PDS ASSIGNMENT-2

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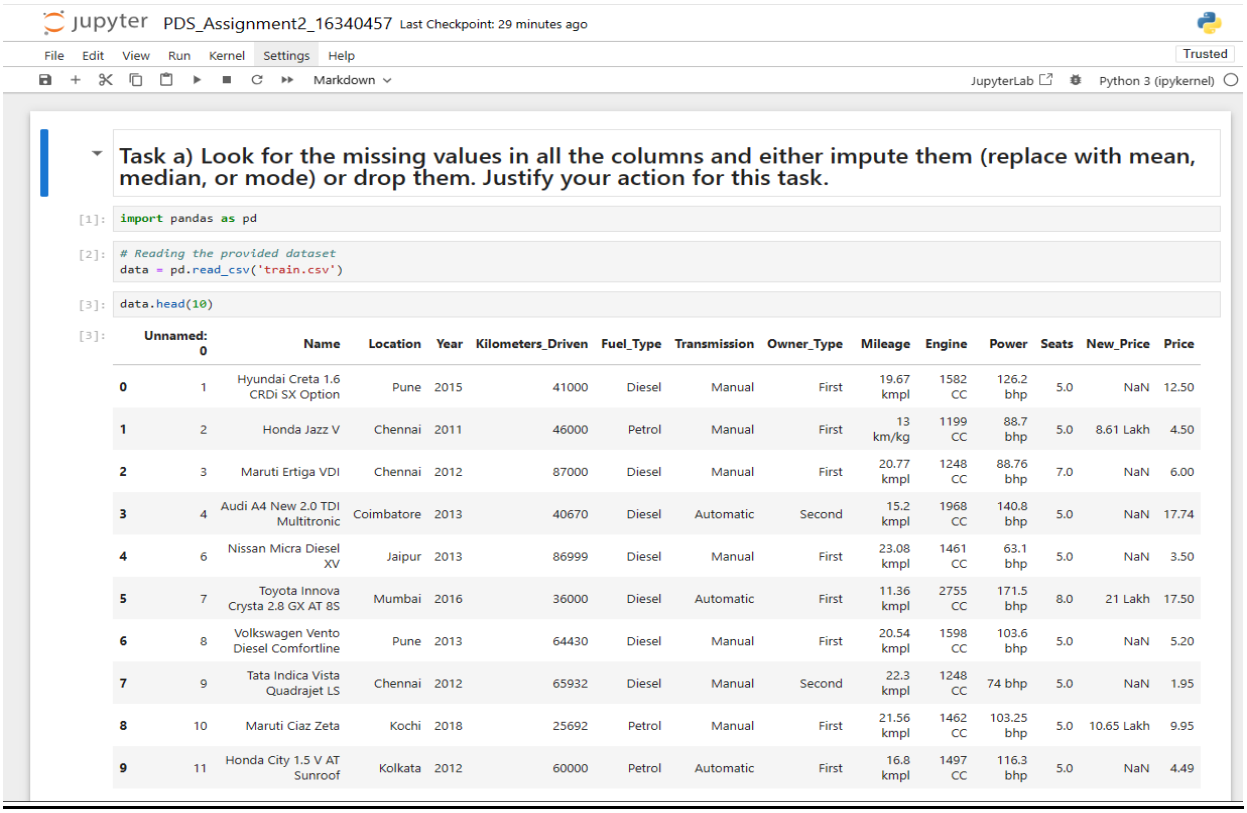
TASK A: Look for the missing values in all the columns and either impute them (replace with mean,median, or mode) or drop them. Justify your action for this task.

Step 1: Reading The data from the train.csv which was given
https://app.box.com/s/jm6pw202asu4xd3uypwtry2rqk691y1i

Step 2:

- First we import pandas as pd
- Then we read the train.csv file using pd.read_csv(train.csv) into data variable
- Then we print the data variable, if we get the output then we successfully loaded and saved the train.csv into data.



