Double-click (or enter) to edit

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import pickle
from sklearn.model_selection import train_test_split
from sklearn.metrics import r2_score
import warnings
warnings.filterwarnings('ignore')
sns.set_style('darkgrid')
```

```
df=pd.read_csv("GOOGL.csv")
df.head()
```

	Date	Open	High	Low	Close	Adj Close	Volume
0	2004-08-19	50.050049	52.082081	48.028027	50.220219	50.220219	44659096
1	2004-08-20	50.555557	54.594597	50.300301	54.209209	54.209209	22834343
2	2004-08-23	55.430431	56.796799	54.579578	54.754753	54.754753	18256126
3	2004-08-24	55.675674	55.855858	51.836838	52.487488	52.487488	15247337
4	2004-08-25	52.532532	54.054054	51.991993	53.053055	53.053055	9188602

```
df.shape
```

```
(4431, 7)
```

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4431 entries, 0 to 4430
Data columns (total 7 columns):
 #   Column     Non-Null Count  Dtype  
---  ------     --------------  -----  
 0   Date       4431 non-null   object 
 1   Open       4431 non-null   float64
 2   High       4431 non-null   float64
 3   Low        4431 non-null   float64
 4   Close      4431 non-null   float64
 5   Adj Close  4431 non-null   float64
 6   Volume     4431 non-null   int64  
dtypes: float64(5), int64(1), object(1)
memory usage: 242.4+ KB
```

```
df.describe()
```

	Open	High	Low	Close	Adj Close	Volume
count	4431.000000	4431.000000	4431.000000	4431.000000	4431.000000	4.431000e+03
mean	693.087345	699.735595	686.078751	693.097367	693.097367	6.444992e+06
std	645.118799	651.331215	638.579488	645.187806	645.187806	7.690351e+06
min	49.644646	50.920921	48.028027	50.055054	50.055054	4.656000e+05

```
nan_count = df.isna().sum()
print(nan_count )
```

```
Date         0
Open         0
High         0
Low          0
Close        0
Adj Close    0
Volume       0
dtype: int64
```

```
display(df.head().style.hide_index())
```

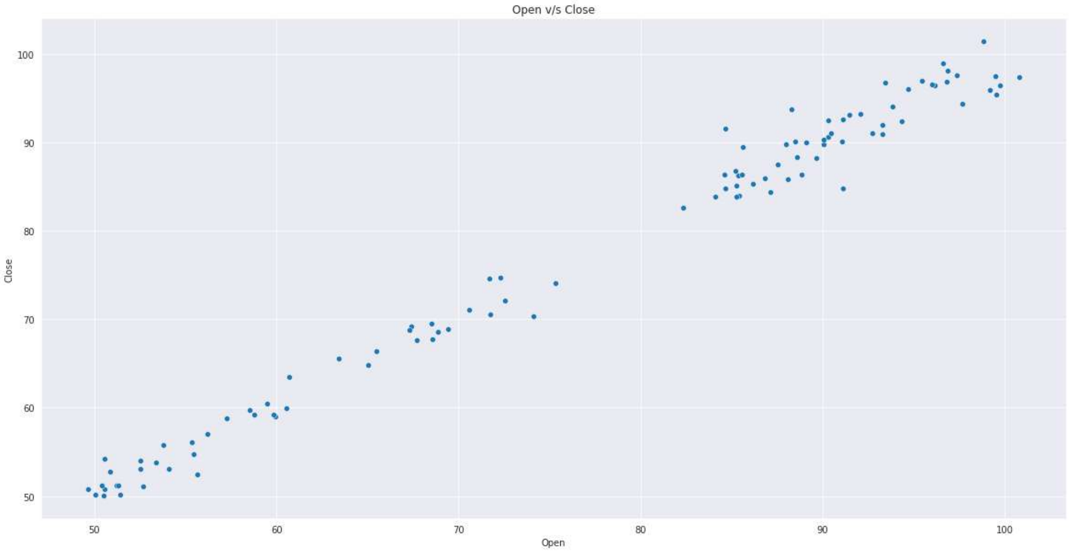
Date	Open	High	Low	Close	Adj Close	Volume
2004-08-19	50.050049	52.082081	48.028027	50.220219	50.220219	44659096
2004-08-20	50.555557	54.594597	50.300301	54.209209	54.209209	22834343
2004-08-23	55.430431	56.796799	54.579578	54.754753	54.754753	18256126
2004-08-24	55.675674	55.855858	51.836838	52.487488	52.487488	15247337
2004-08-25	52.532532	54.054054	51.991993	53.053055	53.053055	9188602

```
df.drop(df.columns.difference(['Date', 'Open', 'Close']), 1, inplace=True)
```

