ASSIGNMENT-4

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NEURAL NETWORKS & DEEP LEARNING

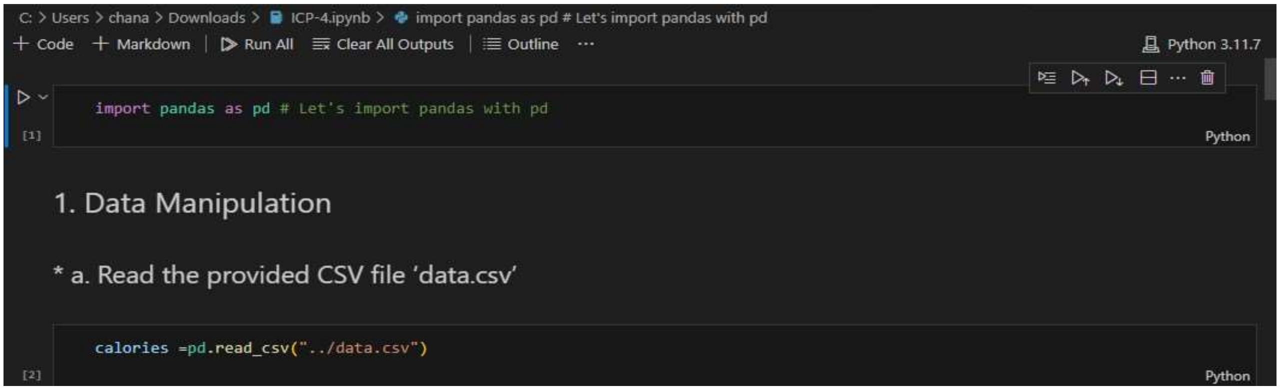
Github link:

Video link:

Screenshots:

1. Data Manipulation

* a. Read the provided CSV file ‘data.csv’


C: > Users > chana > Downloads > ICP-4.ipynb > import pandas as pd # Let's import pandas with pd
+ Code
+ Markdown
Run All
Clear All Outputs
Outline
Python 3.11.7
Python

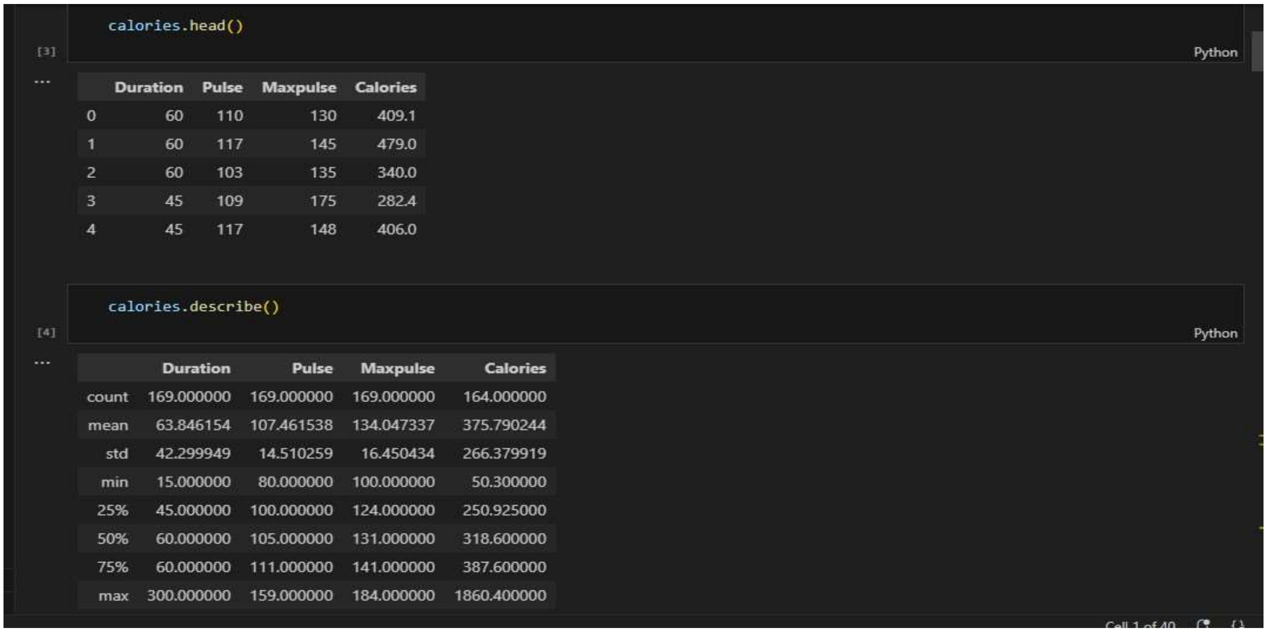
```
[1]  import pandas as pd # Let's import pandas with pd
```

1. Data Manipulation

* a. Read the provided CSV file ‘data.csv’

```
[2]  calories =pd.read_csv("../data.csv")
```

Show the basic statistical description about the data.



```
[3]  calories.head()
```