	Unnamed: 0	Name	Location	Year	Kilometers_Driven	Fuel_Type	Transmission	Owner_Type	Mileage	Engine	Power	Seats	New_Price	Price
0	1	Hyundai Creta 1.6 CRDi SX Option	Pune	2015	41000	Diesel	Manual	First	19.67 kmpl	1582 CC	126.2 bhp	5.0	NaN	12.50
1	2	Honda Jazz V	Chennai	2011	46000	Petrol	Manual	First	13 km/kg	1199 CC	88.7 bhp	5.0	8.61 Lakh	4.50
2	3	Maruti Ertiga VDI	Chennai	2012	87000	Diesel	Manual	First	20.77 kmpl	1248 CC	88.76 bhp	7.0	NaN	6.00
3	4	Audi A4 New 2.0 TDI Multitronic	Coimbatore	2013	40670	Diesel	Automatic	Second	15.2 kmpl	1968 CC	140.8 bhp	5.0	NaN	17.74
4	6	Nissan Micra Diesel XV	Jaipur	2013	86999	Diesel	Manual	First	23.08 kmpl	1461 CC	63.1 bhp	5.0	NaN	3.50
5	7	Toyota Innova Crysta 2.8 GX AT 8S	Mumbai	2016	36000	Diesel	Automatic	First	11.36 kmpl	2755 CC	171.5 bhp	8.0	21 Lakh	17.50
6	8	Volkswagen Vento Diesel Comfortline	Pune	2013	64430	Diesel	Manual	First	20.54 kmpl	1598 CC	103.6 bhp	5.0	NaN	5.20
7	9	Tata Indica Vista Quadrajet LS	Chennai	2012	65932	Diesel	Manual	Second	22.3 kmpl	1248 CC	74 bhp	5.0	NaN	1.95
8	10	Maruti Ciaz Zeta	Kochi	2018	25692	Petrol	Manual	First	21.56 kmpl	1462 CC	103.25 bhp	5.0	10.65 Lakh	9.95
9	11	Honda City 1.5 V AT Sunroof	Kolkata	2012	60000	Petrol	Automatic	First	16.8 kmpl	1497 CC	116.3 bhp	5.0	NaN	4.49

Step3:

- Now we are going to check for the missing values
- This code inspects missing values in the dataset and processes specific columns using regular expressions to extract numeric data ('Mileage', 'Engine', 'Power', 'New_Price', 'Seats') from string representations. It converts these values to floating-point numbers and fills missing data with the mean or median of the respective column.

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Code

JupyterLab Python 3 (ipykernel)

[10]:
```
# Checking for missing values in the dataset
missing_values = data.isnull().sum()
print("Missing Values:")
print(missing_values)
```

```
Missing Values:
Unnamed: 0             0
Name                   0
Location               0
Year                   0
Kilometers_Driven      0
Fuel_Type              0
Transmission           0
Owner_Type             0
Mileage                2
Engine                36
Power                 36
Seats                 38
New_Price           5032
Price                  0
dtype: int64
```

[11]:
```
import re

data['Mileage'] = data['Mileage'].apply(lambda x: re.findall(r'\d+\.?\d*', str(x))[0] if pd.notnull(x) else x).astype(float)
data['Mileage'].fillna(data['Mileage'].mean(), inplace=True)

data['Engine'] = data['Engine'].apply(lambda x: re.findall(r'\d+', str(x))[0] if pd.notnull(x) else x).astype(float)
data['Engine'].fillna(data['Engine'].median(), inplace=True)

data['Power'] = data['Power'].apply(lambda x: re.findall(r'\d+\.?\d*', str(x))[0] if pd.notnull(x) else x).astype(float)
data['Power'].fillna(data['Power'].median(), inplace=True)

data['Seats'] = data['Seats'].apply(lambda x: re.findall(r'\d+\.?\d*', str(x))[0] if pd.notnull(x) else x).astype(float)
data['Seats'].fillna(data['Seats'].mean(), inplace=True)

#dropping new_price column because it contains high number of null values
data.drop(['New_Price', 'Unnamed: 0'], axis=1, inplace=True)
```

[12]:
```
data
```

[12]:

	Name	Location	Year	Kilometers_Driven	Fuel_Type	Transmission	Owner_Type	Mileage	Engine	Power	Seats	Price

