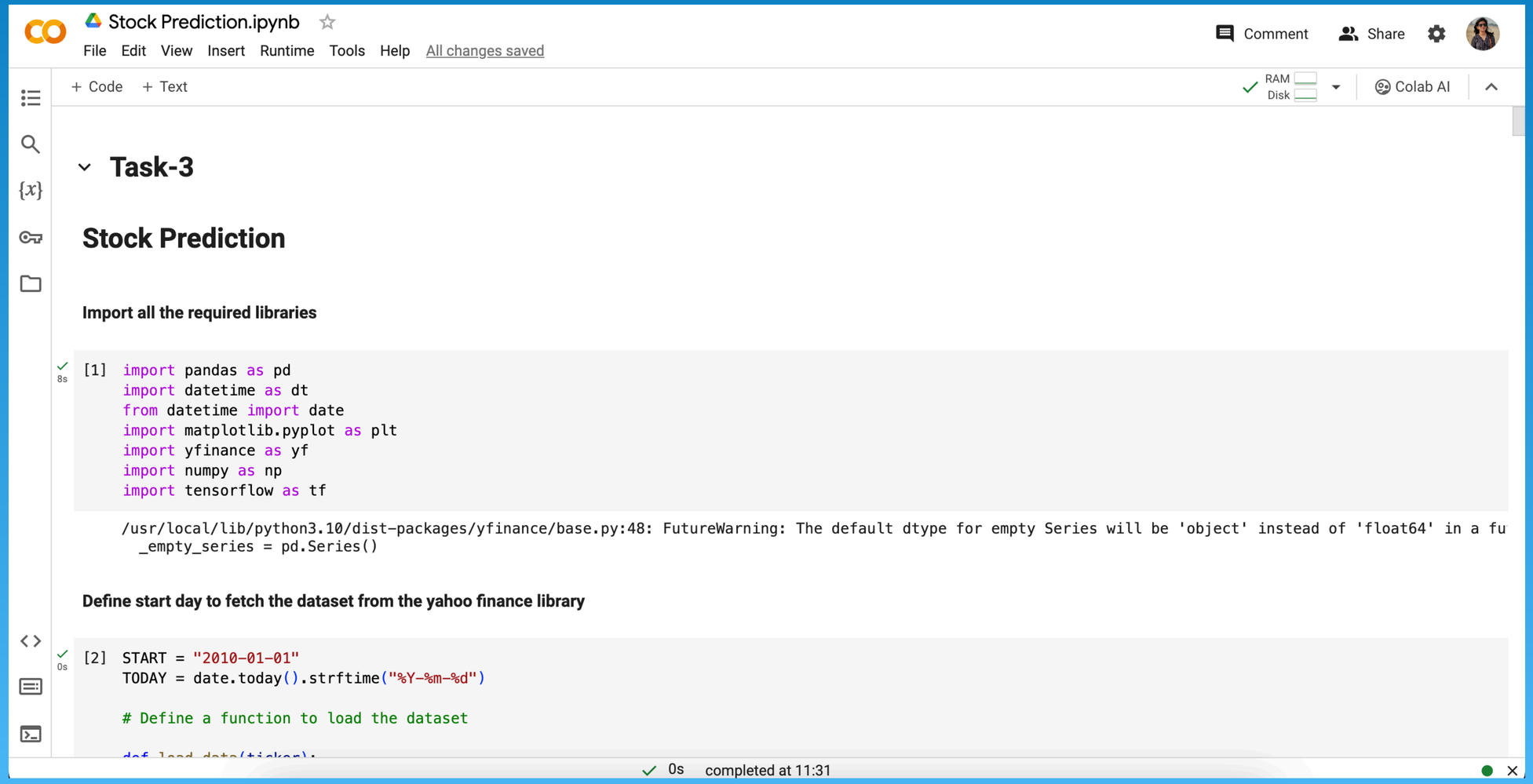
Task-3

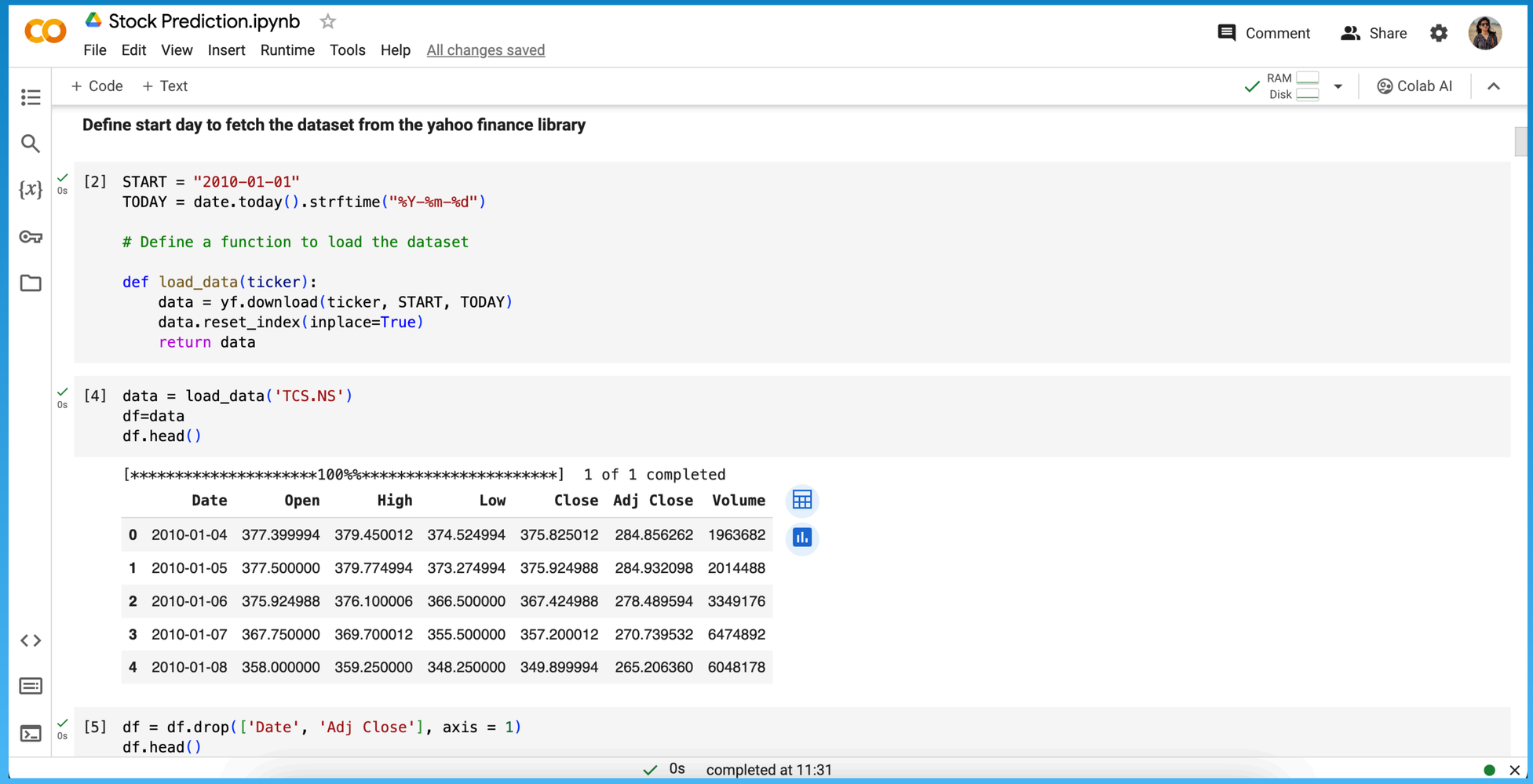
Stock Prediction

Samritha A.R

Importing all necessary Libraries



Fetching TCS Dataset from Yahoo Finance Library



Dropping ‘Date’, ’Adj Close’ column & Visualizing Closing Price of TCS

Stock Prediction.ipynb

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[4]

2	2010-01-06	375.924988	376.100006	366.500000	367.424988	278.489594	3349176
3	2010-01-07	367.750000	369.700012	355.500000	357.200012	270.739532	6474892
4	2010-01-08	358.000000	359.250000	348.250000	349.899994	265.206360	6048178

[5]

```
df = df.drop(['Date', 'Adj Close'], axis = 1)
df.head()
```

	Open	High	Low	Close	Volume
0	377.399994	379.450012	374.524994	375.825012	1963682
1	377.500000	379.774994	373.274994	375.924988	2014488
2	375.924988	376.100006	366.500000	367.424988	3349176
3	367.750000	369.700012	355.500000	357.200012	6474892
4	358.000000	359.250000	348.250000	349.899994	6048178

Visualizing Closing Price

```
plt.figure(figsize=(12, 6))
plt.plot(df['Close'])
plt.title("Tata Consultancy Services Stock Price")
plt.xlabel("Date")
plt.ylabel("Price (INR)")
plt.grid(True)
plt.show()
```

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Visualizing Closing Price of TCS

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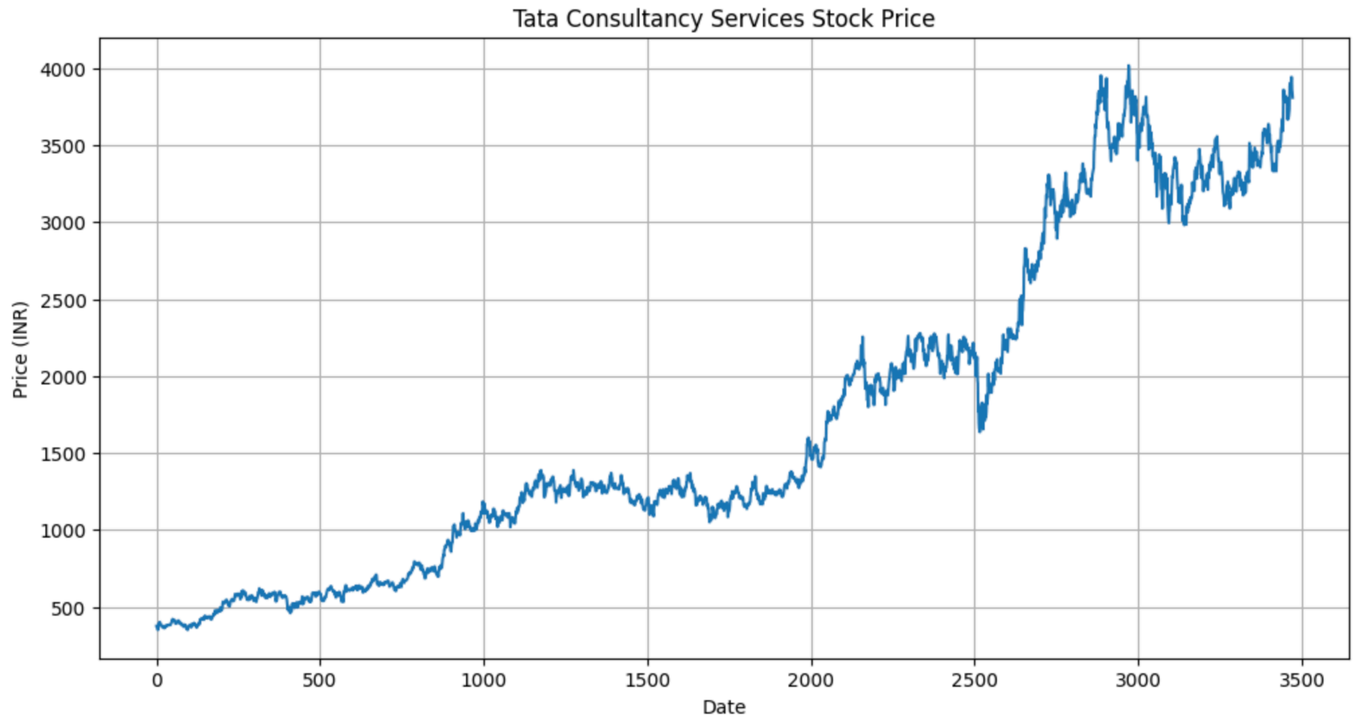
```
[6]  plt.show()
```



