In [1]:
```
import tensorflow as tf
from tensorflow import keras
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
import pandas_datareader as web
import mplfinance as mpf
import yfinance as yf
import datetime as dt
from sklearn.preprocessing import MinMaxScaler
```

In [2]:
```
#Loading The Data Using Yfinance Library
```

In [3]:
```
Stock = 'GOOG'
start = dt.datetime(2010,1,1)
end = dt.datetime(2023,1,1)
data = yf.download(Stock, start, end)
```

```
**********100%**********]  1 of 1 completed
```

In [4]:
```
data
```

Out[4]:

Price	Adj Close	Close	High	Low	Open	Volume
Ticker	GOOG	GOOG	GOOG	GOOG	GOOG	GOOG
Date						
2010-01-04	15.571998	15.610239	15.678981	15.547723	15.615220	78541293
2010-01-05	15.503423	15.541497	15.637387	15.480475	15.620949	120638494
2010-01-06	15.112601	15.149715	15.588072	15.102393	15.588072	159744526
2010-01-07	14.760787	14.797037	15.193053	14.760922	15.178109	257533695
2010-01-08	14.957565	14.994298	15.024933	14.672753	14.744733	189680313
...	...	...	...	...	...	...
2022-12-23	89.589981	89.809998	90.099998	87.620003	87.620003	17815000
2022-12-27	87.714592	87.930000	89.500000	87.535004	89.309998	15470900
2022-12-28	86.248192	86.459999	88.519997	86.370003	87.500000	17879600
2022-12-29	88.732086	88.949997	89.364998	86.989998	87.029999	18280700
2022-12-30	88.512634	88.730003	88.830002	87.029999	87.364998	19190300

