```python
# This Python 3 environment comes with many helpful analytics libraries installed
# It is defined by the kaggle/python Docker image: https://github.com/kaggle/docker-python
# For example, here's several helpful packages to load

import numpy as np # linear algebra
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)

# Input data files are available in the read-only "../input/" directory
# For example, running this (by clicking run or pressing Shift+Enter) will list all files under the input directory

import os
for dirname, _, filenames in os.walk('/kaggle/input'):
    for filename in filenames:
        print(os.path.join(dirname, filename))

# You can write up to 20GB to the current directory (/kaggle/working/) that gets preserved as output when you create a version using
# You can also write temporary files to /kaggle/temp/, but they won't be saved outside of the current session
```

```
/kaggle/input/bax-for-xgb/df_bax_cleaned_to_view_outliers.csv
```

```python
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import xgboost as xgb
from sklearn.model_selection import train_test_split
from sklearn.metrics import mean_squared_error, mean_absolute_error
```

```python
df = pd.read_csv('/kaggle/input/bax-for-xgb/df_bax_cleaned_to_view_outliers.csv')
df
```

	Date	Price	Open	High	Low	Vol.	Change %
0	2010-05-24	1482.42	1491.98	1491.98	1482.42	926980.0	-0.64
1	2010-05-25	1454.85	1482.42	1482.42	1454.85	1660000.0	-1.86
2	2010-05-26	1472.29	1456.50	1472.29	1454.85	1500000.0	1.20
3	2010-05-27	1453.82	1472.29	1478.07	1453.82	2480000.0	-1.25
4	2010-05-30	1455.16	1453.82	1462.04	1453.72	5910000.0	0.09
...	...	...	...	...	...	...	...
3654	2025-03-05	1975.92	1980.24	1980.71	1974.02	818340.0	-0.21
3655	2025-03-06	1973.89	1975.92	1975.92	1973.89	294350.0	-0.10
3656	2025-03-23	1965.58	1962.09	1967.91	1955.49	611460.0	-0.42
3657	2025-03-25	1957.49	1951.62	1957.49	1942.88	1100000.0	-0.41
3658	2025-03-27	1951.36	1954.72	1954.72	1945.34	457910.0	-0.31

3659 rows × 7 columns

```python
# --- 1. Data Preprocessing and Feature Engineering ---

# Convert 'Date' column to datetime objects and set it as the index
df['Date'] = pd.to_datetime(df['Date'])
df.set_index('Date', inplace=True)
```

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# Select only the 'Price' column for our forecasting task
data = df[['Price']].copy()
```

```python
# Create lagged features to convert the time series problem into a supervised learning problem.
# We will use the prices from the last 1, 2, 3, 5, and 10 days to predict the current day's price.
lags = [1, 2, 3, 5, 10]
for lag in lags:
    data[f'Price_lag_{lag}'] = data['Price'].shift(lag)
```

```python
# Drop any rows with NaN values that were created by the lagging process.
data.dropna(inplace=True)
```

```python
# Define the feature set (X) and the target variable (y)
X = data.drop('Price', axis=1)
y = data['Price']
```

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# --- 2. Data Splitting ---

# Split the data in a time-based manner.
# We'll use the first 80% for training and the last 20% for testing.
split_point = int(len(X) * 0.8)
X_train, X_test = X[:split_point], X[split_point:]
y_train, y_test = y[:split_point], y[split_point:]
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# Check the shapes of the splits
print(f"Training data shape: {X_train.shape}, {y_train.shape}")
print(f"Testing data shape: {X_test.shape}, {y_test.shape}")
```

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Training data shape: (2919, 5), (2919,)
Testing data shape: (730, 5), (730,)
```

```
# --- 3. Model Training ---

# Initialize and train the XGBoost Regressor model.
# The 'n_estimators' parameter is similar to the number of trees in Random Forest.
# The 'objective' is set for regression.
# The 'eval_metric' helps monitor performance during training.
# random_state ensures reproducibility of results.
xg_model = xgb.XGBRegressor(
    n_estimators=500,
    objective='reg:squarederror',
    eval_metric='rmse',
    random_state=42,
    n_jobs=-1
)