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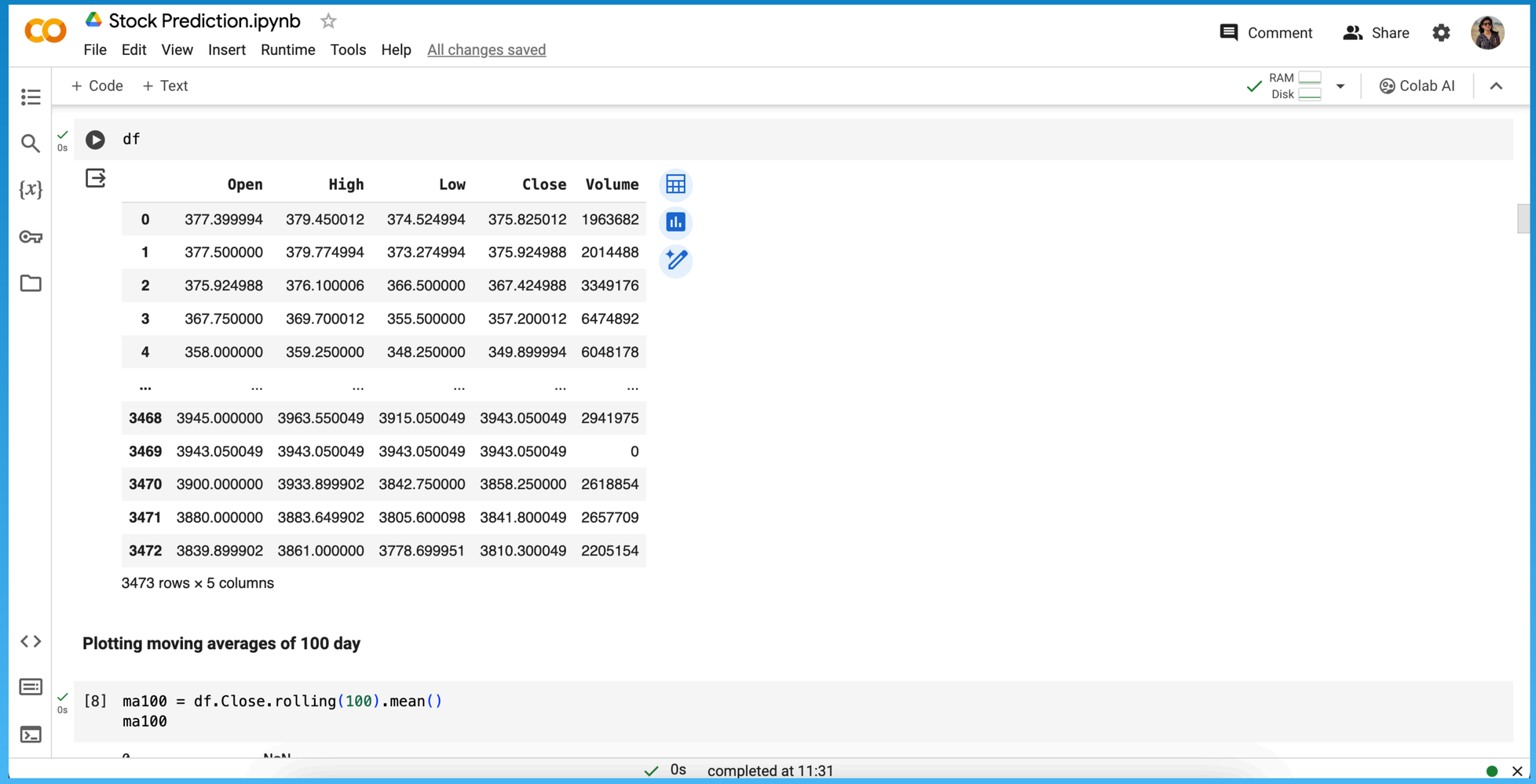
Dataframe and Dimensions of the TCS dataset



Plotting moving average of 100 days

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Plotting moving averages of 100 day

```
ma100 = df.Close.rolling(100).mean()
ma100
```

```
0              NaN
1              NaN
2              NaN
3              NaN
4              NaN
            ...
3468    3569.765002
3469    3575.382502
3470    3580.209502
3471    3584.866003
3472    3589.059504
Name: Close, Length: 3473, dtype: float64
```

```
[9]  plt.figure(figsize = (12,6))
     plt.plot(df.Close)
     plt.plot(ma100, 'r')
     plt.grid(True)
     plt.title('Graph Of Moving Averages Of 100 Days')
```

```
Text(0.5, 1.0, 'Graph Of Moving Averages Of 100 Days')
```

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Plotting moving average of 100 days

Stock Prediction.ipynb

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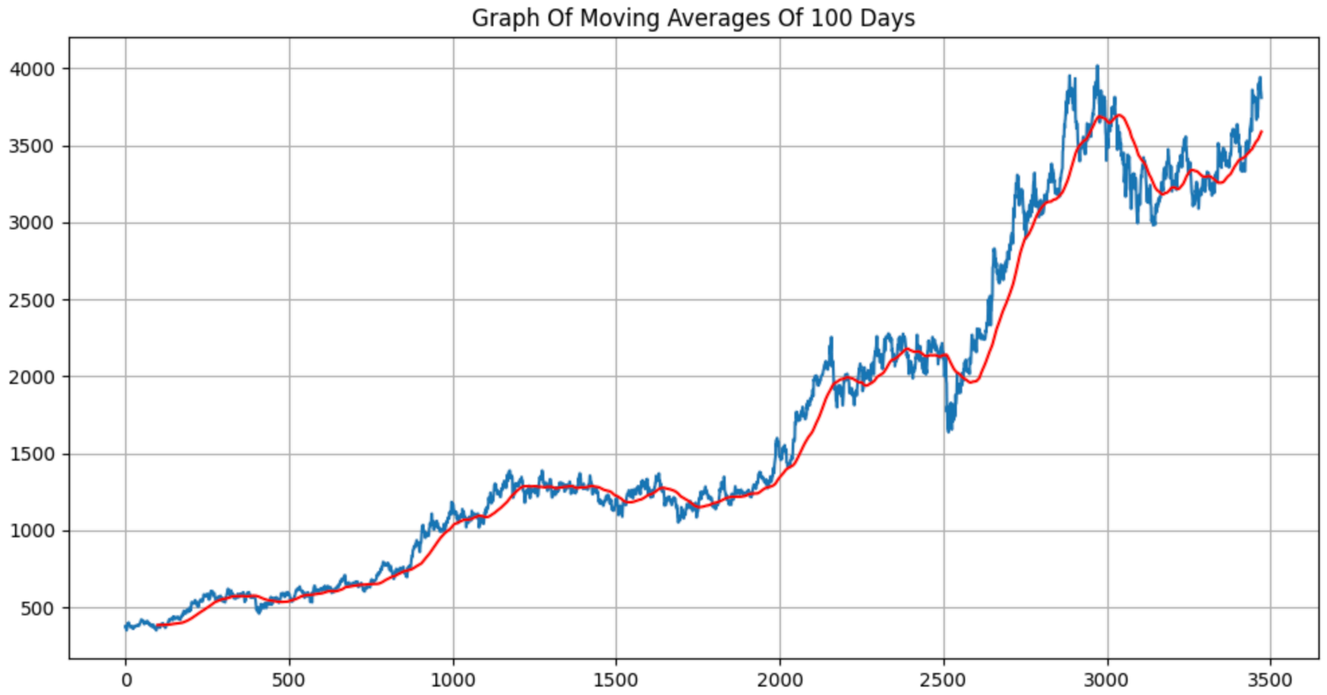
[9] Text(0.5, 1.0, 'Graph Of Moving Averages Of 100 Days')



Defining 200 days moving averages & plotting comparision graph with 100 days moving averages

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Plotting comparison graph with 100 & 200 days moving averages of TCS

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Defining 200 days moving averages & plotting comparision graph with 100 days moving averages

```
[10] ma200 = df.Close.rolling(200).mean()
     ma200
```

```
0              NaN
1              NaN
2              NaN
3              NaN
4              NaN
            ...
3468    3432.585748
3469    3436.606499
3470    3439.868250
3471    3443.077250
3472    3445.929750
Name: Close, Length: 3473, dtype: float64
```

```
plt.figure(figsize = (12,6))
plt.plot(df.Close)
plt.plot(ma100, 'r')
plt.plot(ma200, 'g')
plt.grid(True)
plt.title('Comparision Of 100 Days & 200 Days Moving Averages')
```

```
Text(0.5, 1.0, 'Comparision Of 100 Days & 200 Days Moving Averages')
```

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Plotting comparison graph with 100 & 200 days moving averages of TCS