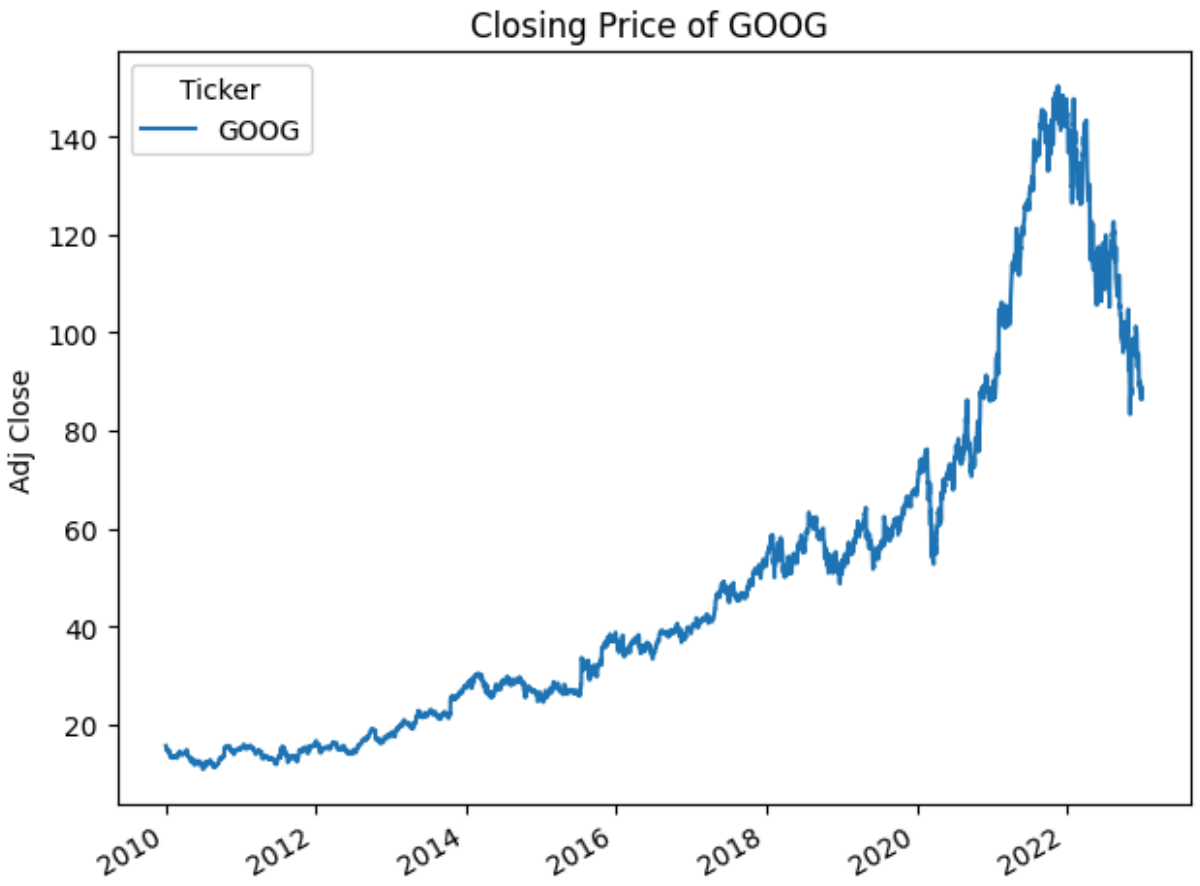
3272 rows × 6 columns

In [5]:
```
data.info()
```

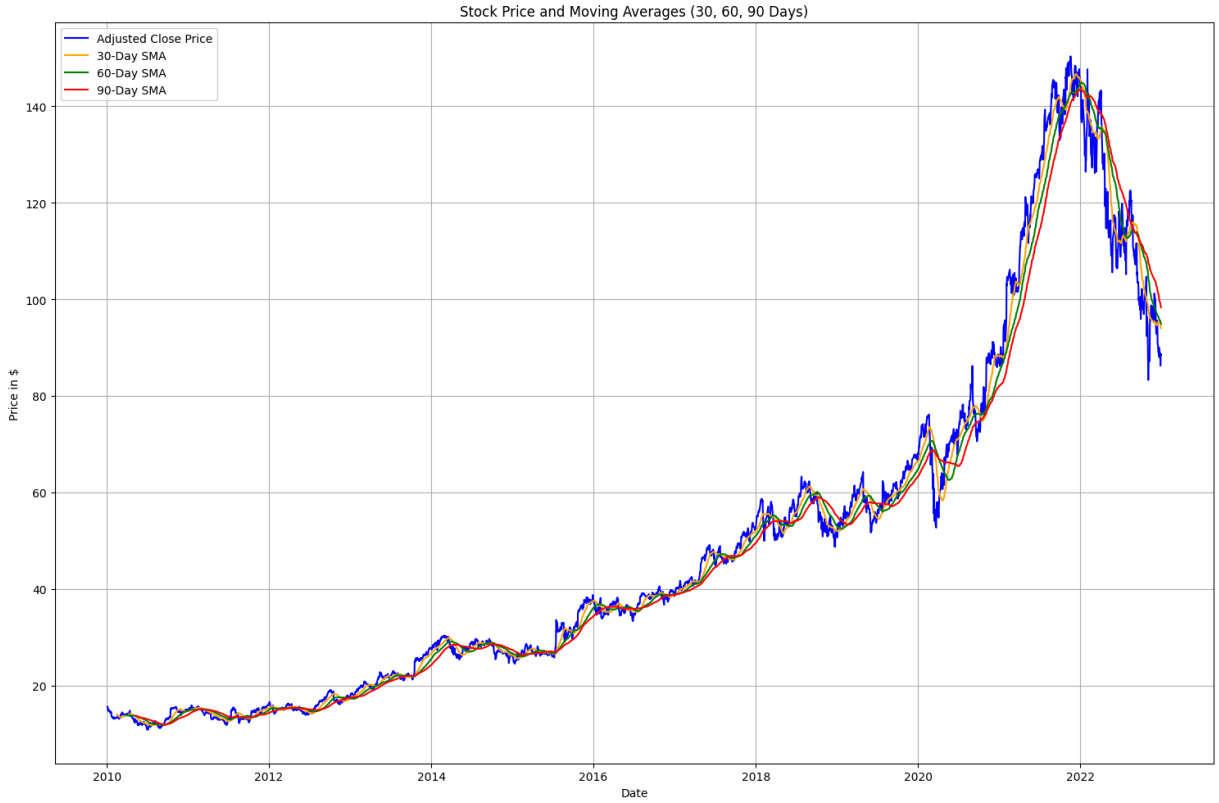
```
<class 'pandas.core.frame.DataFrame'>
DatetimeIndex: 3272 entries, 2010-01-04 to 2022-12-30
Data columns (total 6 columns):
 #   Column             Non-Null Count  Dtype  
---  ------             --------------  -----  
 0   (Adj Close, GOOG)  3272 non-null   float64
 1   (Close, GOOG)      3272 non-null   float64
 2   (High, GOOG)       3272 non-null   float64
 3   (Low, GOOG)        3272 non-null   float64
 4   (Open, GOOG)       3272 non-null   float64
 5   (Volume, GOOG)     3272 non-null   int64  
dtypes: float64(5), int64(1)
memory usage: 178.9 KB
```