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Code

JupyterLab Python 3 (ipykernel)

```
data['Seats'] = data['Seats'].apply(lambda x: re.findall(r'\d+\.?\d*', str(x))[0] if pd.notnull(x) else x).astype(float)
data['Seats'].fillna(data['Seats'].mean(), inplace=True)

#dropping new_price column because it contains high number of null values
data.drop(['New_Price', 'Unnamed: 0'], axis=1, inplace=True)
```

[12]:
```
data
```

[12]:

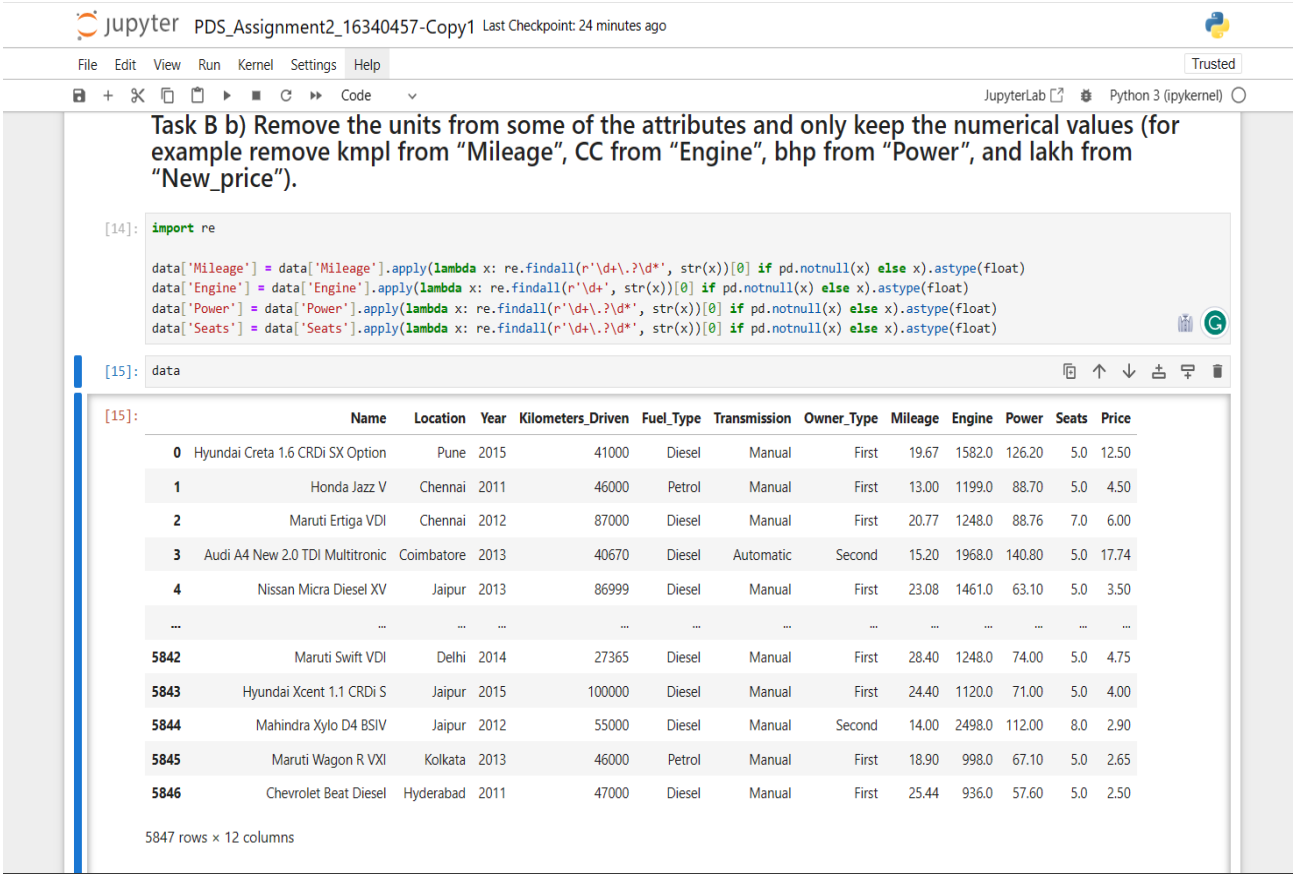
	Name	Location	Year	Kilometers_Driven	Fuel_Type	Transmission	Owner_Type	Mileage	Engine	Power	Seats	Price
0	Hyundai Creta 1.6 CRDi SX Option	Pune	2015	41000	Diesel	Manual	First	19.67	1582.0	126.20	5.0	12.50
1	Honda Jazz V	Chennai	2011	46000	Petrol	Manual	First	13.00	1199.0	88.70	5.0	4.50
2	Maruti Ertiga VDI	Chennai	2012	87000	Diesel	Manual	First	20.77	1248.0	88.76	7.0	6.00
3	Audi A4 New 2.0 TDI Multitronic	Coimbatore	2013	40670	Diesel	Automatic	Second	15.20	1968.0	140.80	5.0	17.74
4	Nissan Micra Diesel XV	Jaipur	2013	86999	Diesel	Manual	First	23.08	1461.0	63.10	5.0	3.50
...	...	...	...	...	...	...	...	...	...	...	...	...
5842	Maruti Swift VDI	Delhi	2014	27365	Diesel	Manual	First	28.40	1248.0	74.00	5.0	4.75
5843	Hyundai Xcent 1.1 CRDi S	Jaipur	2015	100000	Diesel	Manual	First	24.40	1120.0	71.00	5.0	4.00
5844	Mahindra Xylo D4 BSIV	Jaipur	2012	55000	Diesel	Manual	Second	14.00	2498.0	112.00	8.0	2.90
5845	Maruti Wagon R VXI	Kolkata	2013	46000	Petrol	Manual	First	18.90	998.0	67.10	5.0	2.65
5846	Chevrolet Beat Diesel	Hyderabad	2011	47000	Diesel	Manual	First	25.44	936.0	57.60	5.0	2.50

