EXERCISE NO 07

IMPLEMENT PROGRAM FOR DECOMPOSING TIME SERIES DATA INTO TREND AND SEASONALITY.

AIM:
To implement a program 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 the time series data.

```
# Load dataset
file_path = "/content/amazon.csv"
df = pd.read_csv(file_path, encoding='latin1')
```

3. Pre-process the data.

```
# Map Portuguese month names to English
month_map = {
    'Janeiro': 'January', 'Fevereiro': 'February', 'Março': 'March',
    'Abril': 'April', 'Maio': 'May', 'Junho': 'June',
    'Julho': 'July', 'Agosto': 'August', 'Setembro': 'September',
    'Outubro': 'October', 'Novembro': 'November', 'Dezembro': 'December'
}

df['month'] = df['month'].map(month_map)
df['date'] = pd.to_datetime(df['month'] + ' ' + df['year'].astype(str), format='%B %Y',
errors='coerce')
df.set_index('date', inplace=True)

df_monthly = df.resample('ME')['number'].sum()
```

4. Decompose the time series:

decomposition = seasonal_decompose(df_monthly, model='additive', period=12)

5. Visualization:

decomposition.plot()
plt.show()

Output: