EXP:3 06/02/2025	LINEAR REGRESSION MODEL

AIM:

To Develop and Implement a linear regression model for forecasting time series data. .

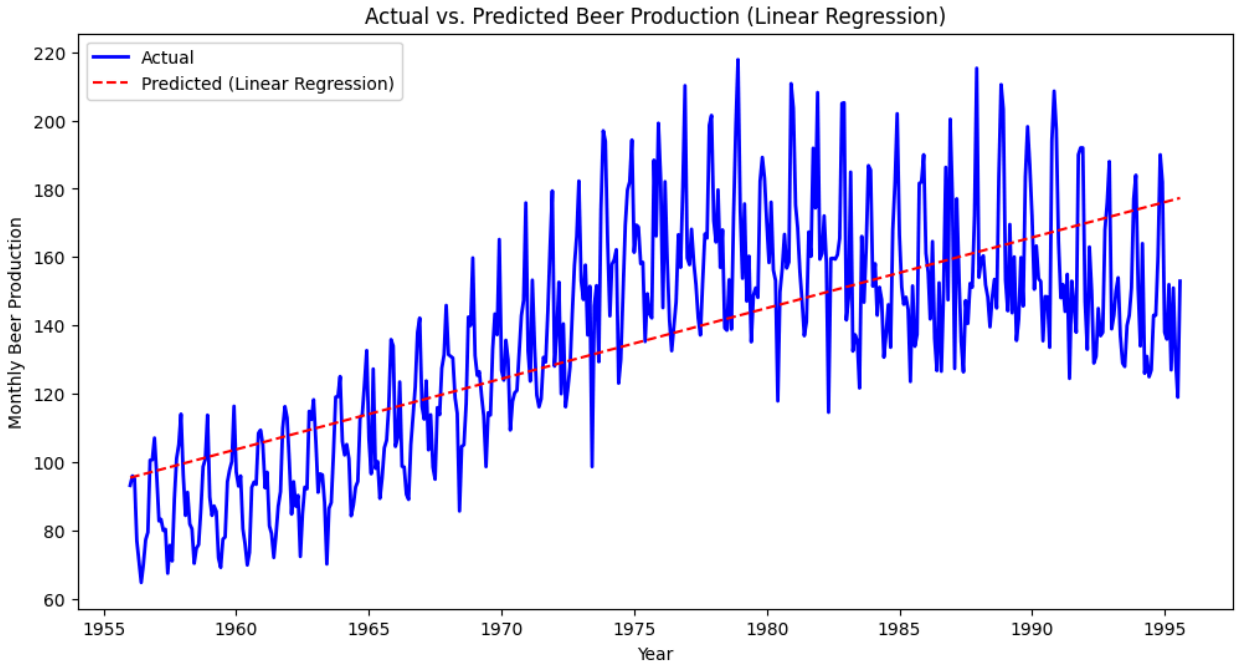
PROCEDURE:

1)Install necessary libraries

```
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np
from sklearn.linear_model import LinearRegression

2) Load the dataset
file_path = "monthly-beer.csv"
df = pd.read_csv(file_path)

3) Convert 'Month' to datetime format
df['Month'] = pd.to_datetime(df['Month'])

4) Create numerical time index
df['Time_Index'] = np.arange(len(df))

5)Define features (X) and target variable (y)
X = df[['Time_Index']]
y = df['Monthly beer production']

6) Train a linear regression model
model = LinearRegression()
model.fit(X, y)

7)Predict values
df['Predicted'] = model.predict(X)

8)Plot actual vs predicted values
plt.figure(figsize=(12, 6))
```

```
plt.plot(df['Month'], df['Monthly beer production'], label='Actual',
color='blue', linewidth=2)
plt.plot(df['Month'], df['Predicted'], label='Predicted (Linear
Regression)', color='red', linestyle='dashed')
plt.xlabel("Year")
plt.ylabel("Monthly Beer Production")
plt.title("Actual vs. Predicted Beer Production (Linear Regression)")
plt.legend()
plt.show()
```

OUTPUT:



RESULT:

Thus the Model has beenImplemented and executed successfully