5847 rows × 12 columns

Justification:

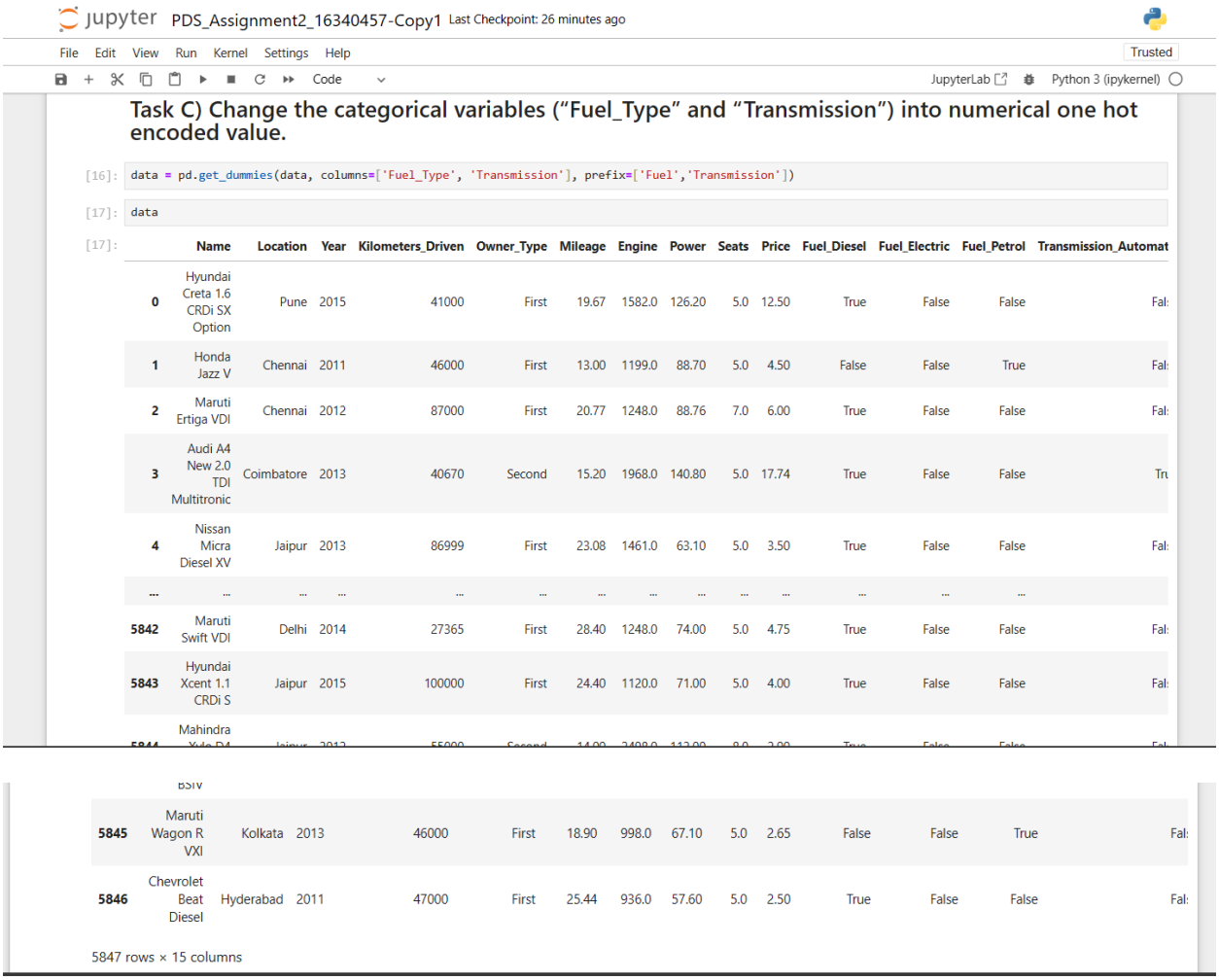
- Dropping the 'New_Price' column due to a high number of missing values is justified to maintain data quality. With over 5000 missing values, imputing them might introduce potential biases in the dataset, hence the decision to remove the column ensures data integrity and reliability in subsequent analysis.