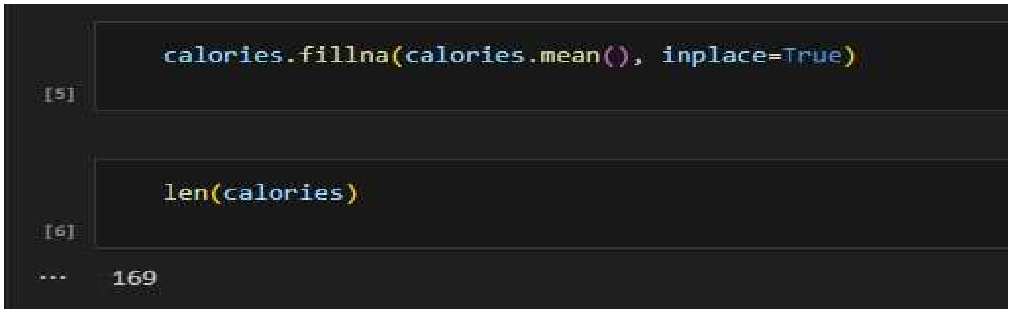
```
   Duration  Pulse  Maxpulse  Calories
0        60    110       130     409.1
1        60    117       145     479.0
2        60    103       135     340.0
3        45    109       175     282.4
4        45    117       148     406.0
```

```
[4]  calories.describe()
```

```
         Duration       Pulse    Maxpulse     Calories
count  169.000000  169.000000  169.000000   164.000000
mean    63.846154  107.461538  134.047337   375.790244
std     42.299949   14.510259   16.450434   266.379919
min     15.000000   80.000000  100.000000    50.300000
25%     45.000000  100.000000  124.000000   250.925000
50%     60.000000  105.000000  131.000000   318.600000
75%     60.000000  111.000000  141.000000   387.600000
max    300.000000  159.000000  184.000000  1860.400000
```

Check if the data has null values.

i. **Replace the null values with the mean**

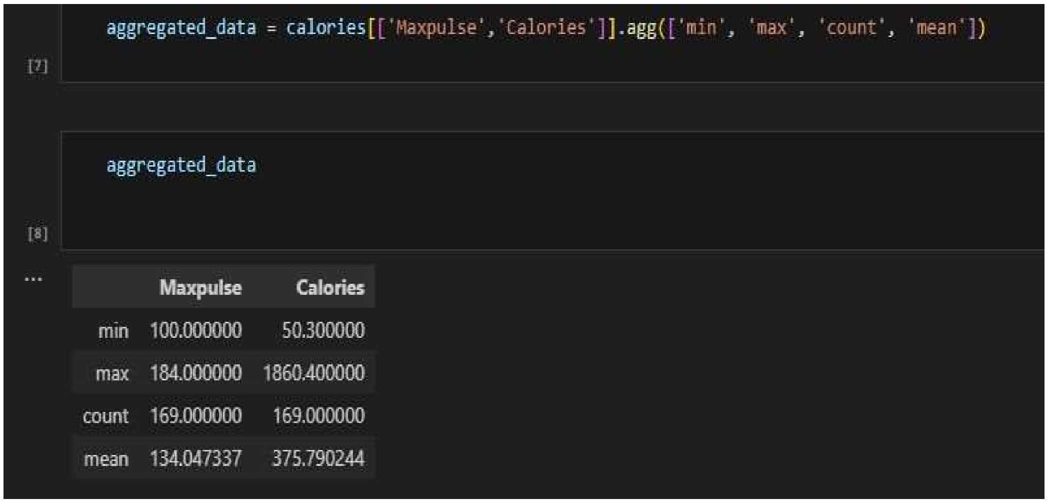


```
[5]  calories.fillna(calories.mean(), inplace=True)
```

```
[6]  len(calories)
```

```
169
```

Select at least two columns and aggregate the data using: min, max, count, mean.

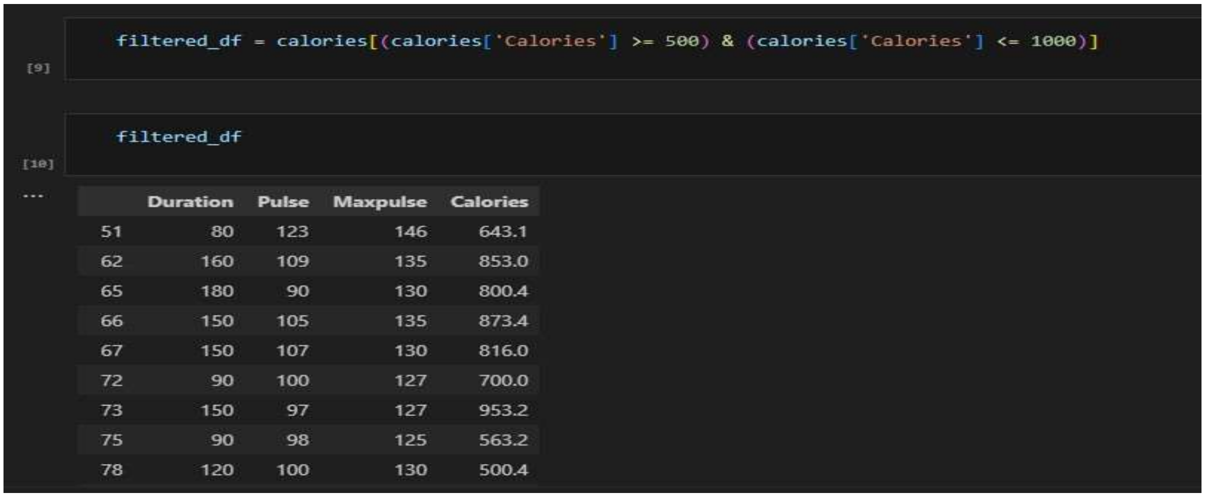


```
[7]  aggregated_data = calories[['Maxpulse','Calories']].agg(['min', 'max', 'count', 'mean'])
```

```
[8]  aggregated_data
```

```
         Maxpulse     Calories
min    100.000000    50.300000
max    184.000000  1860.400000
count  169.000000   169.000000
mean   134.047337   375.790244
```