In [6]:
```
#Analysis of Data
```

In [7]:
```
plt.figure(figsize=(15, 10))
plt.subplots_adjust(top=1.25, bottom=1.2)

plt.subplot(1, 1, 1)
data['Adj Close'].plot()
plt.ylabel('Adj Close')
plt.xlabel(None)
plt.title(f"Closing Price of {Stock} ")

plt.tight_layout()
plt.show()
```



In [8]:
```
#Moving Avgerage
short_window = 30
medium_window = 60
long_window = 90

data['30_Day_MA'] = data['Adj Close'].rolling(window=short_window).mean()
data['60_Day_MA'] = data['Adj Close'].rolling(window=medium_window).mean()
data['90_Day_MA'] = data['Adj Close'].rolling(window=long_window).mean()
# Plotting
plt.figure(figsize=(15, 10))
plt.plot(data['Adj Close'], label='Adjusted Close Price', color='blue')
plt.plot(data['30_Day_MA'], label='30-Day SMA', color='orange')
plt.plot(data['60_Day_MA'], label='60-Day SMA', color='green')
plt.plot(data['90_Day_MA'], label='90-Day SMA', color='red')

plt.title('Stock Price and Moving Averages (30, 60, 90 Days)')
plt.xlabel('Date')
plt.ylabel('Price in $')
plt.legend()
plt.grid()
plt.tight_layout()
plt.show()
```



In [9]:
```
#PreProcessing Of Data
```

In [10]:
```
scaler = MinMaxScaler(feature_range=(0, 1))
scaled_data = scaler.fit_transform(data['Close'].values.reshape(-1, 1))
```

In [11]:
```
scaled_data
```

Out[11]:
```
array([[0.03395973],
       [0.03346818],
       [0.0306667 ],
       ...,
       [0.54057964],
       [0.55838467],
       [0.55681158]])
```

In [12]:
```
#Spliting of Train Data
```

In [13]:
```
prediction_days=60

X_train = []
y_train = []

for x in range(prediction_days, len(scaled_data)):
    X_train.append(scaled_data[x-prediction_days:x, 0])
    y_train.append(scaled_data[x, 0])

X_train = np.array(X_train)
X_train = np.reshape(X_train, (X_train.shape[0], X_train.shape[1], 1))
y_train = np.array(y_train)
```

In [14]:
```
#Model Creation Using LSTM & Dense Layer
```

In [15]:
```
model = keras.Sequential([
    keras.layers.LSTM(50, return_sequences=True, input_shape=(X_train.shape[1], 1)),
    keras.layers.LSTM(50, return_sequences=False),
    keras.layers.Dense(25),
    keras.layers.Dense(1)
])

model.compile(optimizer='adam', loss='mean_squared_error')
```

```
C:\Users\KIIT\anaconda3\envs\tensorflow\Lib\site-packages\keras\src\layers\rnn\rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `Input(shape)` object as the first layer in the model instead.
  super().__init__(**kwargs)
```

In [16]:
```
#Fitting Data in to the Model
```

In [33]:
```
model.fit(X_train, y_train, batch_size=32, epochs=3)
```

```
Epoch 1/3
101/101 ━━━━━━━━━━━━━━━━━━━━ 8s 80ms/step - loss: 2.9190e-04
Epoch 2/3
101/101 ━━━━━━━━━━━━━━━━━━━━ 9s 84ms/step - loss: 2.7039e-04
Epoch 3/3
101/101 ━━━━━━━━━━━━━━━━━━━━ 9s 84ms/step - loss: 2.5669e-04
```