Stock Prediction.ipynb

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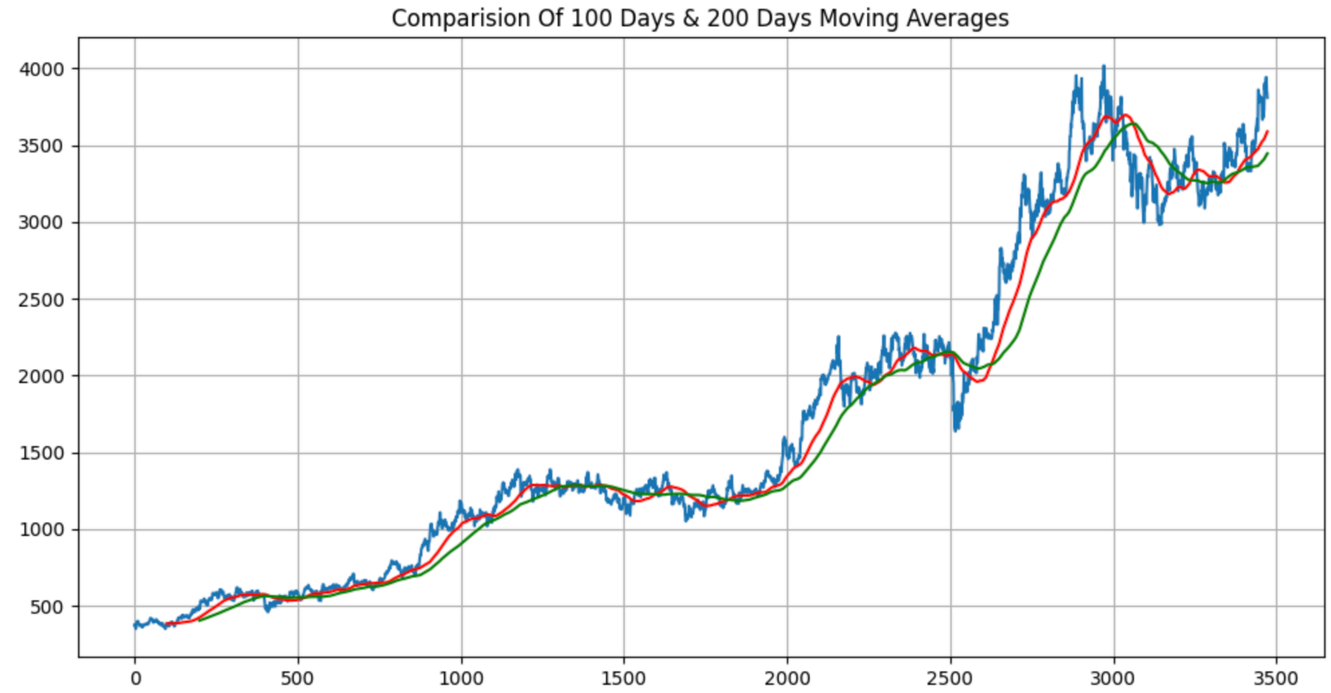
```
Text(0.5, 1.0, 'Comparision Of 100 Days & 200 Days Moving Averages')
```




```
[13] df.shape
```

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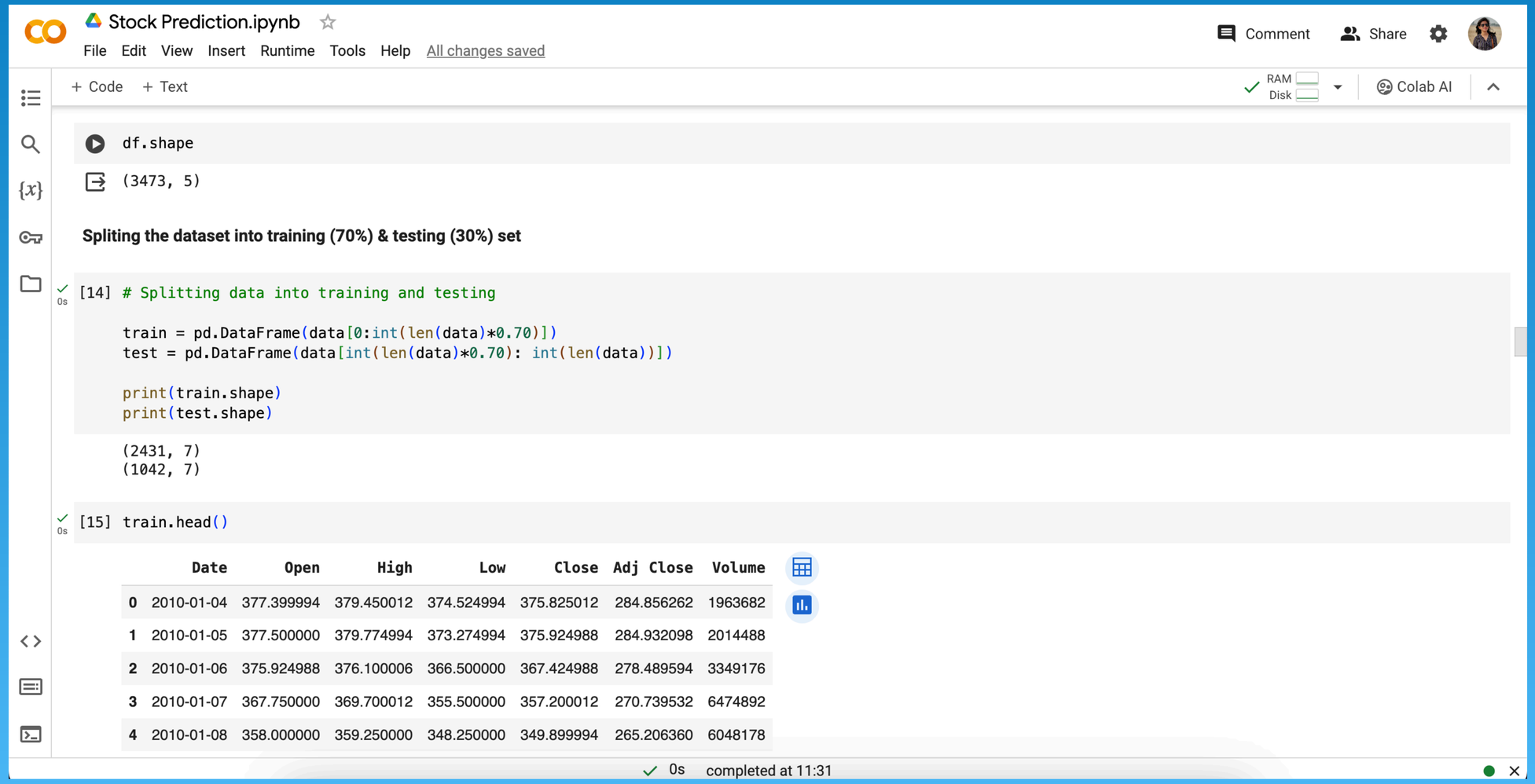
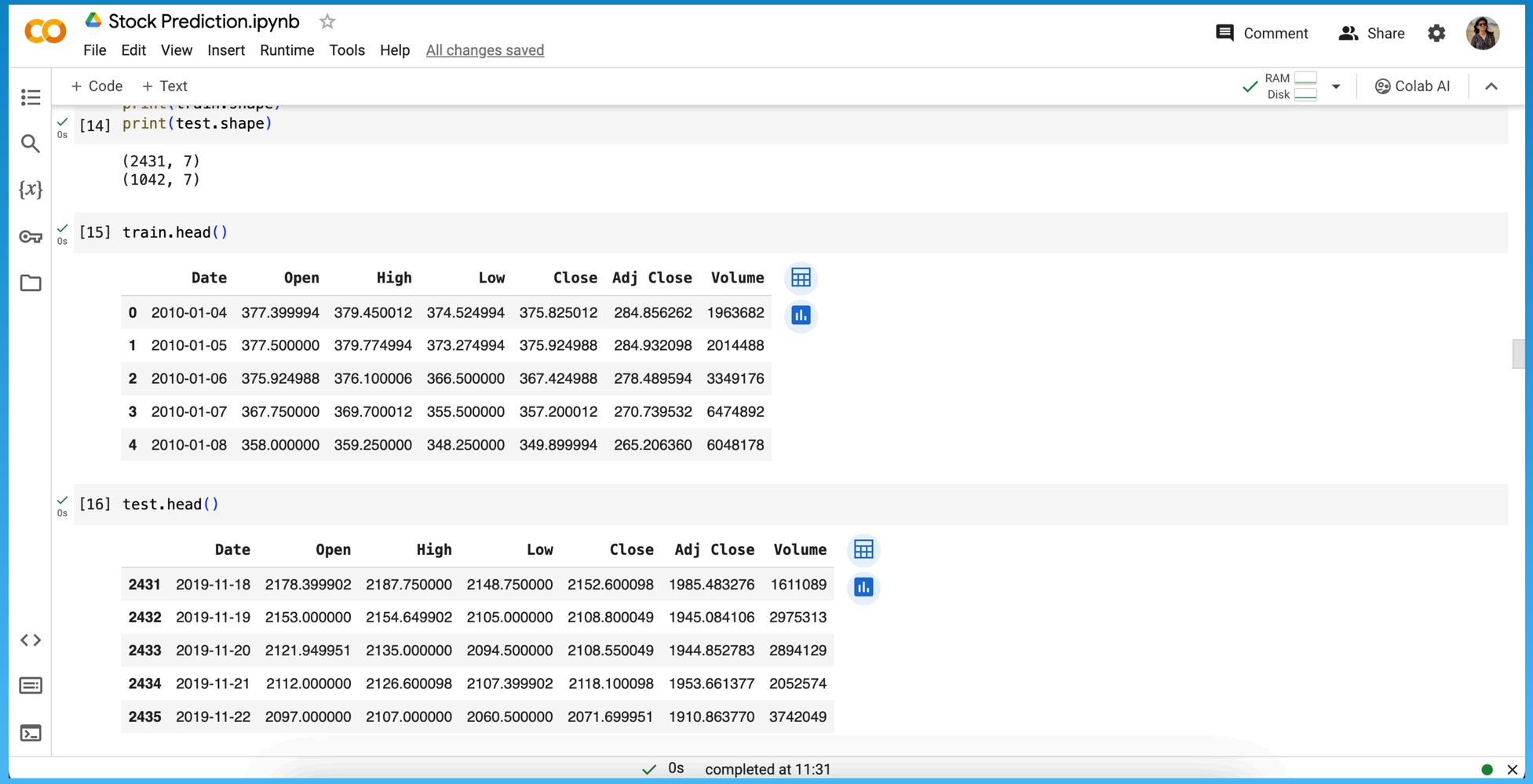
Splitting the dataset into training & testing sets