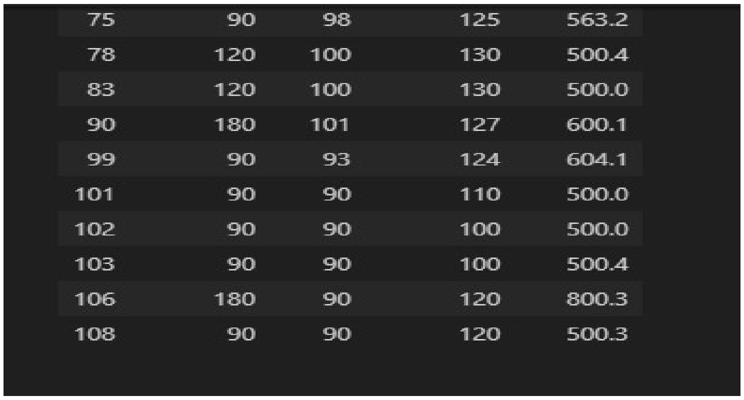
Filter the dataframe to select the rows with calories values between 500 and 1000.



```
[9]  filtered_df = calories[(calories['Calories'] >= 500) & (calories['Calories'] <= 1000)]
```

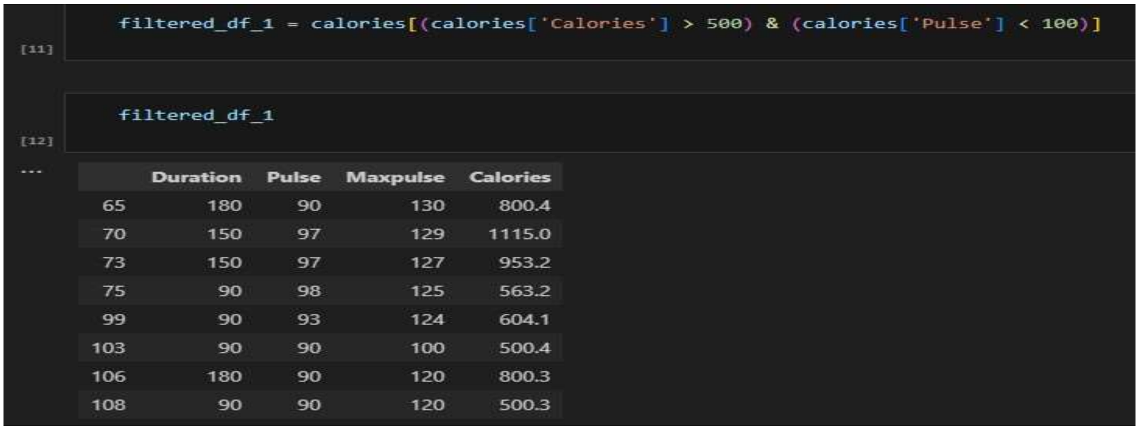
```
[10]  filtered_df
```

```
    Duration  Pulse  Maxpulse  Calories
51        80    123       146     643.1
62       160    109       135     853.0
65       180     90       130     800.4
66       150    105       135     873.4
67       150    107       130     816.0
72        90    100       127     700.0
73       150     97       127     953.2
75        90     98       125     563.2
78       120    100       130     500.4
```



75	90	98	125	563.2
78	120	100	130	500.4
83	120	100	130	500.0
90	180	101	127	600.1
99	90	93	124	604.1
101	90	90	110	500.0
102	90	90	100	500.0
103	90	90	100	500.4
106	180	90	120	800.3
108	90	90	120	500.3

Filter the dataframe to select the rows with calories values > 500 and pulse < 100



[11]

```
filtered_df_1 = calories[(calories['Calories'] > 500) & (calories['Pulse'] < 100)]
```