Out[33]:
```
<keras.src.callbacks.history.History at 0x1e585b48510>
```

In [34]:
```
#Creating Test_data for the Model
```

In [35]:
```
test_start= dt.datetime(2023,1,1)
test_end= dt.datetime.now()

test_data= yf.download(Stock,test_start, test_end)
```

```
**********100%**********]  1 of 1 completed
```

In [36]:
```
test_data
```

Out[36]:

Price	Adj Close	Close	High	Low	Open	Volume
Ticker	GOOG	GOOG	GOOG	GOOG	GOOG	GOOG
Date						
2023-01-03	89.480255	89.699997	91.550003	89.019997	89.830002	20738500
2023-01-04	88.492676	88.709999	91.239998	87.800003	91.010002	27046500
2023-01-05	86.557426	86.769997	88.209999	86.559998	88.070000	23136100
2023-01-06	87.944031	88.160004	88.470001	85.570000	87.360001	26612600
2023-01-09	88.582466	88.800003	90.830002	88.580002	89.195000	22996700
...	...	...	...	...	...	...
2024-12-03	173.020004	173.020004	174.320007	172.509995	173.119995	15721500
2024-12-04	176.089996	176.089996	176.429993	172.750000	172.779999	18239800
2024-12-05	174.309998	174.309998	177.710007	174.009995	177.320007	16145500
2024-12-06	176.490005	176.490005	176.839005	173.550003	173.880005	13305200
2024-12-09	176.740005	176.740005	178.039993	175.399994	175.714996	12523310

487 rows × 6 columns

In [37]:
```
actual_prices= test_data['Close']
```

In [38]:
```
total_data = pd.concat((data['Close'], test_data['Close']),axis=0)
total_data
```

Out[38]:

Ticker	GOOG
Date	
2010-01-04	15.610239
2010-01-05	15.541497
2010-01-06	15.149715
2010-01-07	14.797037
2010-01-08	14.994298
...	...
2024-12-03	173.020004
2024-12-04	176.089996
2024-12-05	174.309998
2024-12-06	176.490005
2024-12-09	176.740005

3759 rows × 1 columns

In [39]:
```
model_input= total_data[len(total_data)- len(test_data)- prediction_days:].values
model_input.reshape(-1,1)
model_input = scaler.fit_transform(model_input)
```

In [40]:
```
X_test=[]

for x in range(prediction_days, len(model_input)):
    X_test.append(model_input[x-prediction_days:x,0])

X_test= np.array(X_test)
X_test= np.reshape(X_test,(X_test.shape[0],X_test.shape[1],1))
```

In [41]:
```
#Testing the Model by Predicting Exsisting data
```

In [42]:
```
predictions = model.predict(X_test)
predictions = scaler.inverse_transform(predictions)
```

```
16/16 ━━━━━━━━━━━━━━━━━━━━ 1s 32ms/step
```

