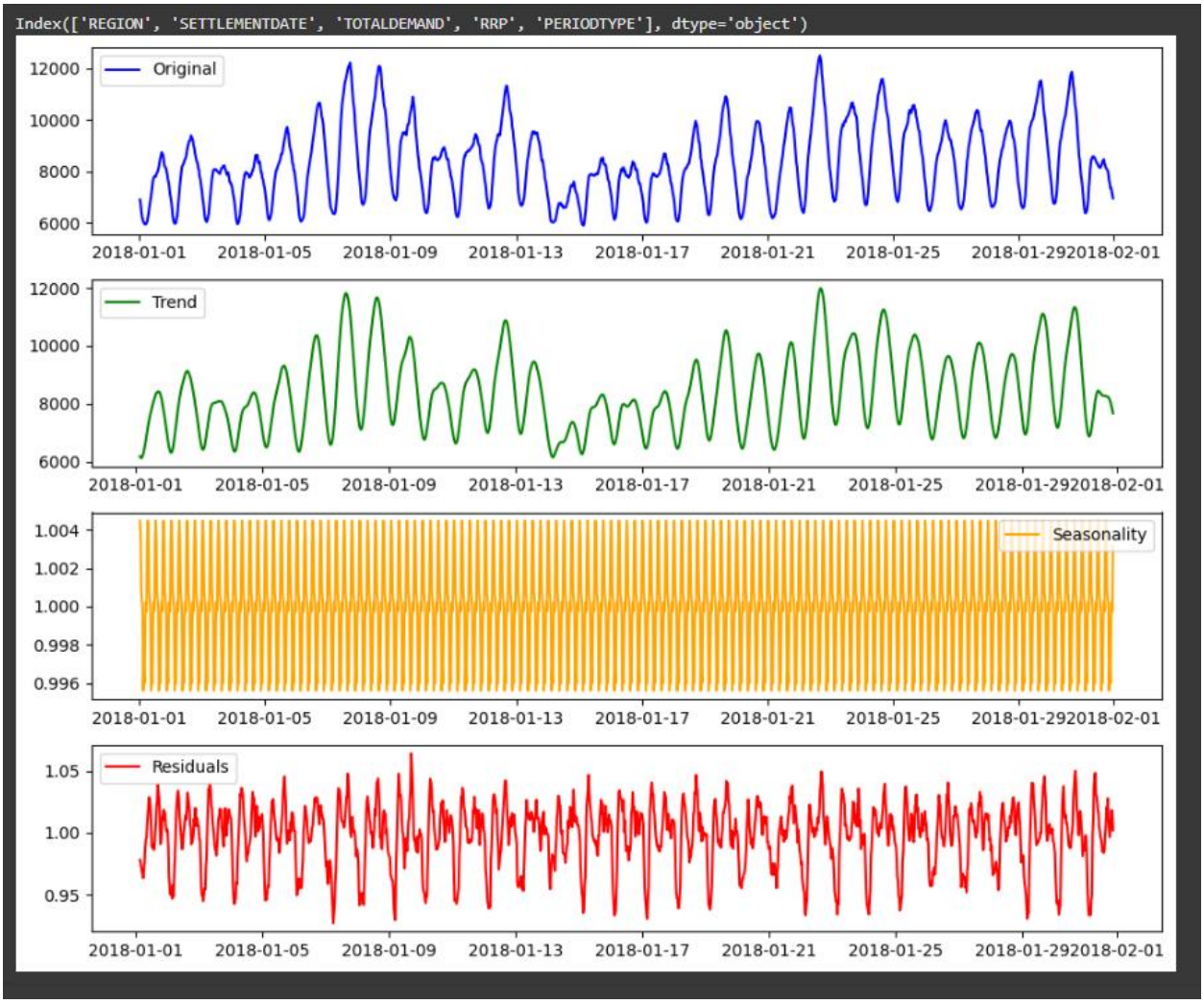
7. Perform decomposition:

```
result = seasonal_decompose(series, model='multiplicative', period=12)
```

8. Plot decomposition:

```
plt.figure(figsize=(10, 8))
plt.subplot(411)
plt.plot(series, label='Original', color='blue')
plt.legend()
plt.subplot(412)
plt.plot(result.trend, label='Trend', color='green')
plt.legend()
plt.subplot(413)
plt.plot(result.seasonal, label='Seasonality', color='orange')
plt.legend()
plt.subplot(414)
plt.plot(result.resid, label='Residuals', color='red')
plt.legend()
plt.tight_layout()
plt.show()
```

OUTPUT:



RESULT:

Thus the program has been executed and implemented successfully.