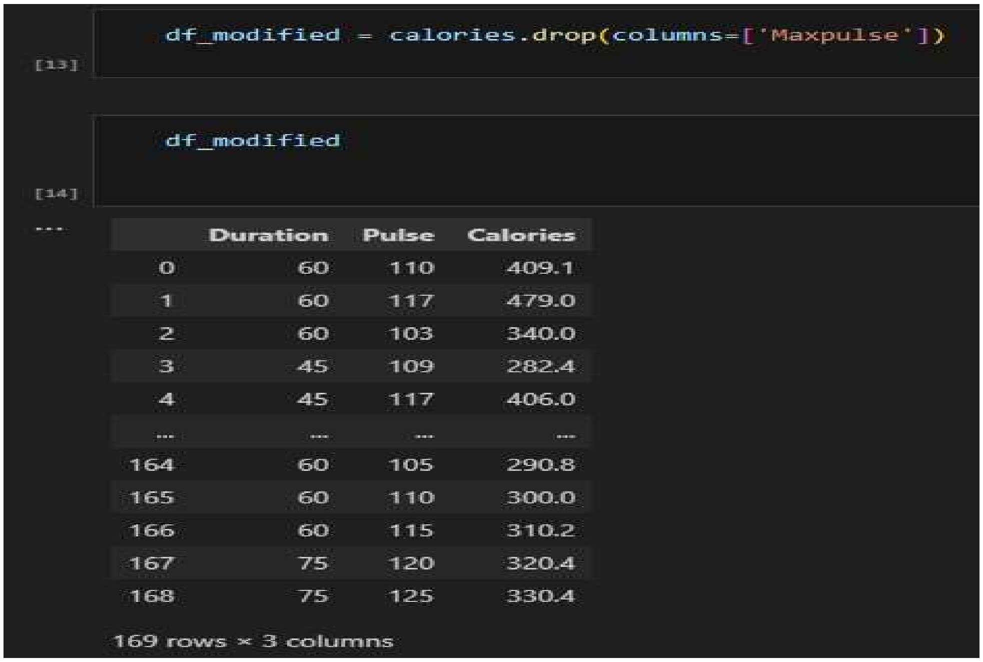
[12]

```
filtered_df_1
```

...

	Duration	Pulse	Maxpulse	Calories
65	180	90	130	800.4
70	150	97	129	1115.0
73	150	97	127	953.2
75	90	98	125	563.2
99	90	93	124	604.1
103	90	90	100	500.4
106	180	90	120	800.3
108	90	90	120	500.3

Create a new “df_modified” dataframe that contains all the columns from df except for “Maxpulse”



[13]

```
df_modified = calories.drop(columns=['Maxpulse'])
```

[14]

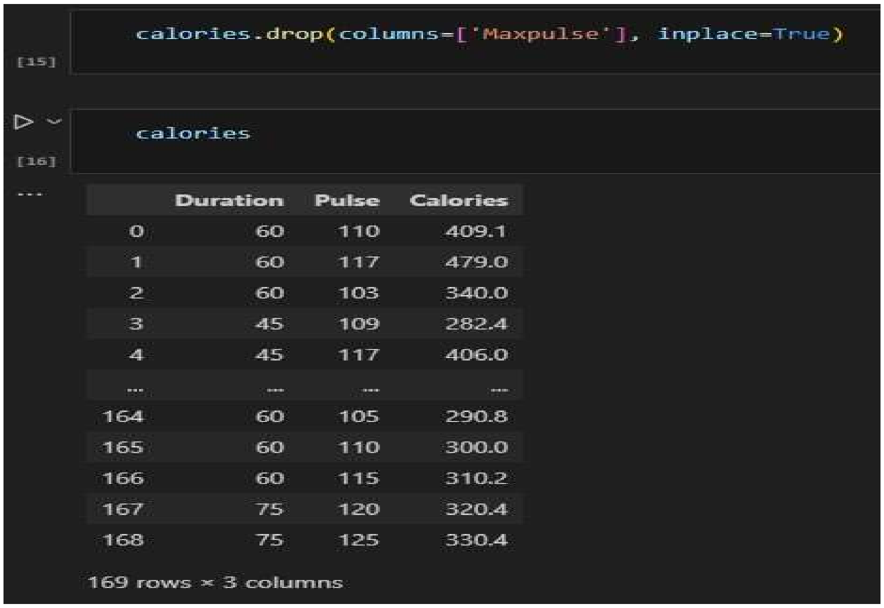
```
df_modified
```

...

	Duration	Pulse	Calories
0	60	110	409.1
1	60	117	479.0
2	60	103	340.0
3	45	109	282.4
4	45	117	406.0
...	...	...	...
164	60	105	290.8
165	60	110	300.0
166	60	115	310.2
167	75	120	320.4
168	75	125	330.4