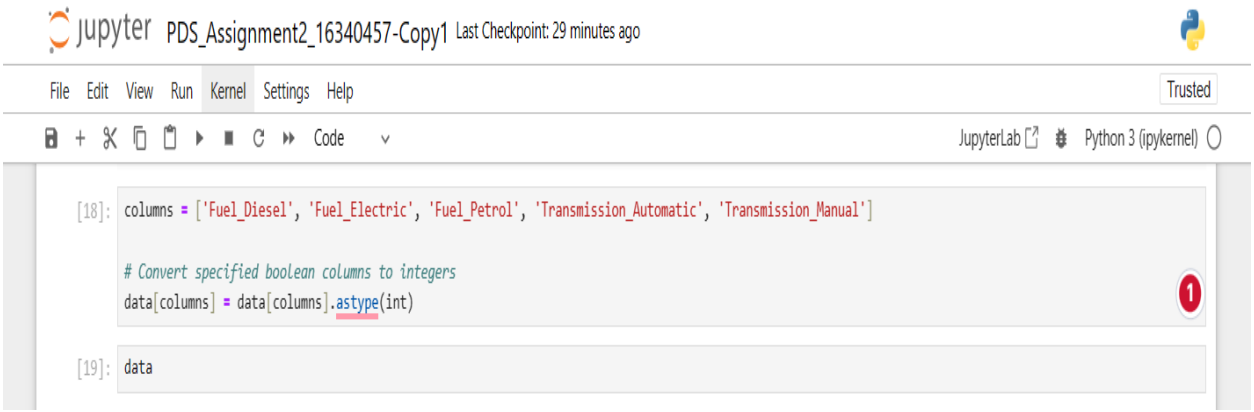
Task B Remove the units from some of the attributes and only keep the numerical values (for example remove kmpl from “Mileage”, CC from “Engine”, bhp from “Power”, and lakh from “New_price”).