print("\nTraining XGBoost model...")
xg_model.fit(X_train, y_train,
             early_stopping_rounds=50,
             eval_set=[(X_test, y_test)],
             verbose=False)
print("Training complete.")
```

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Training XGBoost model...
/usr/local/lib/python3.11/dist-packages/xgboost/sklearn.py:889: UserWarning: `early_stopping_rounds` in `fit` method is deprecated i
  warnings.warn(
Training complete.
```

```

# --- 4. Making Predictions ---

# Use the trained model to make predictions on the test data.
predictions = xg_model.predict(X_test)
```

```
# --- 5. Model Evaluation ---

# Calculate and print the evaluation metrics.
mae = mean_absolute_error(y_test, predictions)
rmse = np.sqrt(mean_squared_error(y_test, predictions))

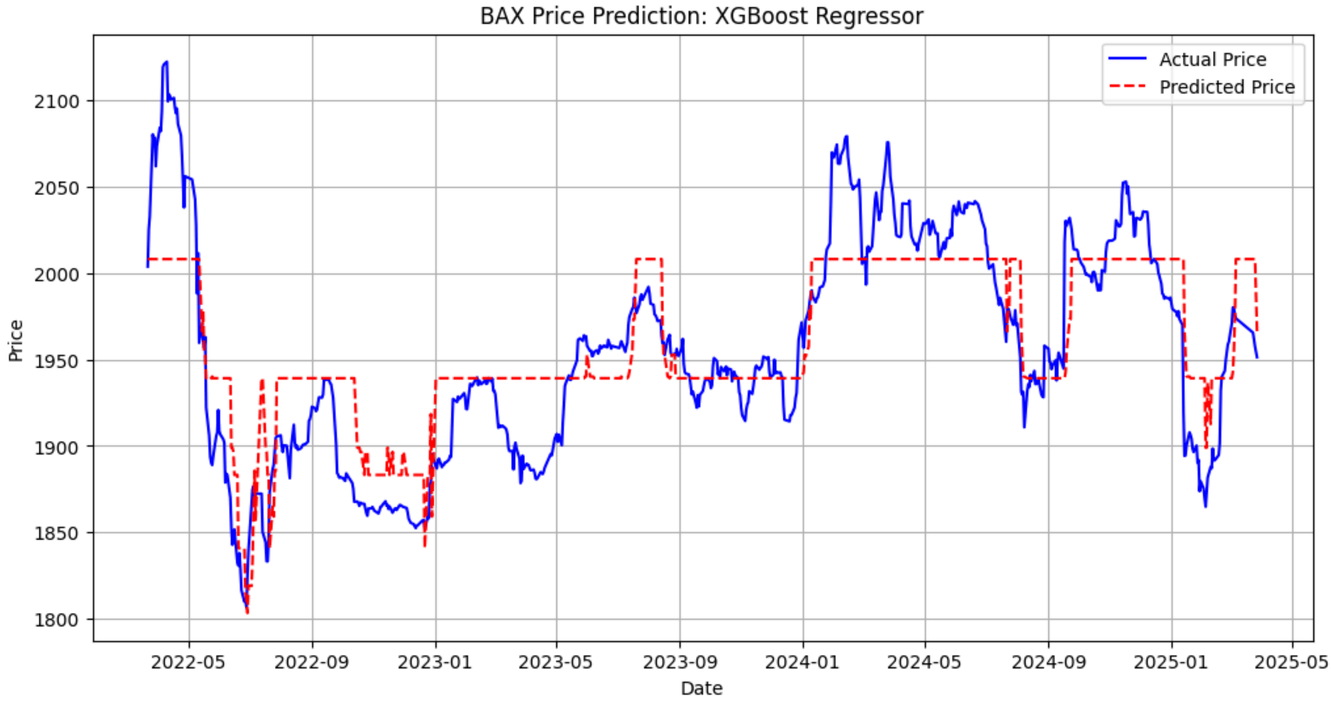
print(f"\nMean Absolute Error (MAE): {mae:.2f}")
print(f"Root Mean Squared Error (RMSE): {rmse:.2f}")
```

```

Mean Absolute Error (MAE): 26.01
Root Mean Squared Error (RMSE): 33.26
```

```
# --- 6. Visualization ---

# Plot the actual vs. predicted prices
plt.figure(figsize=(12, 6))
plt.plot(y_test.index, y_test, label='Actual Price', color='blue')
plt.plot(y_test.index, predictions, label='Predicted Price', color='red', linestyle='--')
plt.title('BAX Price Prediction: XGBoost Regressor')
plt.xlabel('Date')
plt.ylabel('Price')
plt.legend()
plt.grid(True)
plt.show()
```




```
1 Start coding or generate with AI.
```