169 rows × 3 columns

Delete the “Maxpulse” column from the main df dataframe

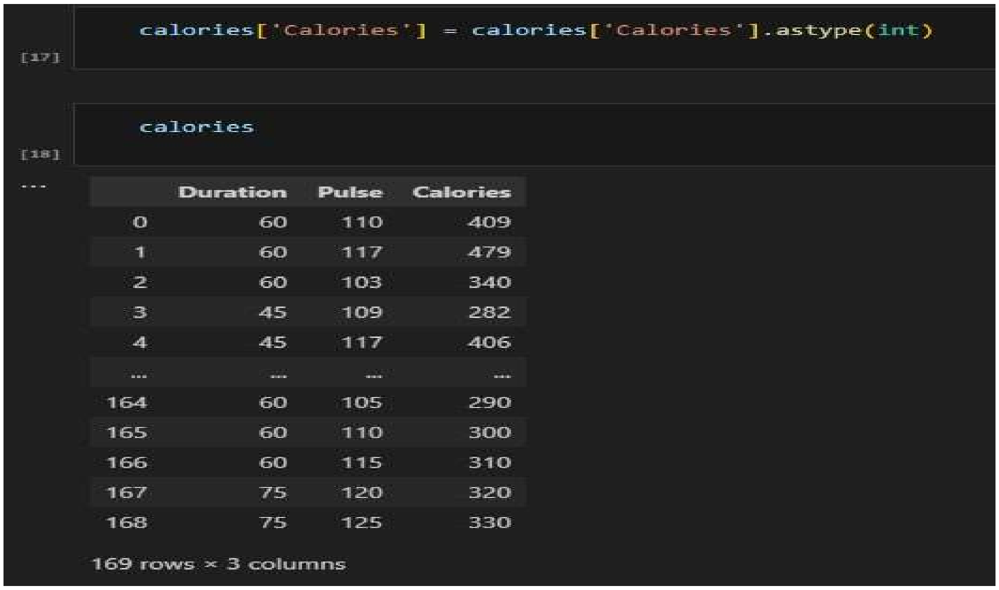


```
calories.drop(columns=['Maxpulse'], inplace=True)
```

```
calories
```

```
     Duration  Pulse  Calories
0          60    110     409.1
1          60    117     479.0
2          60    103     340.0
3          45    109     282.4
4          45    117     406.0
...       ...    ...       ...
164        60    105     290.8
165        60    110     300.0
166        60    115     310.2
167        75    120     320.4
168        75    125     330.4

169 rows × 3 columns
```

Convert the datatype of Calories column to int datatype.

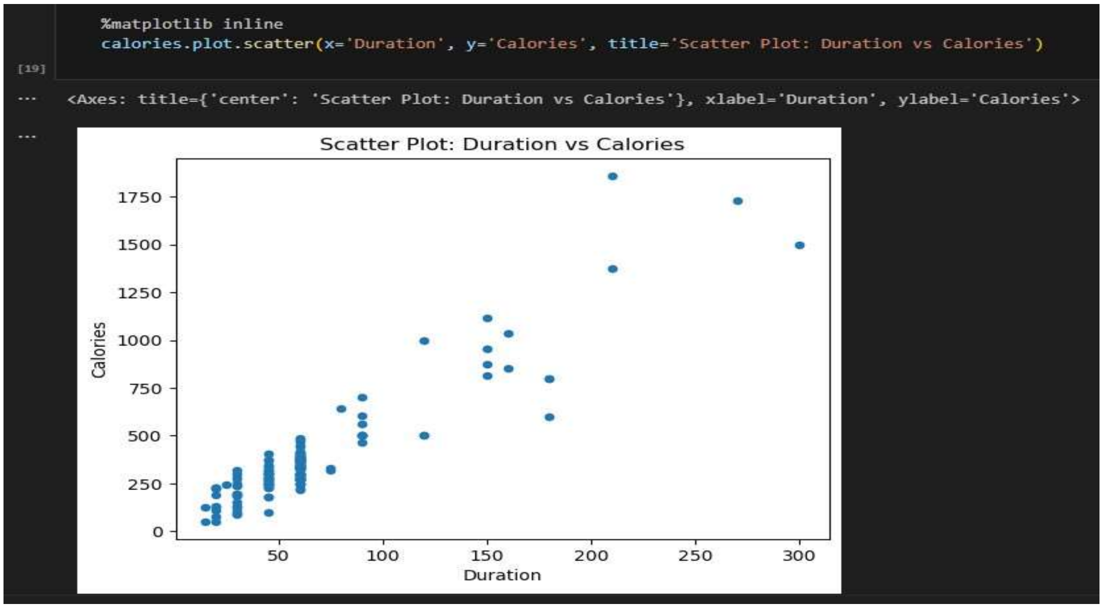


```
calories['Calories'] = calories['Calories'].astype(int)
```

```
calories
```

```
     Duration  Pulse  Calories
0          60    110       409
1          60    117       479
2          60    103       340
3          45    109       282
4          45    117       406
...       ...    ...       ...
164        60    105       290
165        60    110       300
166        60    115       310
167        75    120       320
168        75    125       330

169 rows × 3 columns
```

Using pandas create a scatter plot for the two columns (Duration and Calories).



```
%matplotlib inline
calories.plot.scatter(x='Duration', y='Calories', title='Scatter Plot: Duration vs Calories')
```

```
<Axes: title={'center': 'Scatter Plot: Duration vs Calories'}, xlabel='Duration', ylabel='Calories'>
```

