**Summary**

**Analysis-3:**

1. **Reduce the Memory Usage of the Data Set:**

* Firstly, we have to check the memory of data set by using data.info ().
* To reduce the memory, we can drop the columns which are not useful for our analysis.
* We can also drop duplicate values from the dataset.
* Convert the data types to reduce the memory of the dataset.
* Numerical columns have the data type int64 which is large for certain columns. So, reduce them to int8 (or) int16 (or) int32.
* As the columns price, kilometer and other columns won’t be negative we can reduce the column data type to uint8 (or) uint16 (or) uint32.
* We reduced dataset from 56.7+ MB to 38.6+ MB.

1. **Average price of vehicle by fuel type and gearbox type:**

* Average price for vehicles based on the fuel type and gearbox type provides insights about average price for fuel type and gearbox both at a time.
* We can get the average price for both at a time by using groupby method.
* For visualization, you can create bar plot to visualize the average price for fuel type and gearbox at a time.
* the x-axis represents the fuel type and gearbox type, and the y-axis will represent the average price.
* Fuel type andere and gearbox type manuell has the highest average price 1.199950e+07.
* Fuel type kleinwagen and gearbox type manuell has the lowest average power 3.236602e+03.

1. **Average power of a vehicle-by-vehicle type and gearbox type:**

* Average power for vehicles based on the vehicle type and gearbox type provides insights about average price for vehicle type and gearbox both at a time.
* We can get the average power for both at a time by using groupby method.
* For visualization, you can create bar plot to visualize the average power for vehicle type and gearbox at a time.
* The x-axis represents the vehicle type and gearbox type, and the y-axis will represent the average power.
* Vehicle type coupe and gearbox type automatik has the highest average power 218.723713.
* Vehicle type and gearbox type manuell has the lowest average power

68.242905.

### Average Price of a Vehicle by Brand as Well as Vehicle Type:

* Average price for vehicles based on the brand and vehicle type provides insights about average price for brand and vehicle type both at a time.

### We can get the average price for both at a time by using groupby method.

### Now we have to use crosstab with index as brand and column as vehicle type and values as price and aggregate function as mean.

* For visualization, we used bar heatmap to visualize the average price for brand and vehicle type at a time.
* We can see the average price of both brand and vehicle type in heatmap.