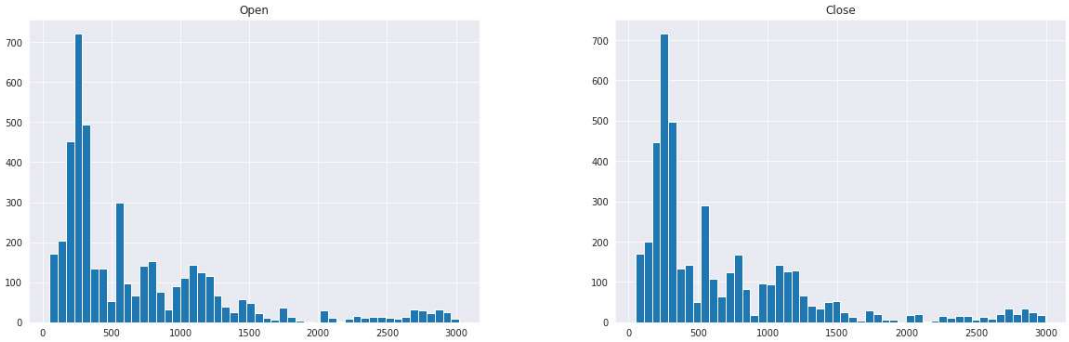
```
display(df.head().style.hide_index())
```

Date	Open	Close
2004-08-19	50.050049	50.220219
2004-08-20	50.555557	54.209209
2004-08-23	55.430431	54.754753
2004-08-24	55.675674	52.487488
2004-08-25	52.532532	53.053055

```
fig, ax = plt.subplots(figsize=(20, 10))
plot1 = sns.scatterplot(data=df.head(100), x="Open", y="Close", ax=ax)
plot1.set(title='Open v/s Close')
plt.show()
```



```
df.hist(bins=50, figsize=(20, 6))
plt.show()
```



```
from sklearn.linear_model import LinearRegression
from sklearn.svm import SVR
from sklearn.tree import DecisionTreeRegressor
from sklearn.ensemble import RandomForestRegressor
```

```
X = df['Open'].values
y = df['Close'].values
```

```
X_train, X_test, y_train, y_test = train_test_split(X, y, train_size=0.7, test_size=0.3)
```

```
model1 = LinearRegression()
build1 = model1.fit(X_train.reshape(-1, 1), y_train)
predict1 = model1.predict(X_test.reshape(-1, 1))
```

```
print("Co-efficient: ", model1.coef_)
print("\nIntercept: ", model1.intercept_)
```

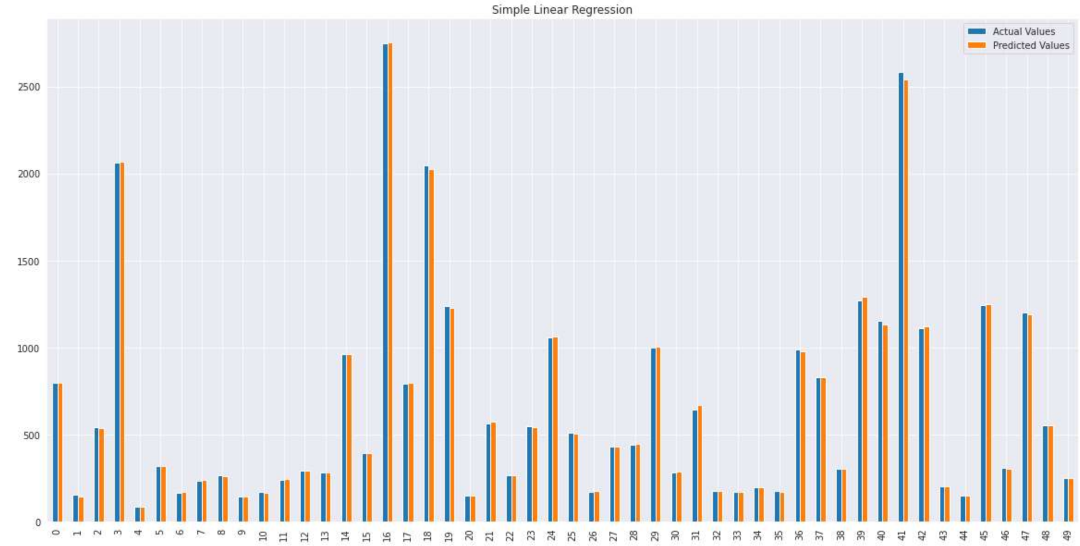
```
Co-efficient:  [0.99999177]

Intercept:  0.02387340994994247
```

```
df1 = pd.DataFrame(list(zip(y_test, predict1)), columns=["Actual Values", "Predicted Values"])
```

```
df1.head().style.hide_index()
```