2. Linear Regression

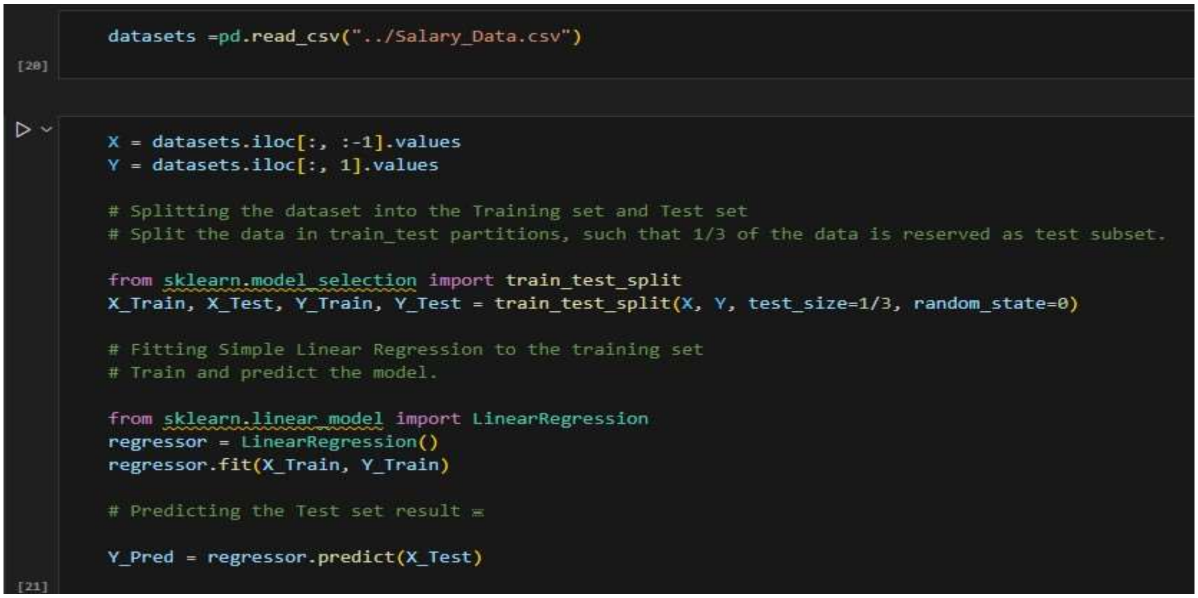
Import the given “Salary_Data.csv”

Split the data in train_test partitions, such that 1/3 of the data is reserved as test subset.

c) Train and predict the model.

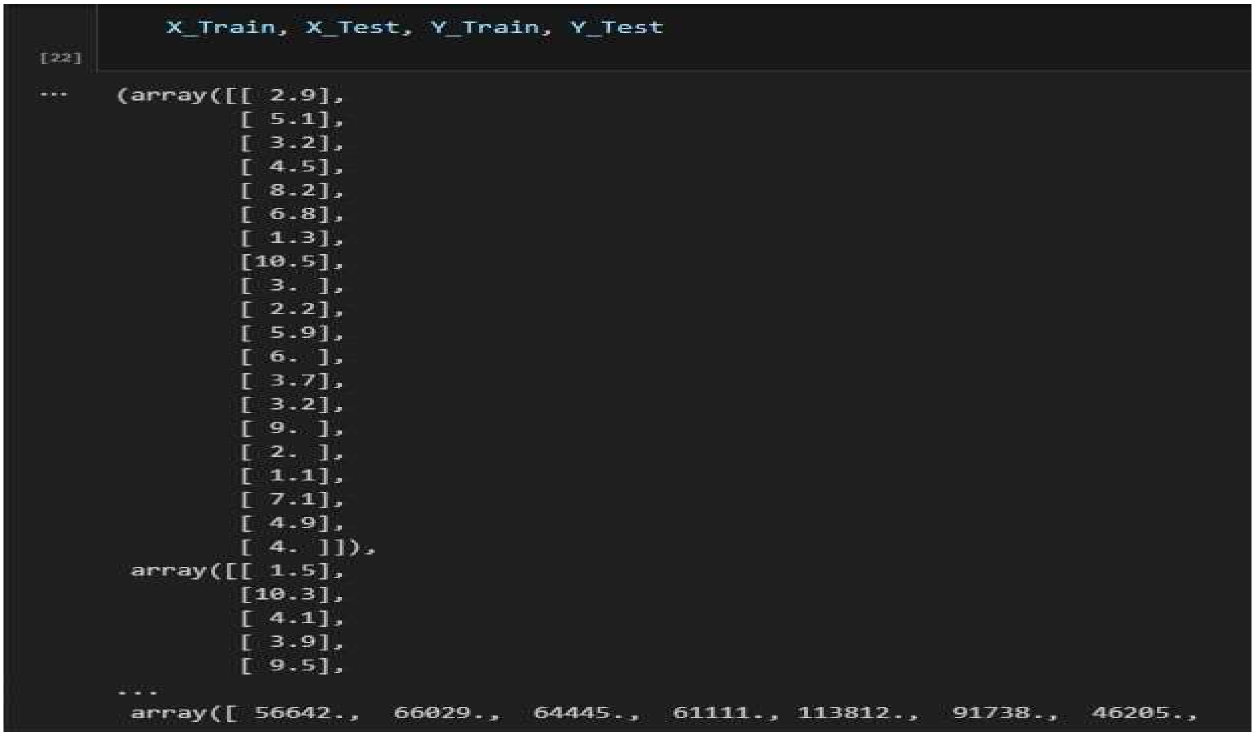
d) Calculate the mean_squared error

e) Visualize both train and test data using scatter plot.