	Date	Open	High	Low	Close	Adj Close	Volume
0	2010-01-04	377.399994	379.450012	374.524994	375.825012	284.856262	1963682
1	2010-01-05	377.500000	379.774994	373.274994	375.924988	284.932098	2014488
2	2010-01-06	375.924988	376.100006	366.500000	367.424988	278.489594	3349176
3	2010-01-07	367.750000	369.700012	355.500000	357.200012	270.739532	6474892
4	2010-01-08	358.000000	359.250000	348.250000	349.899994	265.206360	6048178

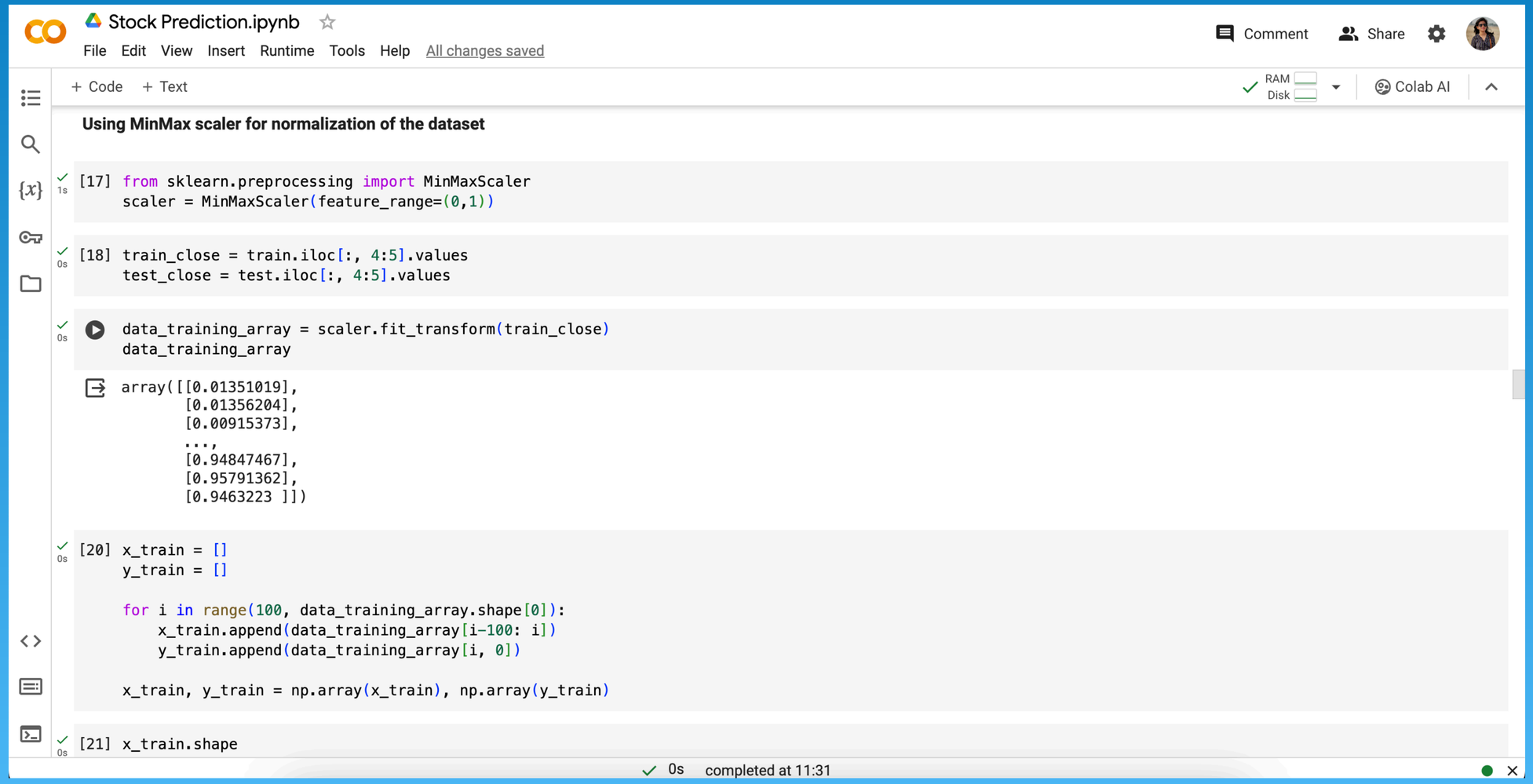
Fetching the train & test dataset's 1st five rows



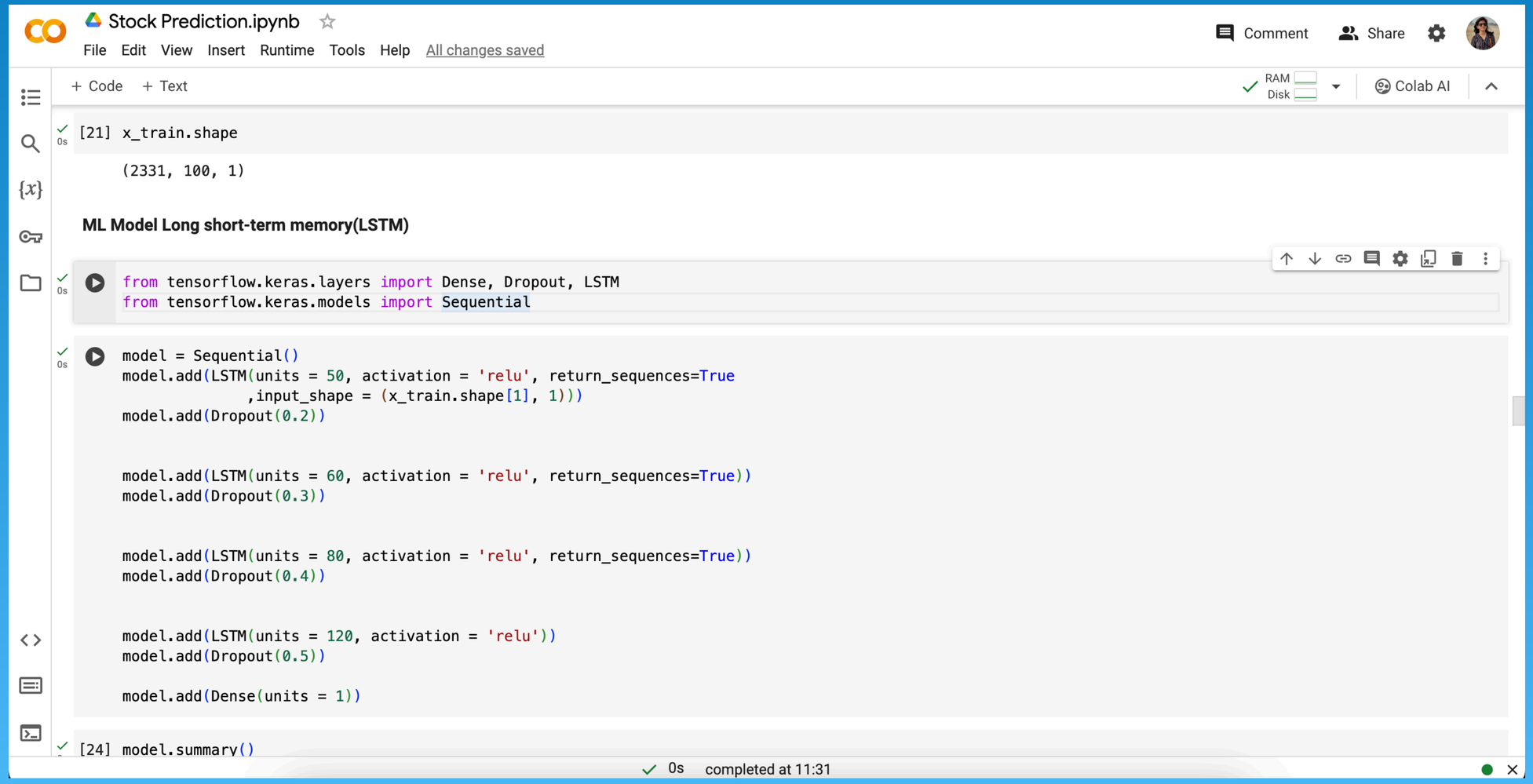
	Date	Open	High	Low	Close	Adj Close	Volume
0	2010-01-04	377.399994	379.450012	374.524994	375.825012	284.856262	1963682
1	2010-01-05	377.500000	379.774994	373.274994	375.924988	284.932098	2014488
2	2010-01-06	375.924988	376.100006	366.500000	367.424988	278.489594	3349176
3	2010-01-07	367.750000	369.700012	355.500000	357.200012	270.739532	6474892
4	2010-01-08	358.000000	359.250000	348.250000	349.899994	265.206360	6048178

	Date	Open	High	Low	Close	Adj Close	Volume
2431	2019-11-18	2178.399902	2187.750000	2148.750000	2152.600098	1985.483276	1611089
2432	2019-11-19	2153.000000	2154.649902	2105.000000	2108.800049	1945.084106	2975313
2433	2019-11-20	2121.949951	2135.000000	2094.500000	2108.550049	1944.852783	2894129
2434	2019-11-21	2112.000000	2126.600098	2107.399902	2118.100098	1953.661377	2052574
2435	2019-11-22	2097.000000	2107.000000	2060.500000	2071.699951	1910.863770	3742049