Actual Values	Predicted Values
796.950012	798.527313
156.196198	146.053708
542.917908	536.480946
2064.479980	2064.846971
84.434433	87.160294

```
df1.head(50).plot(kind="bar", figsize=(20, 10), title='Simple Linear Regression')
plt.show()
```



```
accuracy1 = r2_score(y_test, predict1)
print("Accuracy of Simple Linear Regression:", accuracy1)
```

```
Accuracy of Simple Linear Regression: 0.9995735664113886
```

Support vector machine

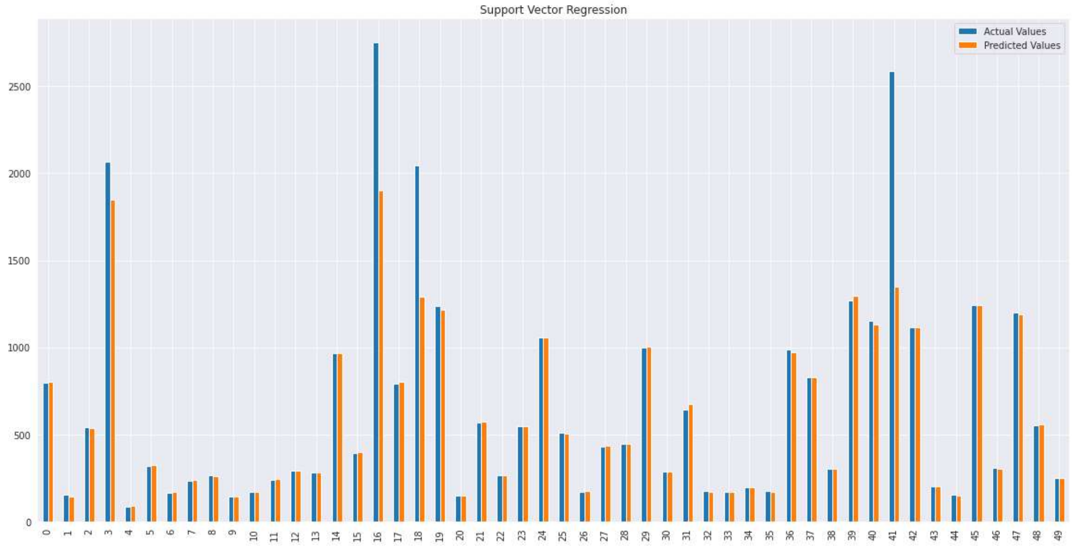
```
model2 = SVR(kernel="rbf", gamma = 0.01, C=100)
build2 = model2.fit(X_train.reshape(-1, 1), y_train)
predict2 = model2.predict(X_test.reshape(-1, 1))
```

```
df2 = pd.DataFrame(list(zip(y_test, predict2)), columns=["Actual Values", "Predicted Values"])
```

```
df2.head().style.hide_index()
```

Actual Values	Predicted Values
796.950012	802.251093
156.196198	146.030877
542.917908	536.921151
2064.479980	1848.457970
84.434433	87.983041

```
df2.head(50).plot(kind="bar", figsize=(20, 10), title='Support Vector Regression')
plt.show()
```



```
accuracy2 = r2_score(y_test, predict2)
print("Accuracy of Support Vector Regression:", accuracy2)
```