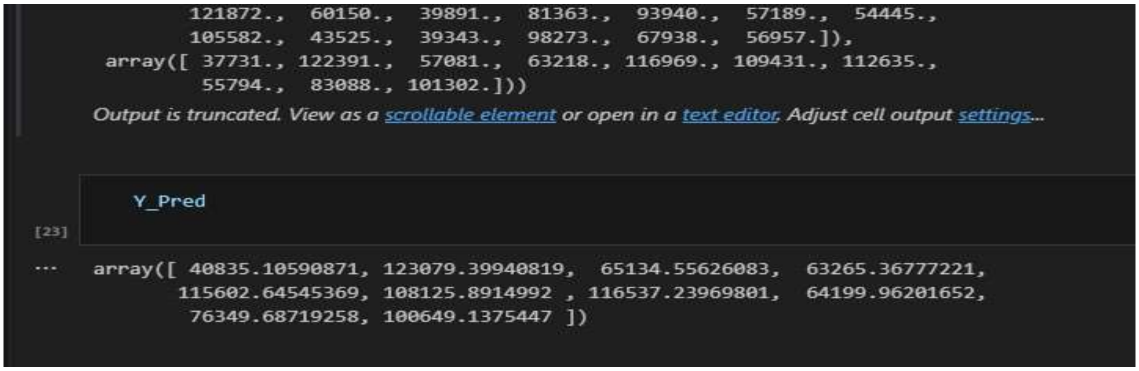
```
datasets =pd.read_csv("../Salary_Data.csv")
```

```
X = datasets.iloc[:, :-1].values
Y = datasets.iloc[:, 1].values

# Splitting the dataset into the Training set and Test set
# Split the data in train_test partitions, such that 1/3 of the data is reserved as test subset.

from sklearn.model_selection import train_test_split
X_Train, X_Test, Y_Train, Y_Test = train_test_split(X, Y, test_size=1/3, random_state=0)

# Fitting Simple Linear Regression to the training set
# Train and predict the model.

from sklearn.linear_model import LinearRegression
regressor = LinearRegression()
regressor.fit(X_Train, Y_Train)

# Predicting the Test set result =

Y_Pred = regressor.predict(X_Test)
```



```
    X_Train, X_Test, Y_Train, Y_Test
[22]
```

```
... (array([[ 2.9],
            [ 5.1],
            [ 3.2],
            [ 4.5],
            [ 8.2],
            [ 6.8],
            [ 1.3],
            [10.5],
            [ 3. ],
            [ 2.2],
            [ 5.9],
            [ 6. ],
            [ 3.7],
            [ 3.2],
            [ 9. ],
            [ 2. ],
            [ 1.1],
            [ 7.1],
            [ 4.9],
            [ 4. ]]),
     array([[ 1.5],
            [10.3],
            [ 4.1],
            [ 3.9],
            [ 9.5],
    ...
     array([ 56642.,  66029.,  64445.,  61111., 113812.,  91738.,  46205.,
```

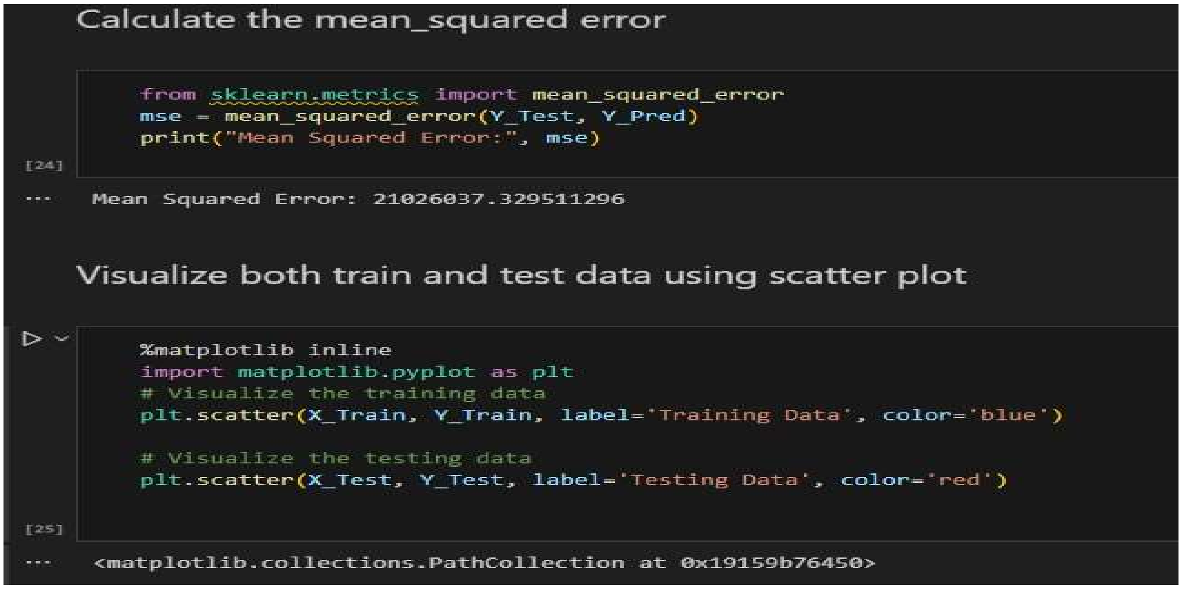


```
        121872.,  60150.,  39891.,  81363.,  93940.,  57189.,  54445.,
        105582.,  43525.,  39343.,  98273.,  67938.,  56957.]),
 array([ 37731., 122391.,  57081.,  63218., 116969., 109431., 112635.,
         55794.,  83088., 101302.]))
```