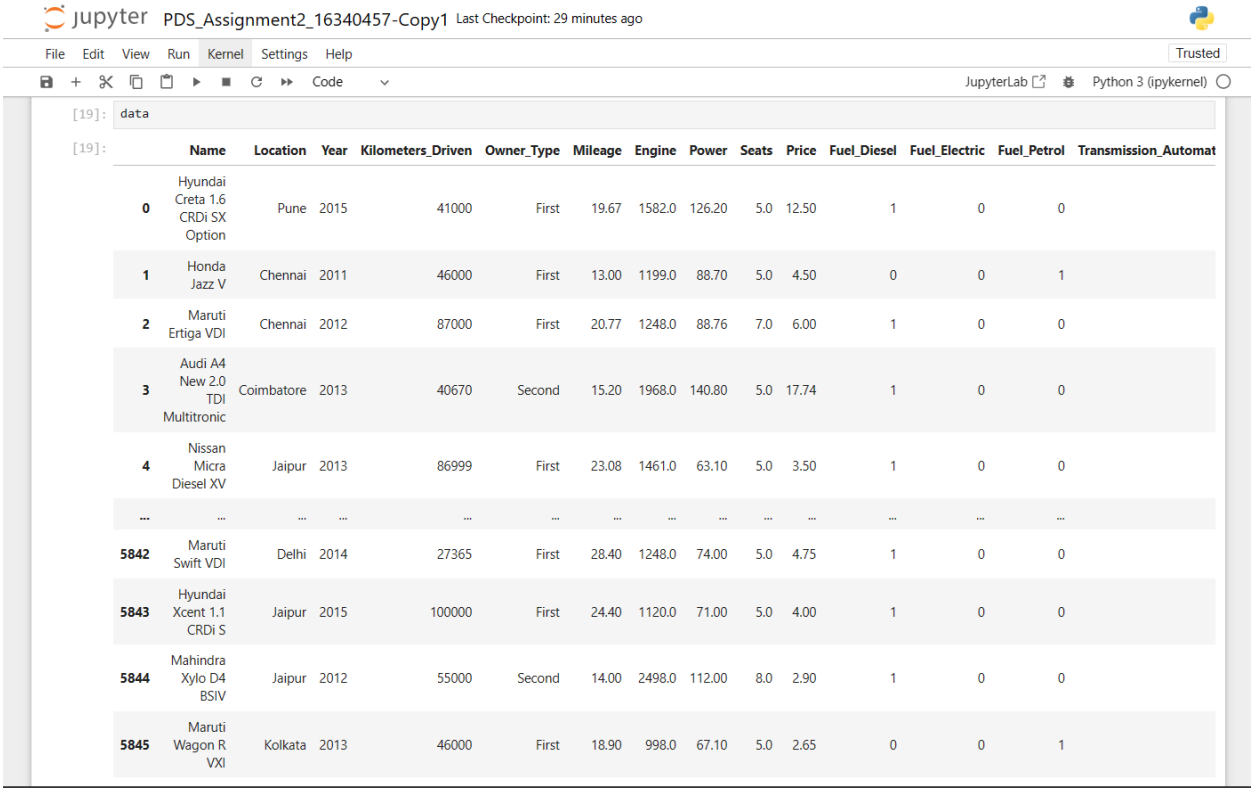


<u>Task</u> C) Change the categorical variables ("Fuel_Type" and "Transmission") into numerical one hot encoded value.

- The code pd.get_dummies() in Pandas is used to convert categorical variables into dummy/indicator variables. By applying this function to the 'Fuel_Type' and 'Transmission' columns and specifying prefixes for the new columns, it creates new columns for each category in those columns, marking the presence of each category with 1 (or 0 for absence).





