1. Implement programs for time series data cleaning, loading and handling times series data and pre-processing techniques.

EX.N0 : 1	**Implement programs for time series data cleaning, loading and handling times series data and pre-processing techniques.**
DATE : 25/01/2025	

AIM:

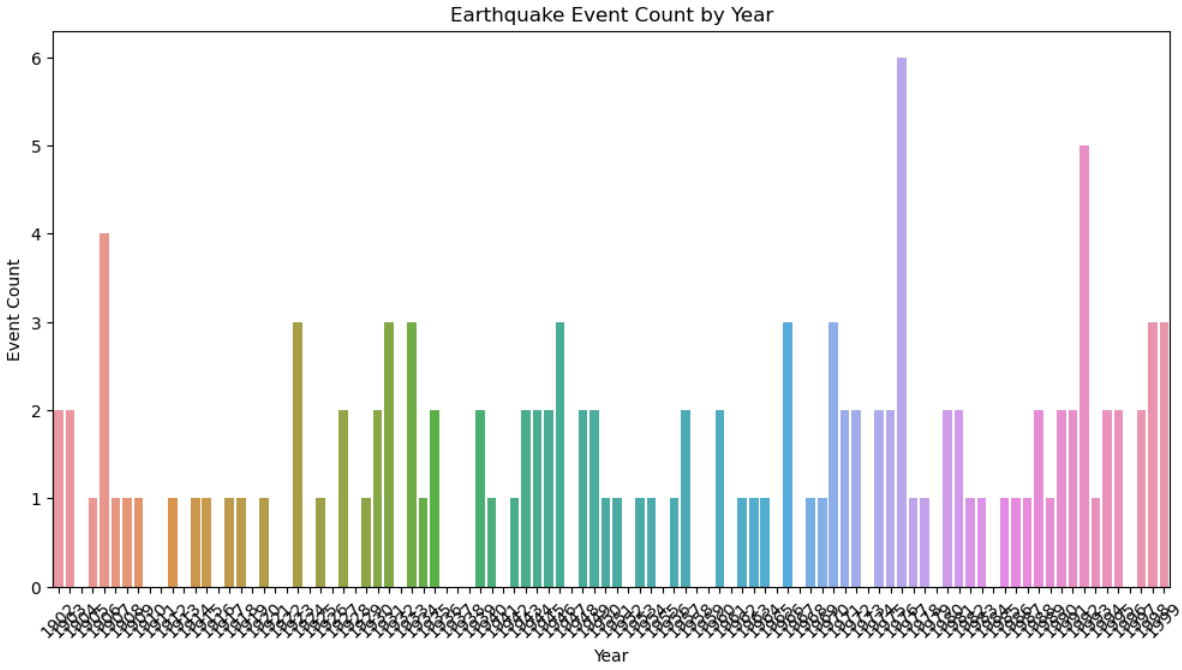
To Implement programs for time series data cleaning, loading and handling times series data and pre-processing techniques.

PROGRAM:

```
 import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.cluster import KMeans
from datetime import datetime

# Function to load dataset
def load_dataset(file_path):
    """
    Load a time series disaster dataset.

    Args:
        file_path (str): Path to the dataset file.

    Returns:
        DataFrame: Loaded dataset.
    """
    try:
        data = pd.read_csv(file_path)
        print("Dataset loaded successfully.")
        return data
    except Exception as e:
        print(f"Error loading dataset: {e}")
        return None

# Function to clean dataset
def clean_dataset(data):
    """
    Clean the disaster dataset by handling missing values and duplicates.
```

```
    Args:
        data (DataFrame): Input dataset.

    Returns:
        DataFrame: Cleaned dataset.
    """
    print("Cleaning dataset...")
# Combine 'year', 'month', and 'day' into a single 'date' column
    data['month'] = data['month'].apply(lambda x: datetime.strptime(x, '%B').month if
isinstance(x, str) else x)
    data['date'] = pd.to_datetime(data[['year', 'month', 'day']])
    data.drop(columns=['year', 'month', 'day'], inplace=True)

    # Handle missing values
    data['area'].fillna('Unknown', inplace=True)
    data['region'].fillna('Unknown', inplace=True)
    data['deaths'].fillna(data['deaths'].median(), inplace=True)

    # Remove duplicates
    data = data.drop_duplicates()

    # Sort by date
    data.sort_values(by='date', inplace=True)

    print("Dataset cleaned.")
    return data

# Function to preprocess time series data
def preprocess_timeseries(data):
    """
    Preprocess the disaster dataset by resampling and feature extraction.

    Args:
        data (DataFrame): Input dataset.

    Returns:
        DataFrame: Preprocessed dataset.
    """
    print("Preprocessing dataset...")

    # Resample to yearly data
    data_resampled = data.set_index('date').resample('Y').agg({
        'richter': 'mean',      # Average magnitude per year
        'deaths': 'sum',        # Total deaths per year
        'area': 'count',        # Count of events per year (proxy for frequency)
    }).rename(columns={'area': 'event_count'})
```

OUTPUT:



RESULT:

Thus, the program for Implement programs for time series data cleaning, loading and handling times series data and pre-processing techniques is executed successfully.