Output is truncated. View as a scrollable element or open in a text editor. Adjust cell output settings...

```
    Y_Pred
[23]
```

```
... array([ 40835.10590871, 123079.39940819,  65134.55626083,  63265.36777221,
           115602.64545369, 108125.8914992 , 116537.23969801,  64199.96201652,
            76349.68719258, 100649.1375447 ])
```



Calculate the mean_squared error

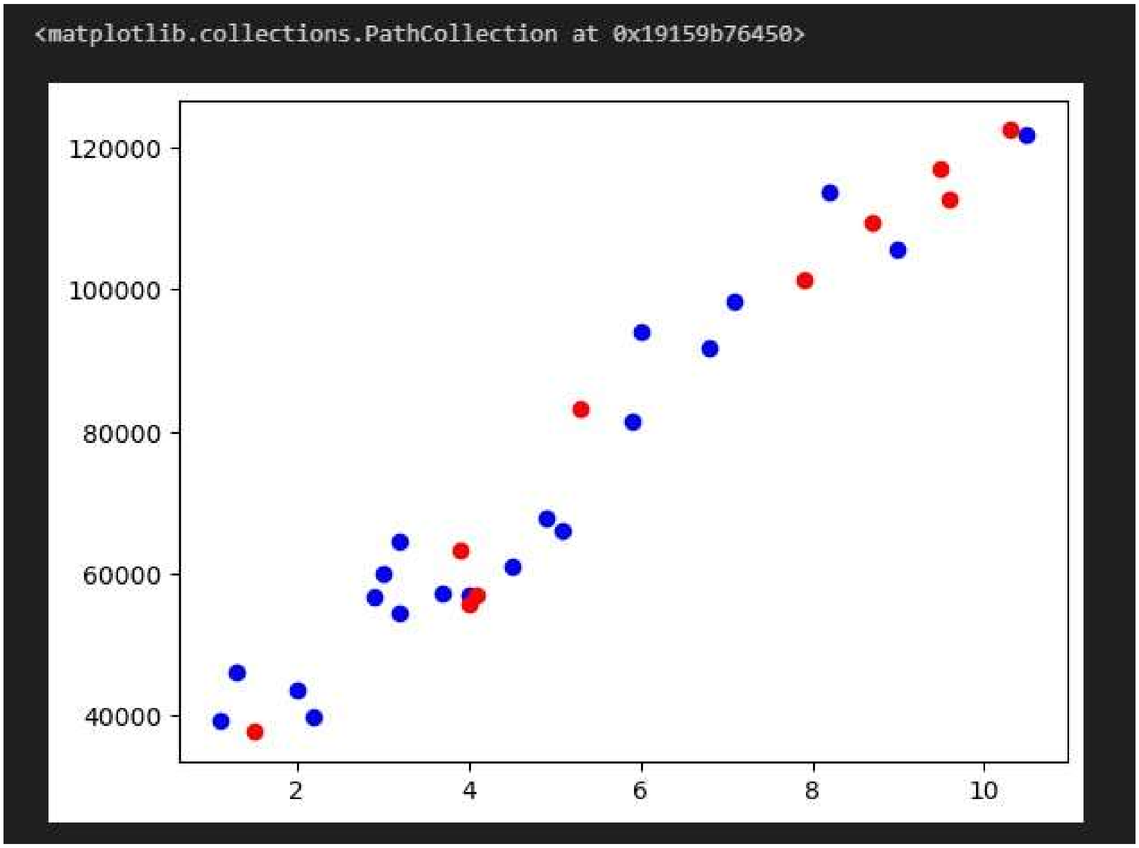
```
    from sklearn.metrics import mean_squared_error
    mse = mean_squared_error(Y_Test, Y_Pred)
    print("Mean Squared Error:", mse)
[24]
```

```
... Mean Squared Error: 21026037.329511296
```

Visualize both train and test data using scatter plot

```
    %matplotlib inline
    import matplotlib.pyplot as plt
    # Visualize the training data
    plt.scatter(X_Train, Y_Train, label='Training Data', color='blue')

    # Visualize the testing data
    plt.scatter(X_Test, Y_Test, label='Testing Data', color='red')

[25]
```

```
... <matplotlib.collections.PathCollection at 0x19159b76450>
```



```
<matplotlib.collections.PathCollection at 0x19159b76450>
```

120000
100000
80000
60000
40000
2
4
6
8
10