EX.No.7 **DECOMPOSING TIME SERIES DATA INTO TREND AND SEASONALITY**

Date:03.04.25

AIM:

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

Procedure and Code:

Step1:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from statsmodels.tsa.seasonal import seasonal_decompose
```

Step2:

```
 file_path = '/mnt/data/GOOGL.csv'
df = pd.read_csv(file_path)
print("Dataset preview:")
print(df.head())
```

Step3:

```
# Perform decomposition
result = seasonal_decompose(df['Passengers'], model='multiplicative',
period=12)
```

Step4:

```
# Plot the decomposition
plt.figure(figsize=(10, 8))
```

Step5: plt.subplot(411)

```
plt.plot(df['Passengers'], label='Original Time Series')
plt.legend()
```

Step6:

```
plt.subplot(412)
plt.plot(result.trend, label='Trend', color='orange')
plt.legend()
```

Step7:

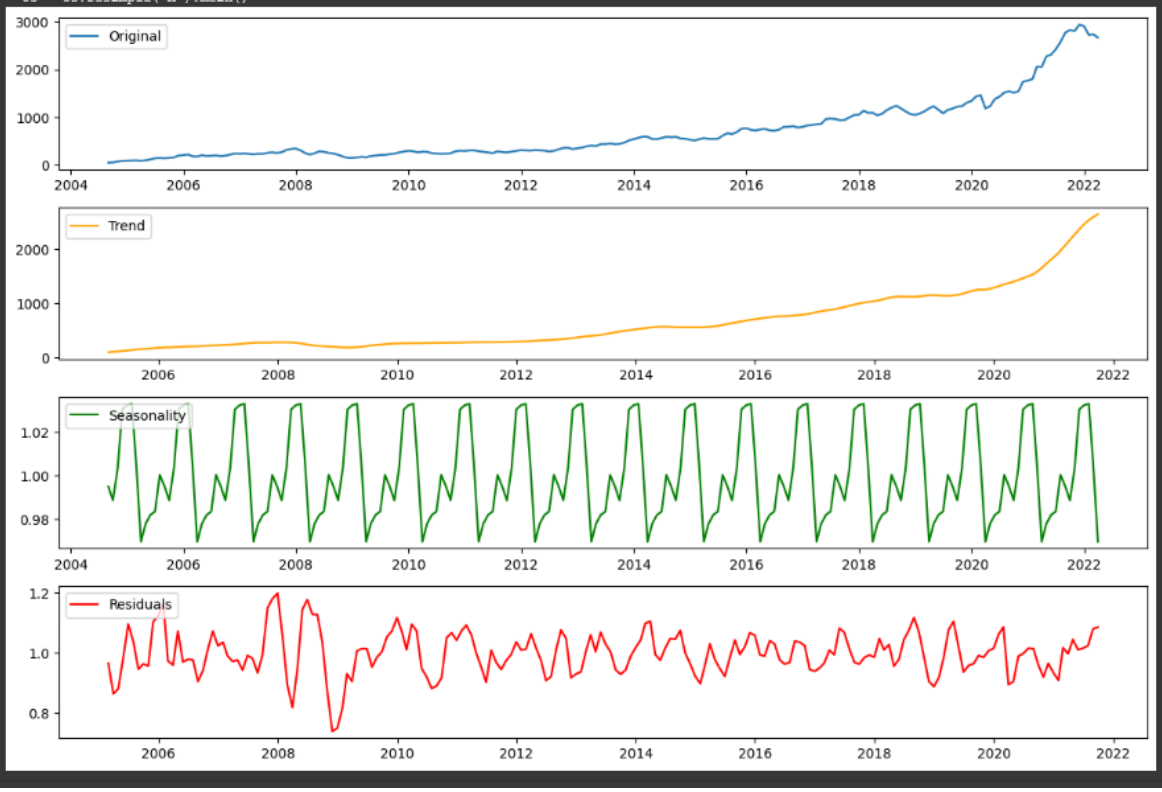
```
plt.subplot(413)
plt.plot(result.seasonal, label='Seasonality', color='green')
plt.legend()
```

Step 8:

```
plt.tight_layout()
plt.show()
```

OUTPUTS:

```
Dataset preview:
         Date       Open       High        Low      Close  Adj Close    Volume
0  2004-08-19  50.050049  52.082081  48.028027  50.220219  50.220219  44659096
1  2004-08-20  50.555557  54.594597  50.300301  54.209209  54.209209  22834343
2  2004-08-23  55.430431  56.796799  54.579578  54.754753  54.754753  18256126
3  2004-08-24  55.675674  55.855858  51.836838  52.487488  52.487488  15247337
4  2004-08-25  52.532532  54.054054  51.991993  53.053055  53.053055   9188602
<ipython-input-1-75009eecb6a2>:20: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME' instead.
  ts = ts.resample('M').mean()
```



RESULT:

The program to execute trend in time series data and seasonality has been executed successfully.