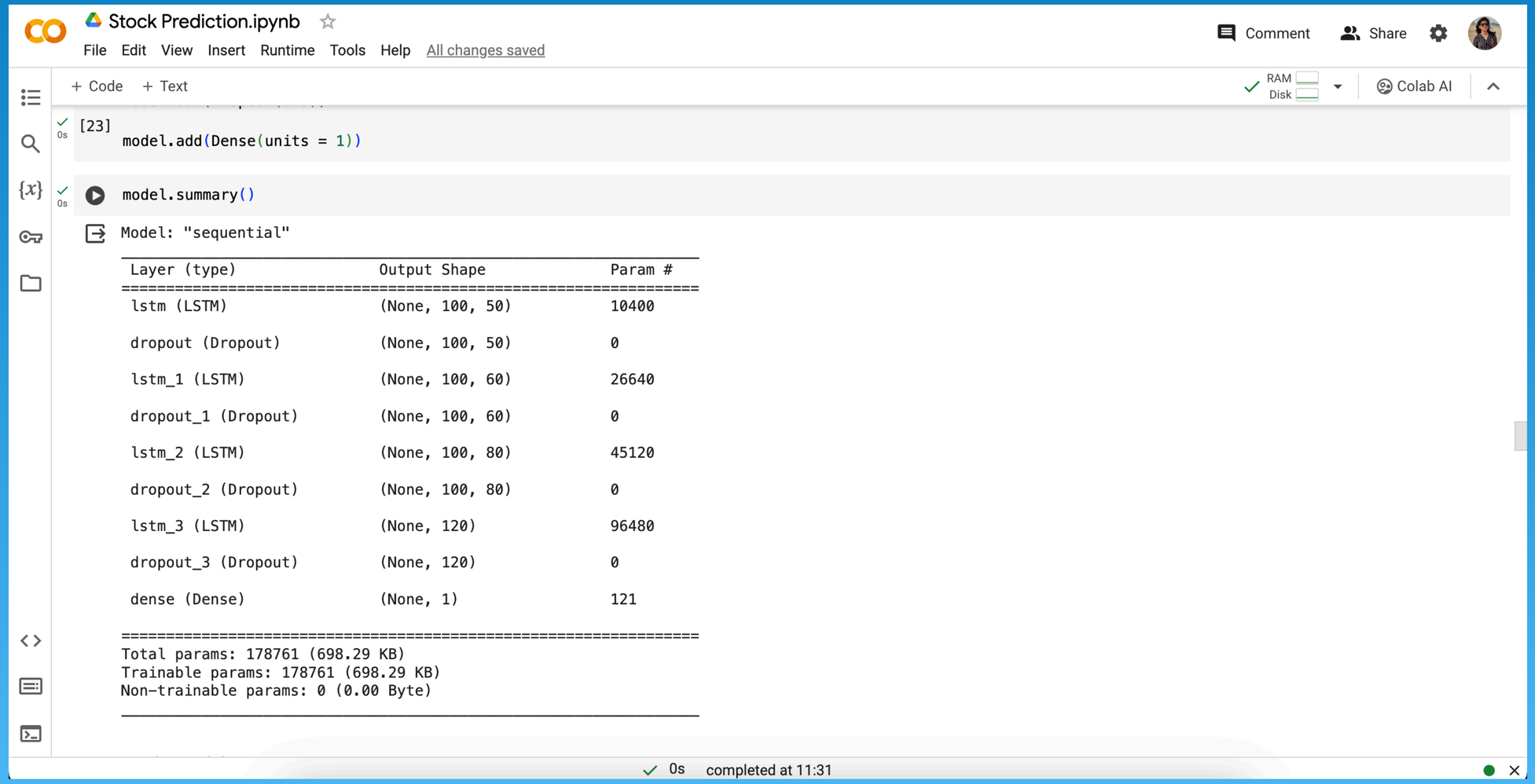
Normalization of the dataset



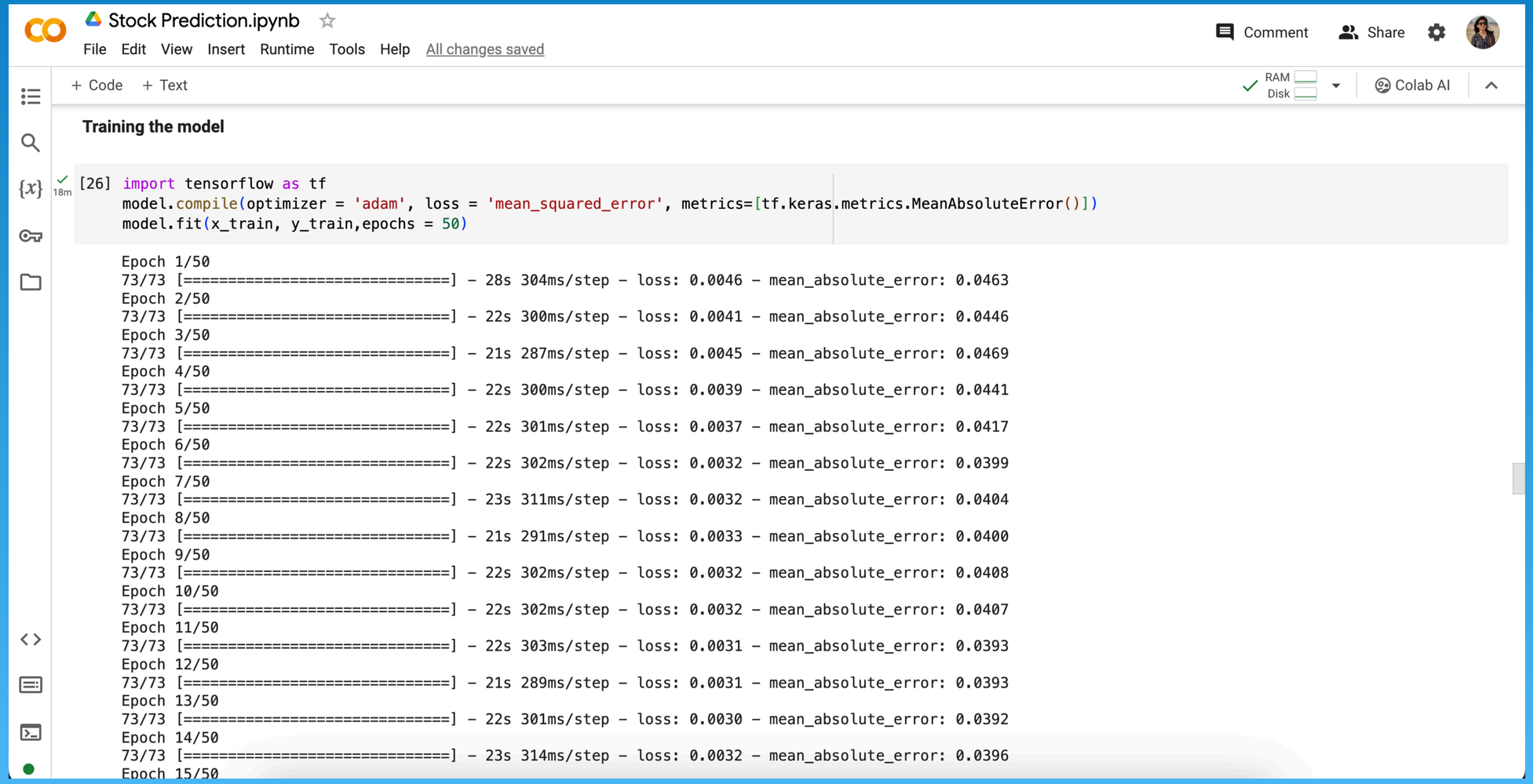
LSTM Machine Learning Model



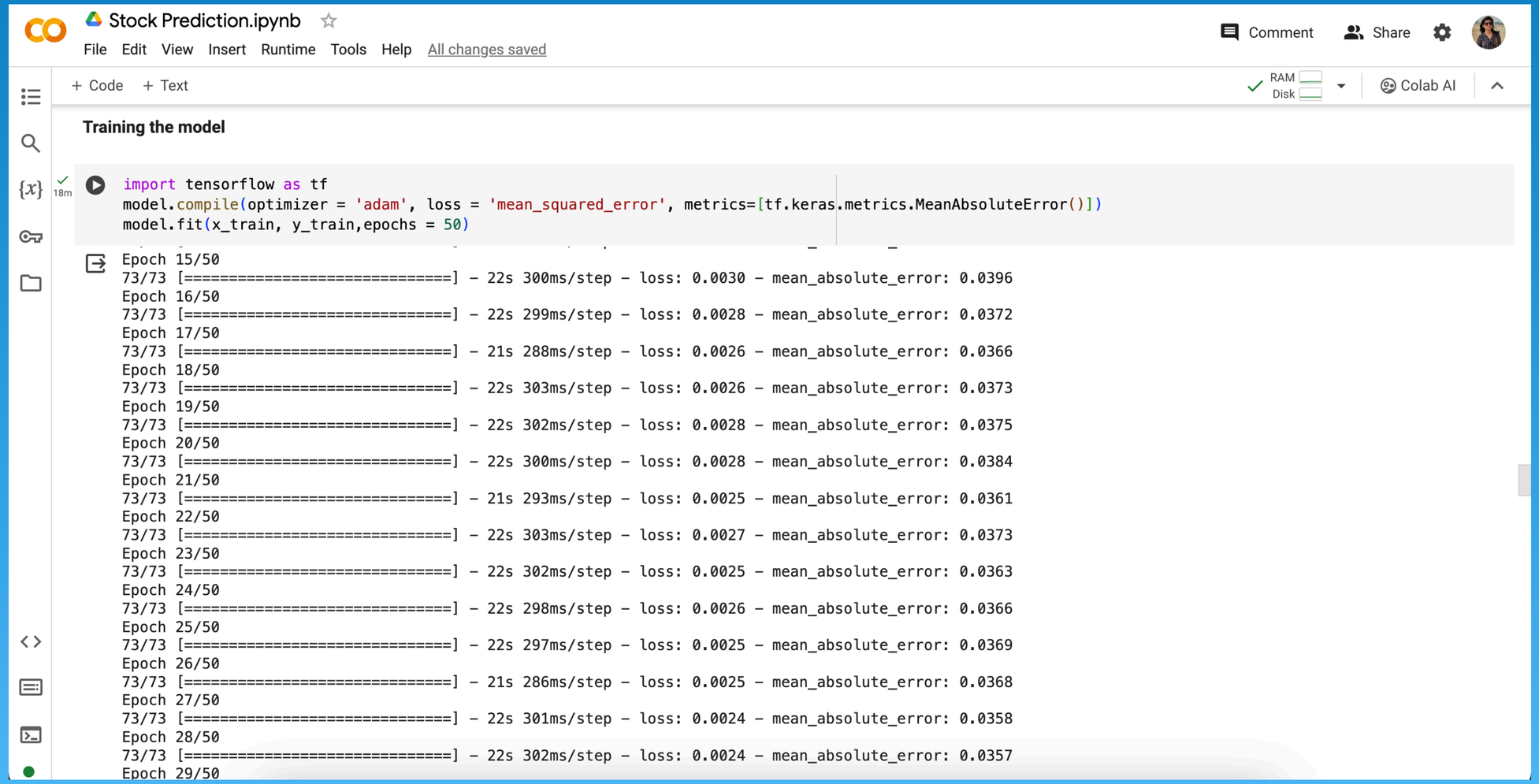
Model Summary of LSTM



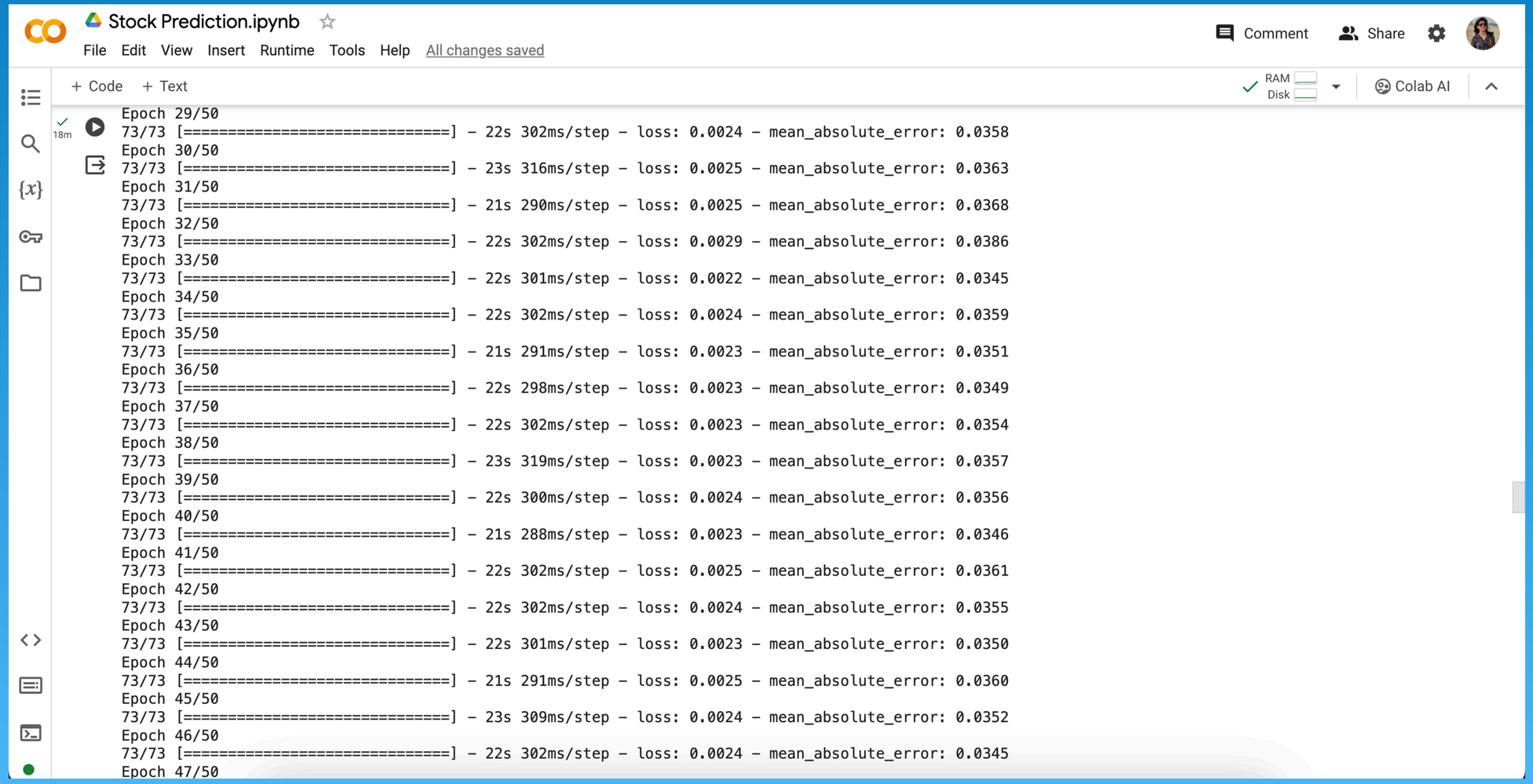
Training the Model



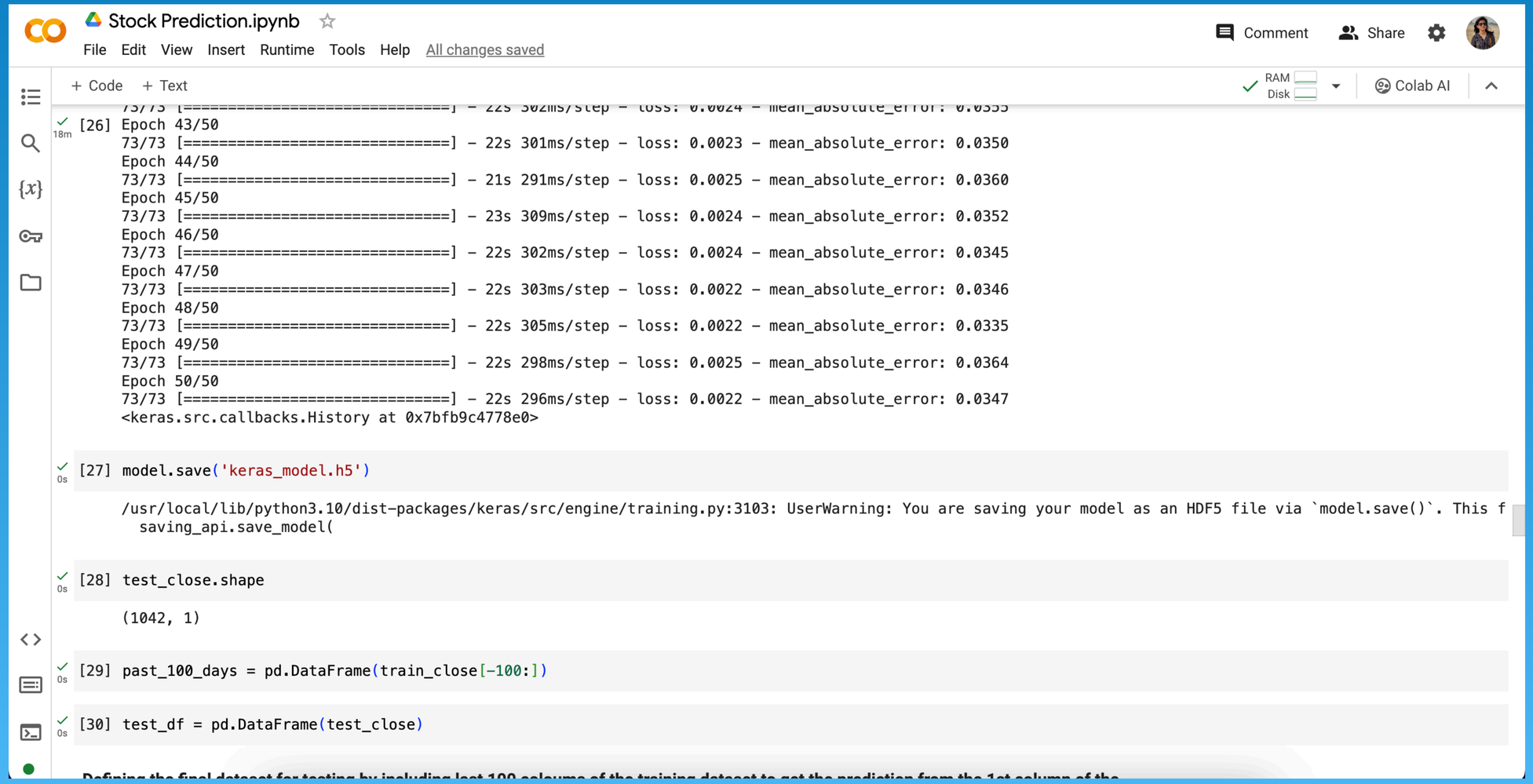
Training the Model



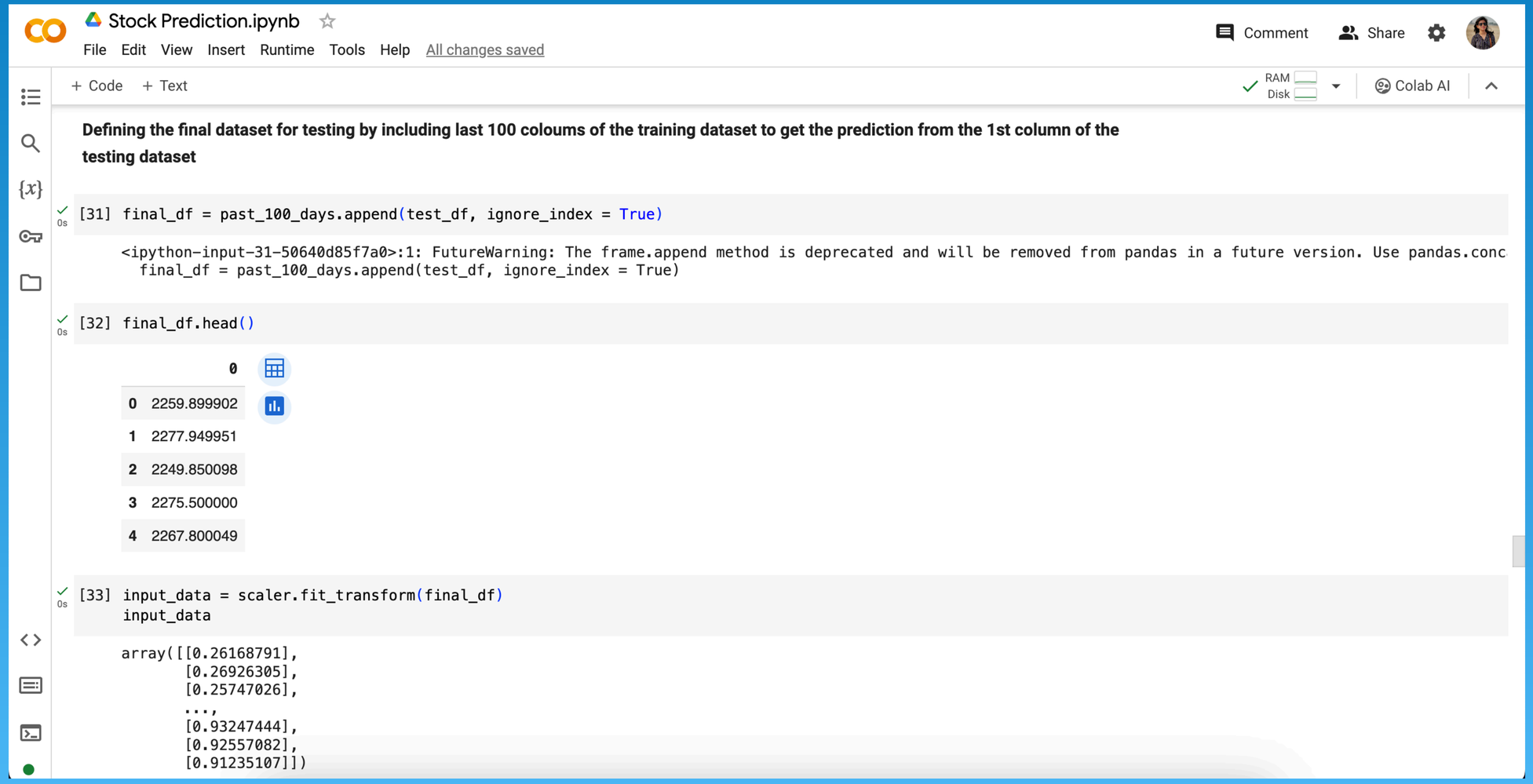
Training the Model