In [43]:
```
#Measuring the Accuracy of the Model
```

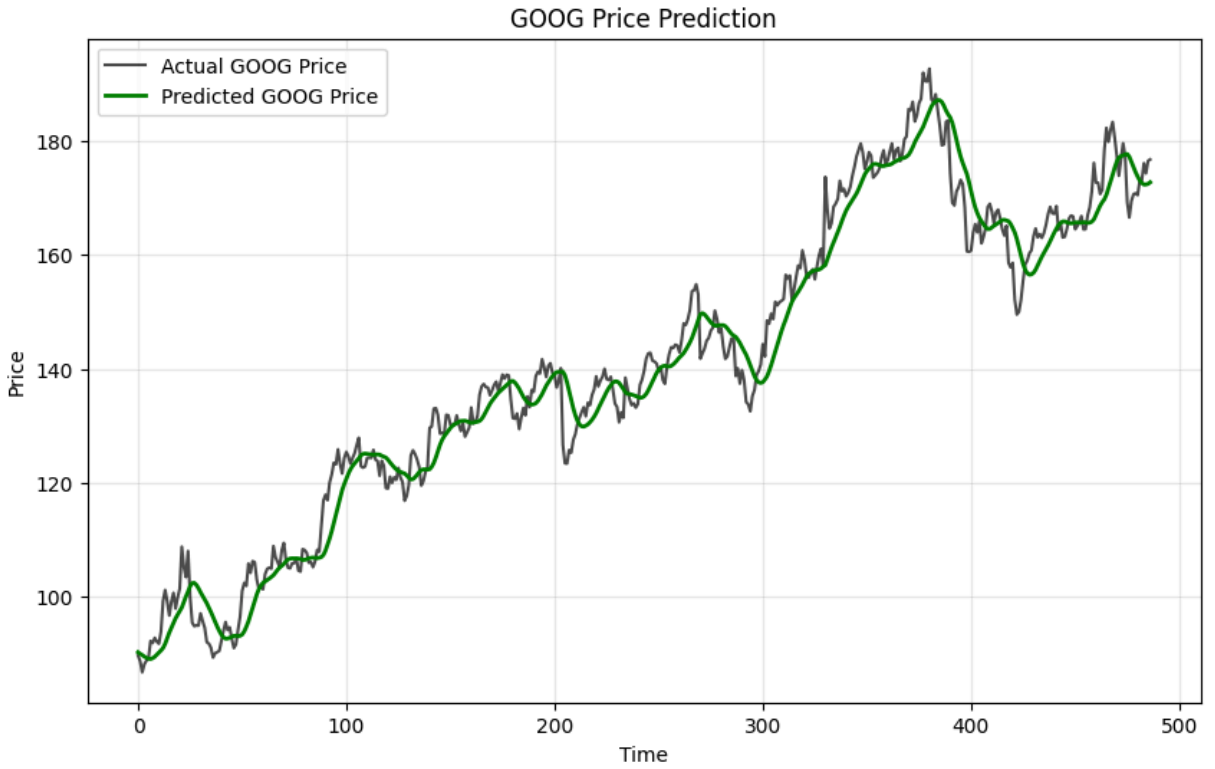
In [44]:
```
from sklearn.metrics import mean_absolute_error,mean_squared_error,r2_score

mae = mean_absolute_error(actual_prices, predictions)
mse = mean_squared_error(actual_prices, predictions)
rmse = mean_squared_error(actual_prices, predictions, squared=False)
r2 = r2_score(actual_prices, predictions)
```

```
print(f"MAE: {mae}")
print(f"MSE: {mse}")
print(f"RMSE: {rmse}")
print(f"R-squared: {r2}")
```

```
MAE: 3.8464182201596993
MSE: 23.93283319676838
RMSE: 4.892119499436658
R-squared: 0.9665126204490662
```

```
C:\Users\KIIT\anaconda3\envs\tensorflow\Lib\site-packages\sklearn\metrics\_regression.py:492: FutureWarning: 'squared' is deprecated in version 1.4 and will be removed in 1.6. To calculate the root mean squared error, use the function'root_mean_squared_error'.
  warnings.warn(
```

In [45]:
```
plt.figure(figsize=(10, 6))
plt.plot(range(len(actual_prices)), actual_prices, color="black", label=f"Actual {S
plt.plot(predictions, color="green", label=f"Predicted {Stock} Price", linewidth=2)

plt.xlabel('Time')
plt.ylabel('Price')
plt.title(f"{Stock} Price Prediction")
plt.legend()
plt.grid(alpha=0.3)
plt.show()
```



In [ ]:
```
```

In [46]:
```
real_data= [model_input[len(model_input)+1-prediction_days:len(model_input+1),0]]
real_data = np.array(real_data)
real_data = np.reshape(real_data,(real_data.shape[0],real_data.shape[1],1))
```

In [47]:
```
next_day_price= model.predict(real_data)
next_day_price= scaler.inverse_transform(next_day_price)
```

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 112ms/step
```

In [48]:
```
next_day_price
```

Out[48]:
```
array([[173.11766]], dtype=float32)
```

In [ ]:
```

```