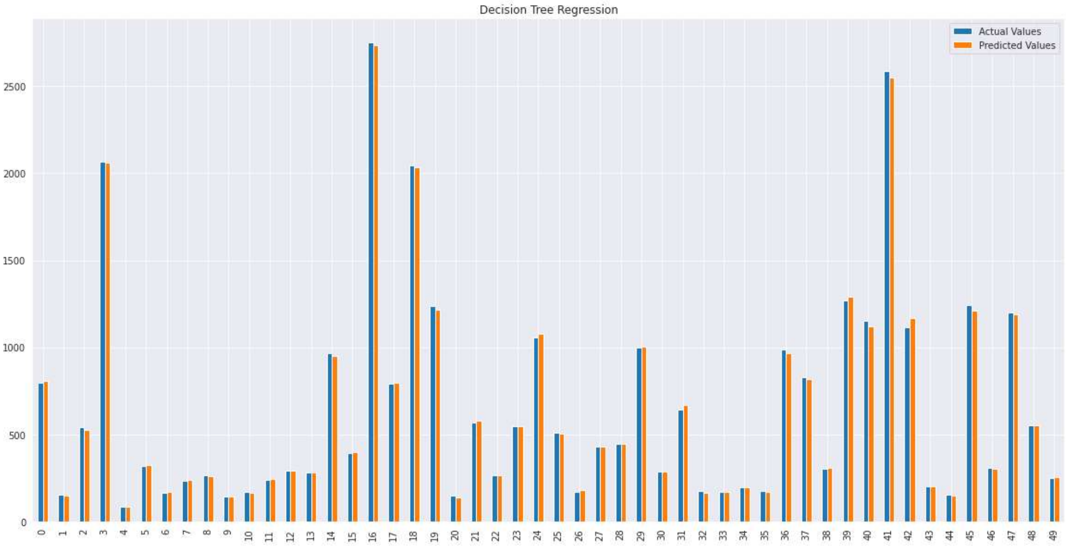
```
Accuracy of Support Vector Regression: 0.8254217399924029
```

decision tree regression

```
model3 = DecisionTreeRegressor()
build3 = model3.fit(X_train.reshape(-1, 1), y_train)
predict3 = model3.predict(X_test.reshape(-1, 1))


df3 = pd.DataFrame(list(zip(y_test, predict3)), columns=["Actual Values", "Predicted Values"])


df3.head().style.hide_index()
```

Actual Values	Predicted Values
796.950012	808.020020
156.196198	149.744751
542.917908	528.080017
2064.479980	2058.879883
84.434433	85.910912

```
df3.head(50).plot(kind="bar", figsize=(20, 10), title='Decision Tree Regression')
plt.show()
```



```
accuracy3 = r2_score(y_test, predict3)
print("Accuracy of Decision Tree Regression:", accuracy3)

    Accuracy of Decision Tree Regression: 0.9993048273503061
```

Random Forest Regression

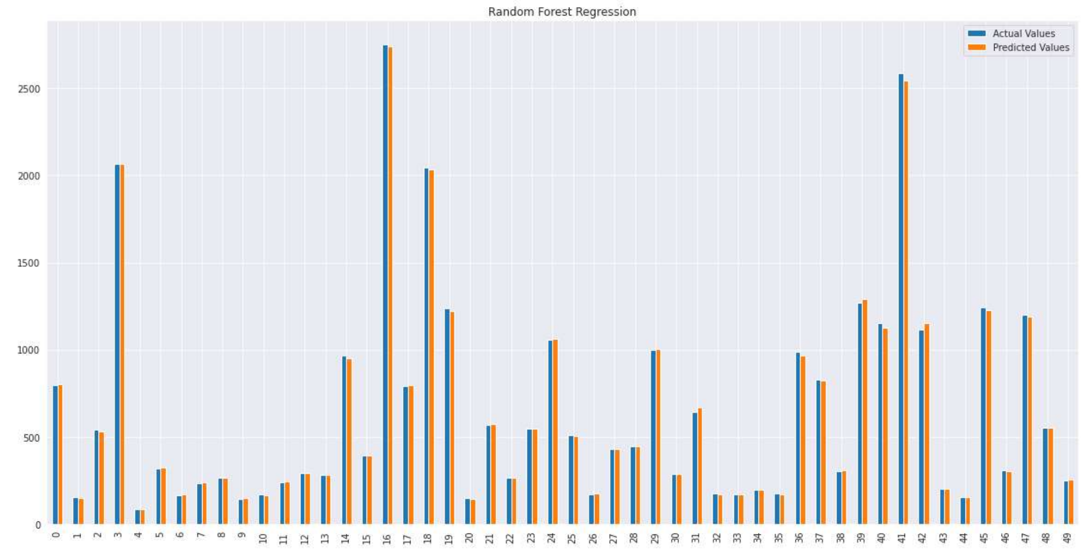
```
model4 = RandomForestRegressor(n_estimators=100)
build4 = model4.fit(X_train.reshape(-1, 1), y_train)
predict4 = model4.predict(X_test.reshape(-1, 1))
```

```
df4 = pd.DataFrame(list(zip(y_test, predict4)), columns=["Actual Values", "Predicted Values"])
```

```
df4.head().style.hide_index()
```

Actual Values	Predicted Values
796.950012	804.322411
156.196198	147.976928
542.917908	533.598223
2064.479980	2066.287398
84.434433	86.586137

```
df4.head(50).plot(kind="bar", figsize=(20, 10), title='Random Forest Regression')
plt.show()
```



```
accuracy4 = r2_score(y_test, predict4)
print("Accuracy of Random Forest Regression:", accuracy4)
```