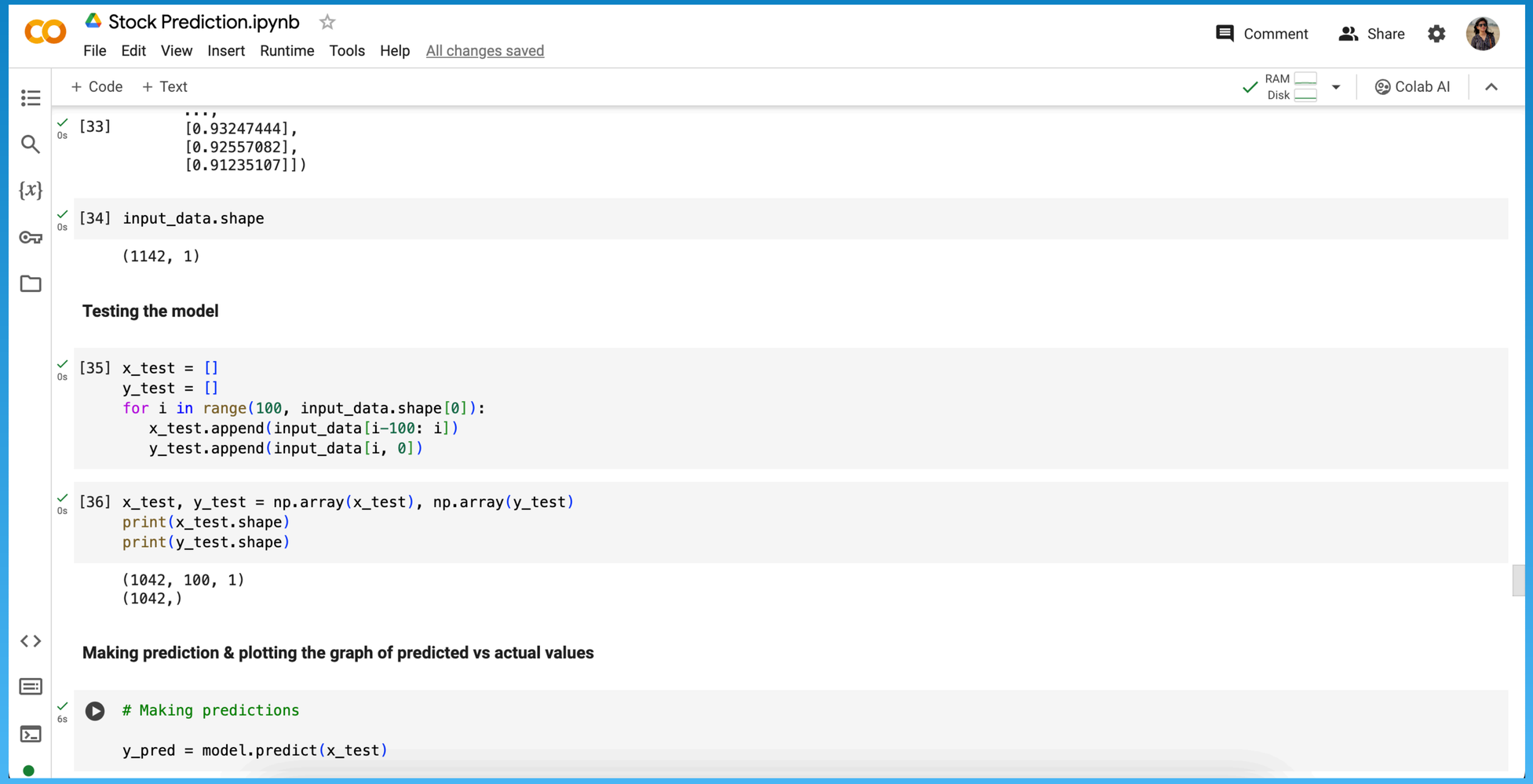
Saving the trained model



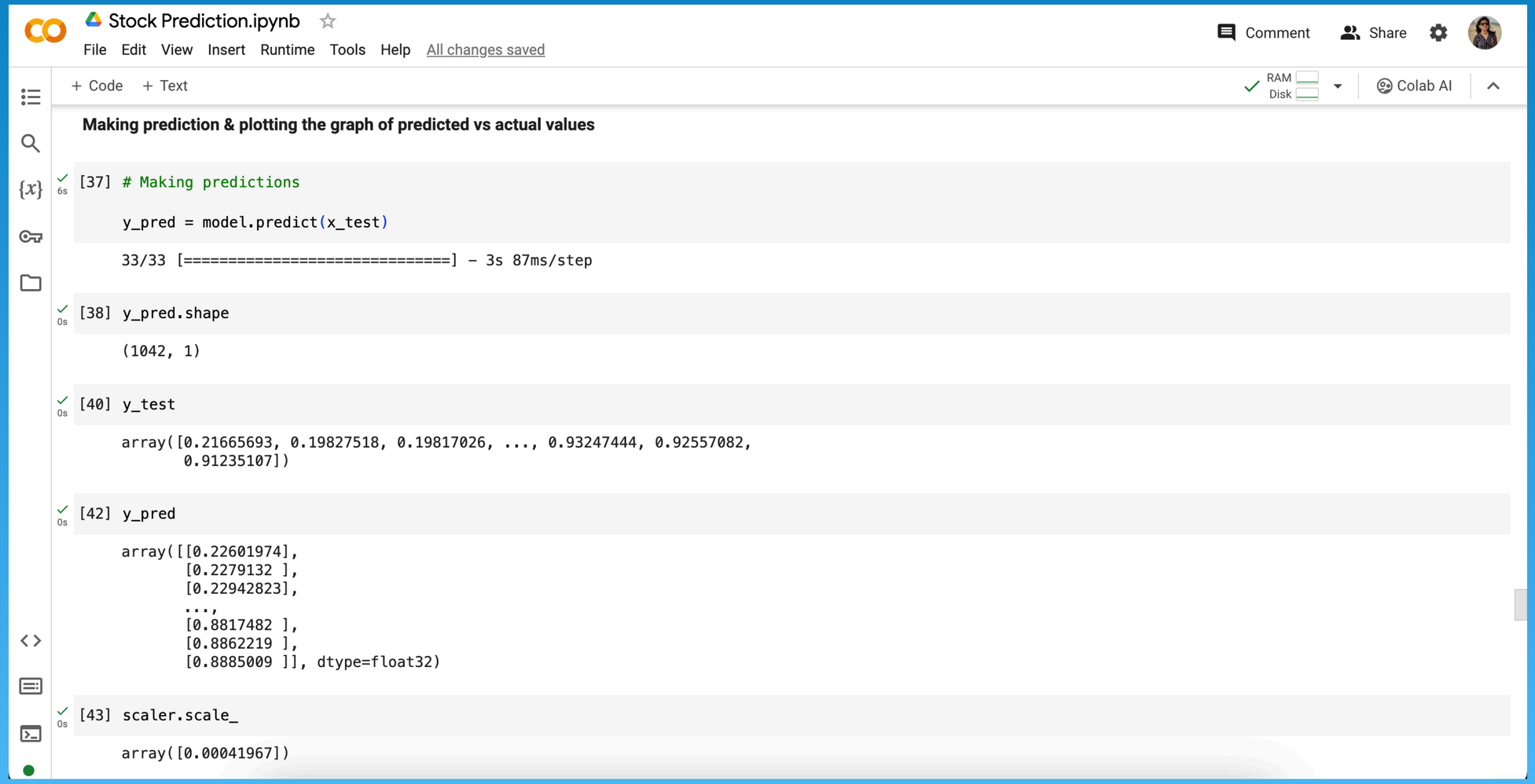
Defining the final dataset by including last 100 columns of training dataset to get prediction



Ploting graph



Making Prediction



Plotting graph of Predicted and Actual values

Stock Prediction.ipynb

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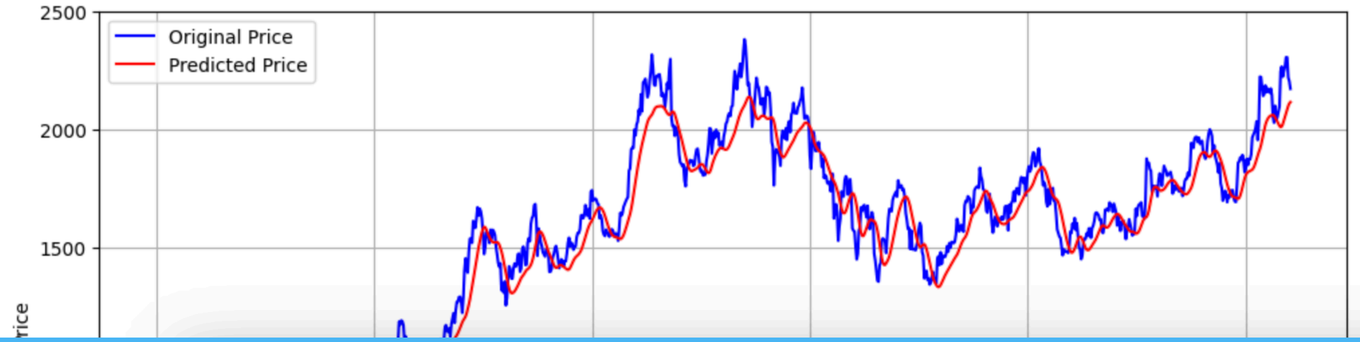
```
[43] scaler.scale_

     array([0.00041967])

[44] scale_factor = 1/0.00041967
     y_pred = y_pred * scale_factor
     y_test = y_test * scale_factor

     plt.figure(figsize = (12,6))
     plt.plot(y_test, 'b', label = "Original Price")
     plt.plot(y_pred, 'r', label = "Predicted Price")
     plt.xlabel('Time')
     plt.ylabel('Price')
     plt.legend()
     plt.grid(True)
     plt.show()
```



