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

EX.N0 : 7	**Implement program for decomposing time series data into trend and seasonality**
DATE : 07/04/2025	

AIM:

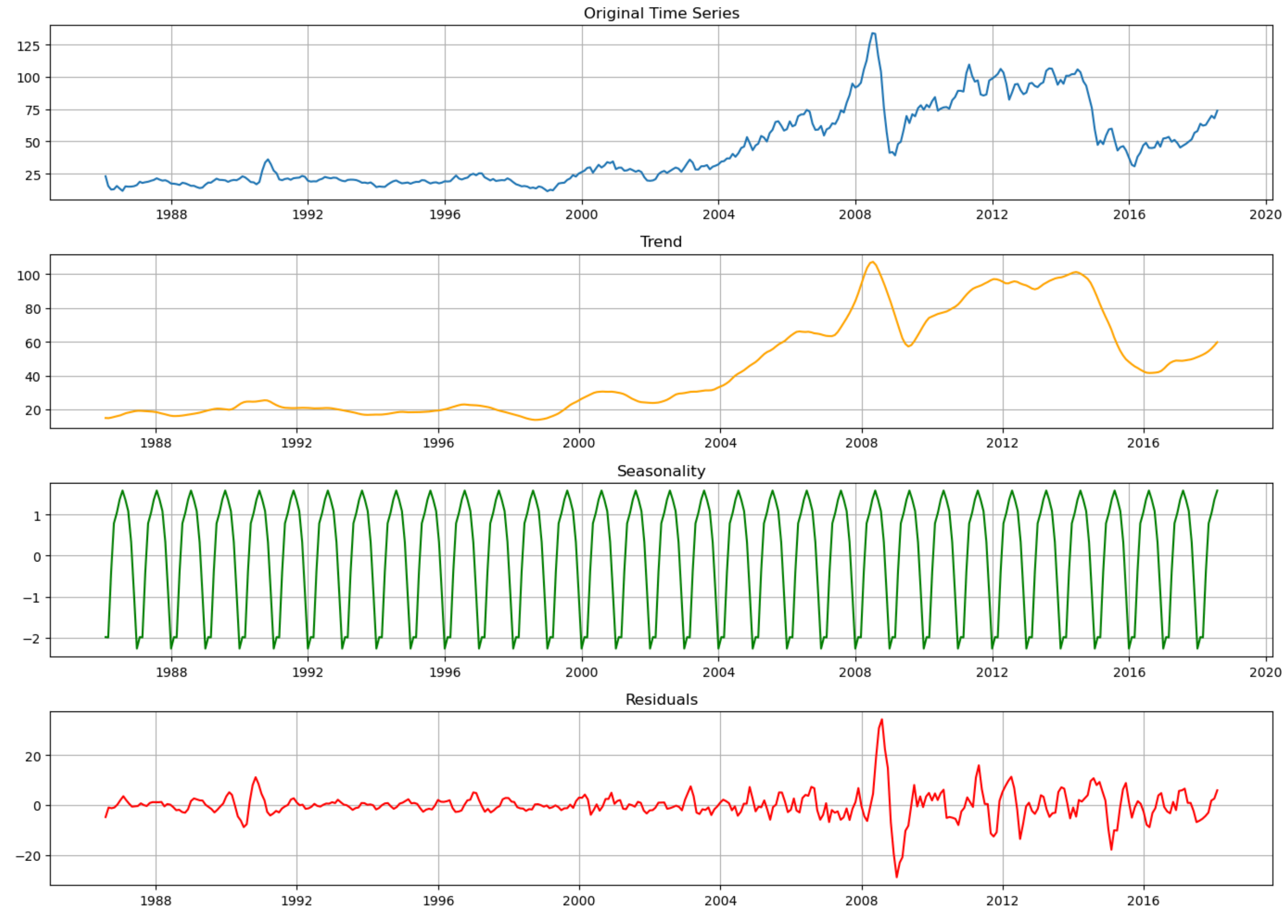
To Implement program for decomposing time series data into trend and seasonality.

PROGRAM:

```
import pandas as pd
import matplotlib.pyplot as plt
from statsmodels.tsa.seasonal import seasonal_decompose
'
file_path = r"C:\Users\heman\OneDrive\Desktop\abdul\TSA\EX 6\Crude Oil Prices Daily.xlsx"
df = pd.read_csv(file_path, parse_dates=['Date'], index_col='Date')

df.columns = df.columns.str.strip()

print("\n Available columns:", df.columns)
target_col = "Adj Close"
if target_col not in df.columns:
 raise ValueError(f"'{target_col}' column not found in the dataset.")

ts = df[target_col].dropna()

result = seasonal_decompose(ts, model='additive', period=30)

plt.figure(figsize=(12, 10))
plt.subplot(411)
plt.plot(ts, label="Original", color='blue')
plt.title("Original Time Series")
plt.legend()
plt.subplot(412)
plt.plot(result.trend, label="Trend", color='orange')
plt.title("Trend Component")
plt.legend()
plt.subplot(413)
plt.plot(result.seasonal, label="Seasonality", color='green')
plt.title("Seasonal Component")
plt.legend()
plt.subplot(414)
plt.plot(result.resid, label="Residuals", color='red')
plt.title("Residual Component")
```

```
plt.legend()
plt.tight_layout()
plt.suptitle("Time Series Decomposition of Gold Price", fontsize=16, y=1.02)
plt.show()
```

<u>OUTPUT</u>:



<u>RESULT</u>:

Thus, the program for Implement program for decomposing time series data into trend and seasonality is executed successfully.