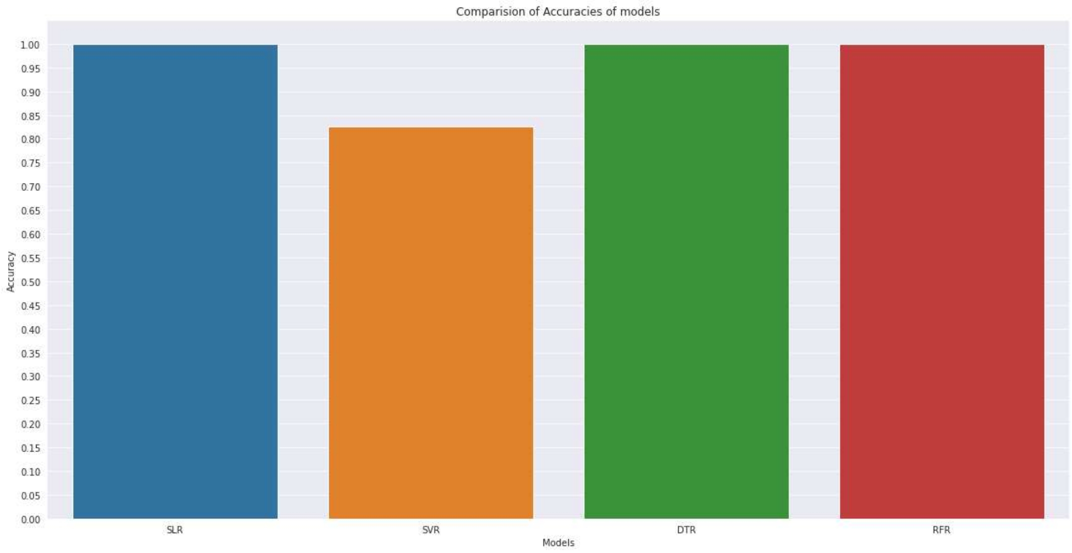
```
Accuracy of Random Forest Regression: 0.9994494411230984
```

Visualize the result

```
dict1 = {
    "Model": ["Simple Linear Regression", "Support Vector Regression", "Decision Tree Regression", "Random For
    "Accuracy": np.array([accuracy1, accuracy2, accuracy3, accuracy4])
}
df = pd.DataFrame(dict1)
display(df.style.hide_index())
```

Model	Accuracy
Simple Linear Regression	0.999574
Support Vector Regression	0.825422
Decision Tree Regression	0.999305
Random Forest Regression	0.999449

```
models = ['SLR', 'SVR', 'DTR', 'RFR']
acc = [accuracy1, accuracy2, accuracy3, accuracy4]
plt.figure(figsize=(20, 10))
plt.title('Comparision of Accuracies of models')
plt.yticks(np.linspace(0,1,21))
plt.ylabel("Accuracy")
plt.xlabel("Models")
values = df.Accuracy
plot = sns.barplot(x=models, y=acc, data=values, errwidth=0)
plt.show()
```



find the closing price of the complany that day

```
new_dict = {
    'Date': np.array(['2023-02-16']),
    'Open':np.array([95.4])}

future_stock_value = pd.DataFrame(new_dict)
display(future_stock_value.style.hide_index())
```

```
      Date        Open
2023-02-16   95.400000
```

predict using highest accuracy model

```
models = np.array(df['Model'])
accuracy = np.array(df['Accuracy'])


highest_accuracy=0.0
best_model=""


for i in range(len(accuracy)) :
    if accuracy[i] >= highest_accuracy :
        highest_accuracy=accuracy[i]
        best_model=models[i]


slr, svr, dtr, rfr = [], [], [], []

if best_model == models[0] :
    future_stock_value['Predicted'] = model1.predict(future_stock_value.Open.values.reshape(-1, 1))
elif best_model == models[1] :
    future_stock_value['Predicted'] = model2.predict(future_stock_value.Open.values.reshape(-1, 1))
elif best_model == models[2] :
    future_stock_value['Predicted'] = model3.predict(future_stock_value.Open.values.reshape(-1, 1))
elif best_model == models[3] :
    future_stock_value['Predicted'] = model4.predict(future_stock_value.Open.values.reshape(-1, 1))


display(future_stock_value.style.hide_index())
```

```
      Date        Open   Predicted
2023-02-16   95.400000   95.423088
```

● ×