Plotting graph of Predicted and Actual values

Stock Prediction.ipynb

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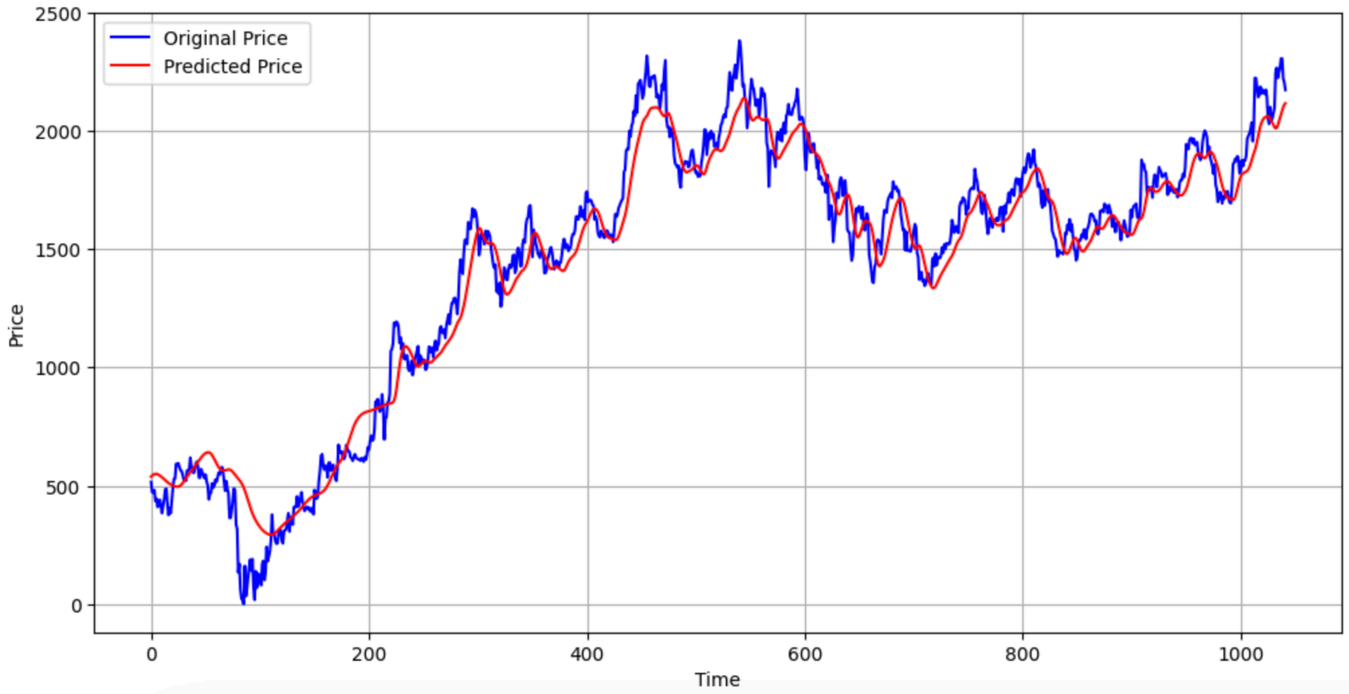
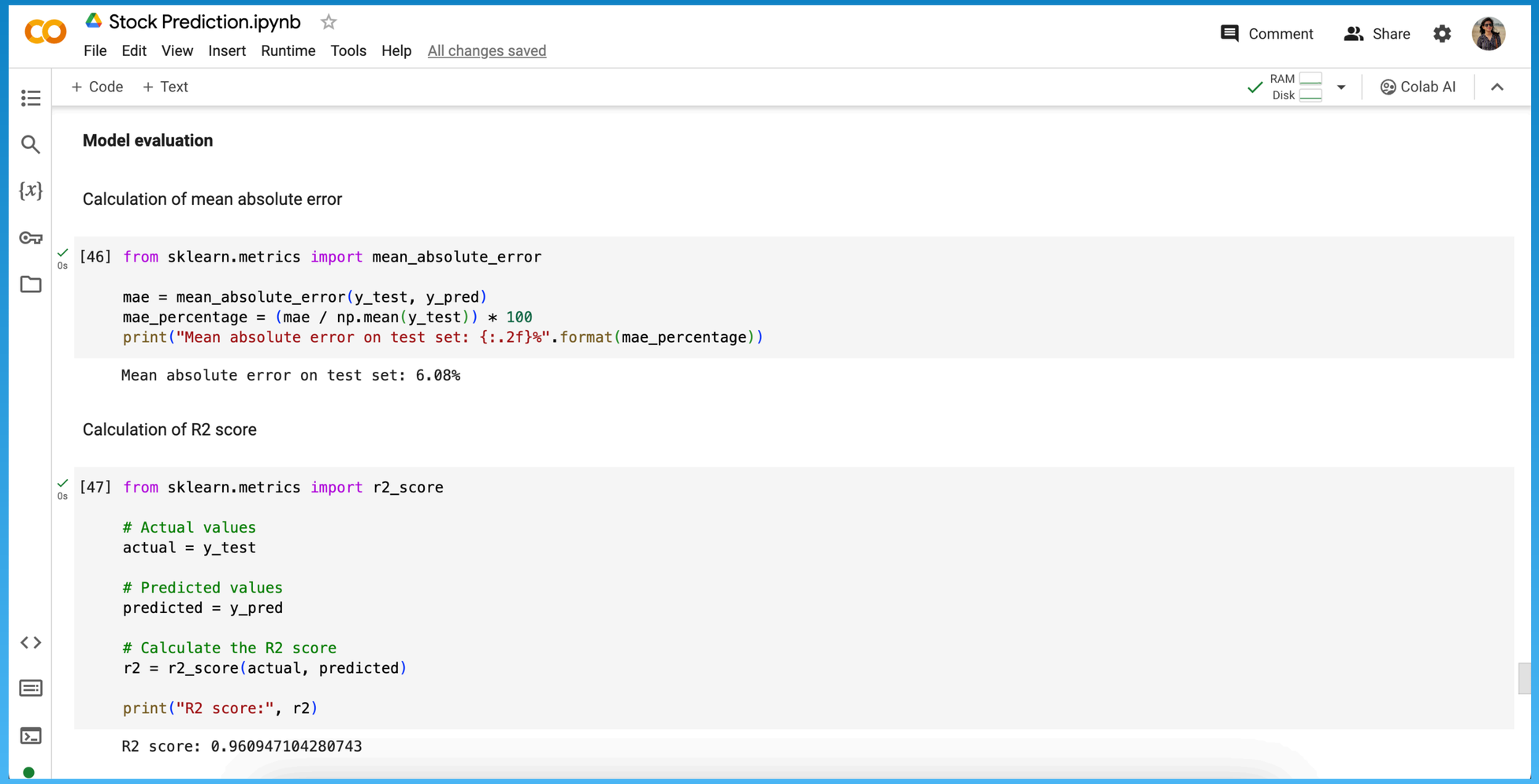
```
plt.ylabel('Price')
plt.legend()
plt.grid(True)
plt.show()
```



Model Evaluation



Model Evaluation

Stock Prediction.ipynb

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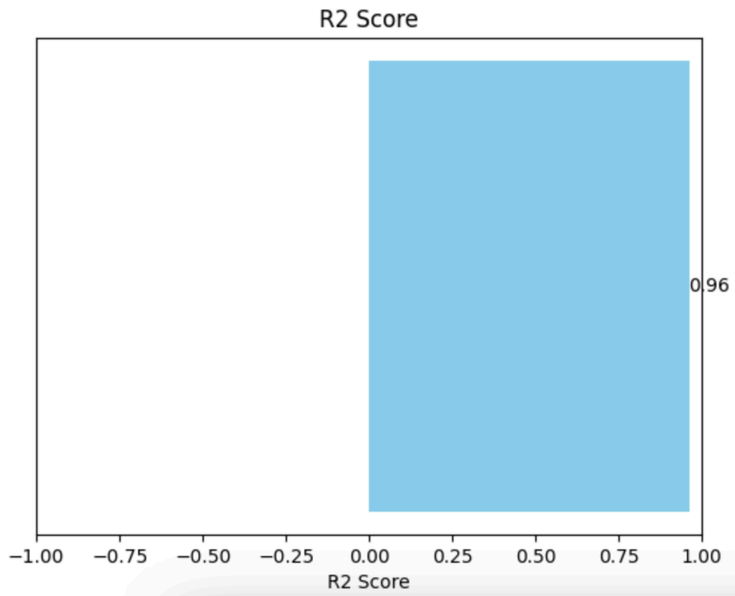
Plotting the R2 score

```
fig, ax = plt.subplots()
ax.barh(0, r2, color='skyblue')
ax.set_xlim([-1, 1])
ax.set_yticks([])
ax.set_xlabel('R2 Score')
ax.set_title('R2 Score')

# Adding the R2 score value on the bar
ax.text(r2, 0, f'{r2:.2f}', va='center', color='black')

plt.show()
```



Plotting the R2 Graph

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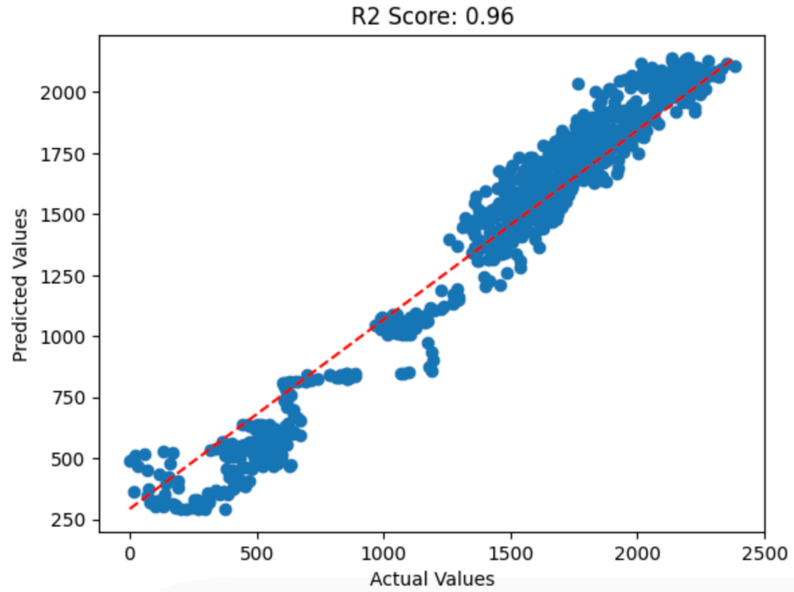
```
plt.scatter(actual, predicted)
plt.plot([min(actual), max(actual)], [min(predicted), max(predicted)], 'r--')
plt.xlabel('Actual Values')
plt.ylabel('Predicted Values')
plt.title(f'R2 Score: {r2:.2f}')
plt.show()
```



Thank you