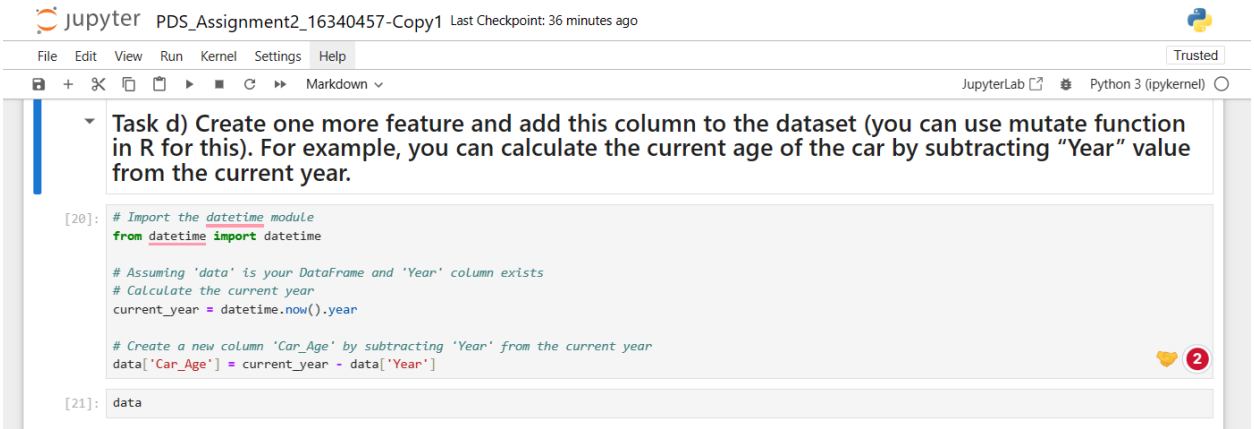


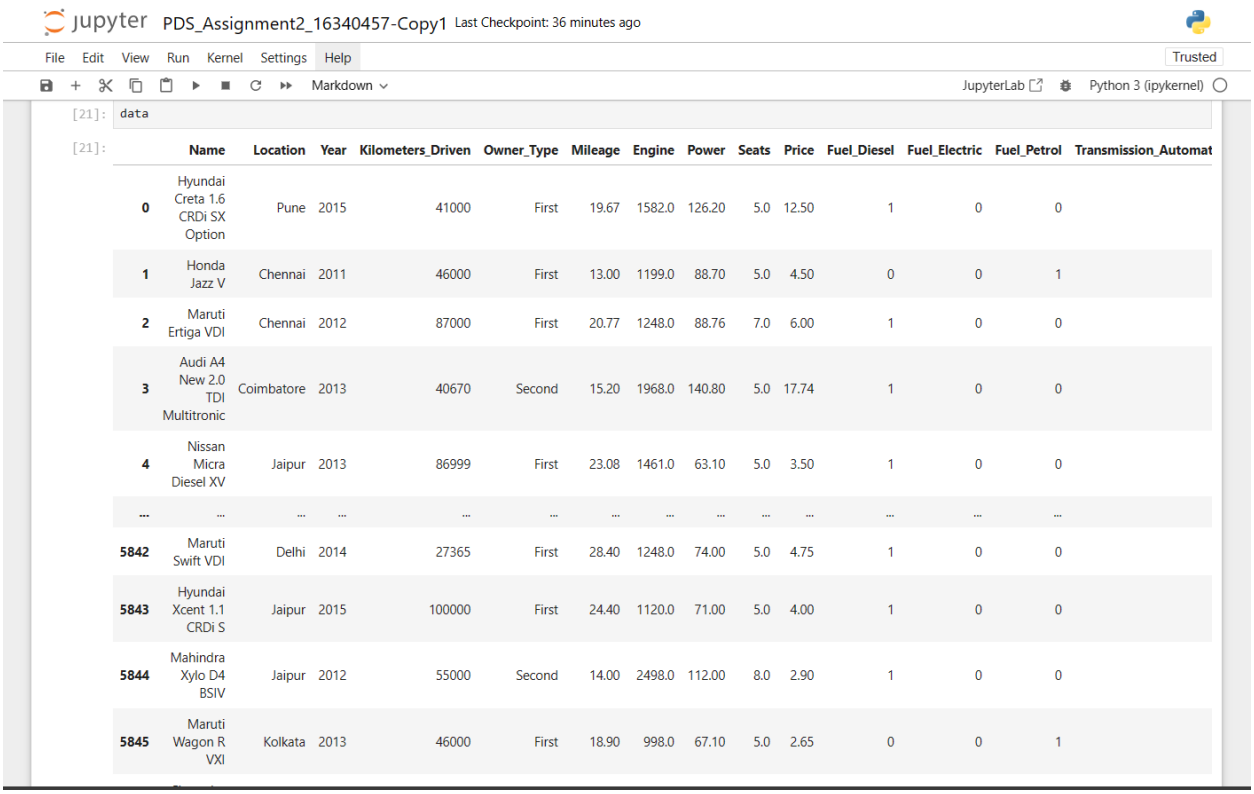
[19]:

	Name	Location	Year	Kilometers_Driven	Owner_Type	Mileage	Engine	Power	Seats	Price	Fuel_Diesel	Fuel_Electric	Fuel_Petrol	Transmission_Automat
0	Hyundai Creta 1.6 CRDi SX Option	Pune	2015	41000	First	19.67	1582.0	126.20	5.0	12.50	1	0	0	
1	Honda Jazz V	Chennai	2011	46000	First	13.00	1199.0	88.70	5.0	4.50	0	0	1	
2	Maruti Ertiga VDI	Chennai	2012	87000	First	20.77	1248.0	88.76	7.0	6.00	1	0	0	
3	Audi A4 New 2.0 TDI Multitronic	Coimbatore	2013	40670	Second	15.20	1968.0	140.80	5.0	17.74	1	0	0	
4	Nissan Micra Diesel XV	Jaipur	2013	86999	First	23.08	1461.0	63.10	5.0	3.50	1	0	0	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	
5842	Maruti Swift VDI	Delhi	2014	27365	First	28.40	1248.0	74.00	5.0	4.75	1	0	0	
5843	Hyundai Xcent 1.1 CRDi S	Jaipur	2015	100000	First	24.40	1120.0	71.00	5.0	4.00	1	0	0	
5844	Mahindra Xylo D4 BSIV	Jaipur	2012	55000	Second	14.00	2498.0	112.00	8.0	2.90	1	0	0	
5845	Maruti Wagon R VXI	Kolkata	2013	46000	First	18.90	998.0	67.10	5.0	2.65	0	0	1	

- This code is transforming certain columns (Fuel and Transmission types) that contain Boolean (True/False) values into integer values, where True becomes 1 and False becomes 0. The specified columns are converted to a numerical representation for further analysis or machine learning models.

<u>Task d</u>) Create one more feature and add this column to the dataset (you can use mutate function in R for this). For example, you can calculate the current age of the car by subtracting "Year" value from the current year.





[21]:

	Name	Location	Year	Kilometers_Driven	Owner_Type	Mileage	Engine	Power	Seats	Price	Fuel_Diesel	Fuel_Electric	Fuel_Petrol	Transmission_Automat
0	Hyundai Creta 1.6 CRDi SX Option	Pune	2015	41000	First	19.67	1582.0	126.20	5.0	12.50	1	0	0	
1	Honda Jazz V	Chennai	2011	46000	First	13.00	1199.0	88.70	5.0	4.50	0	0	1	
2	Maruti Ertiga VDI	Chennai	2012	87000	First	20.77	1248.0	88.76	7.0	6.00	1	0	0	
3	Audi A4 New 2.0 TDI Multitronic	Coimbatore	2013	40670	Second	15.20	1968.0	140.80	5.0	17.74	1	0	0	
4	Nissan Micra Diesel XV	Jaipur	2013	86999	First	23.08	1461.0	63.10	5.0	3.50	1	0	0	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	
5842	Maruti Swift VDI	Delhi	2014	27365	First	28.40	1248.0	74.00	5.0	4.75	1	0	0	
5843	Hyundai Xcent 1.1 CRDi S	Jaipur	2015	100000	First	24.40	1120.0	71.00	5.0	4.00	1	0	0	
5844	Mahindra Xylo D4 BSIV	Jaipur	2012	55000	Second	14.00	2498.0	112.00	8.0	2.90	1	0	0	
5845	Maruti Wagon R VXI	Kolkata	2013	46000	First	18.90	998.0	67.10	5.0	2.65	0	0	1	

- This code utilizes the datetime module in Python to calculate the current year. Subsequently, it computes the age of the car by subtracting the 'Year' column from the current year, storing the result in a new column named 'Car_Age'.