Homework 4

Due: Monday Nov 11, at 11:59pm via Blackboard

Import the necessary panda libraries (1 point)

In [1]:

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Q1. Import the stock data for Meta and Telsa and Create the respective data frames, parsing the Date variable as dates and changing the index column to Date. (2 point)

In [3]:

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Out[3]:

	Open	High	Low	Close	Adj Close	Volume
Date						
2021-01-04	274.779999	275.000000	265.200012	268.940002	268.940002	15106100
2021-01-05	268.290009	272.399994	268.209991	270.970001	270.970001	9871600
2021-01-06	262.000000	267.750000	260.010010	263.309998	263.309998	24354100
2021-01-07	265.899994	271.609985	264.779999	268.739990	268.739990	15789800
2021-01-08	268.309998	268.950012	263.179993	267.570007	267.570007	18528300

In [4]:

Out[4]:

	Open	High	Low	Close	Adj Close	Volume
Date						
2021-01-04	239.820007	248.163330	239.063339	243.256668	243.256668	145914600
2021-01-05	241.220001	246.946671	239.733337	245.036667	245.036667	96735600
2021-01-06	252.830002	258.000000	249.699997	251.993332	251.993332	134100000
2021-01-07	259.209991	272.329987	258.399994	272.013336	272.013336	154496700
2021-01-08	285.333344	294.829987	279.463318	293.339996	293.339996	225166500

Q2. Merge the stock data for Meta and Tesla stock data. Include the necessary prefixes (2 points)

In [5]:

Out[5]:

	Open_meta	High_meta	Low_meta	Close_meta	Adj Close_meta	Volume_meta	Open_tsla	High_tsla
Date								
2021-01-04	274.779999	275.000000	265.200012	268.940002	268.940002	15106100	239.820007	248.163330
2021-01-05	268.290009	272.399994	268.209991	270.970001	270.970001	9871600	241.220001	246.946671
2021-01-06	262.000000	267.750000	260.010010	263.309998	263.309998	24354100	252.830002	258.000000
2021-01-07	265.899994	271.609985	264.779999	268.739990	268.739990	15789800	259.209991	272.329987
2021-01-08	268.309998	268.950012	263.179993	267.570007	267.570007	18528300	285.333344	294.829987

Q3a. Report the summary statistics for the Adjusted close for Tesla and Meta stocks prices. (1 point)

In [6]:

Out[6]:

	Adj Close_tsla	Adj Close_meta
count	503.000000	503.000000
mean	261.542545	250.817098
std	55.775860	84.762832
min	109.099998	88.910004
25%	223.201668	170.205002
50%	251.213333	265.739990
75%	296.856659	330.300003
max	409.970001	382.179993

Q3b: What are the Ranges and Interquartile Ranges for the Adjusted Close of Tesla and Meta Stock prices? (2 point)

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In [ ]:
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Q4. Using Seaborn, plot line graphs for the daily volumes for Meta and Tesla Stock and include the title and labels. Which stock had greater volume volatility? (3 points)

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In [7]:
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Out[7]: Text(0.5, 1.0, 'Meta vs Tesla Volume Volatility')
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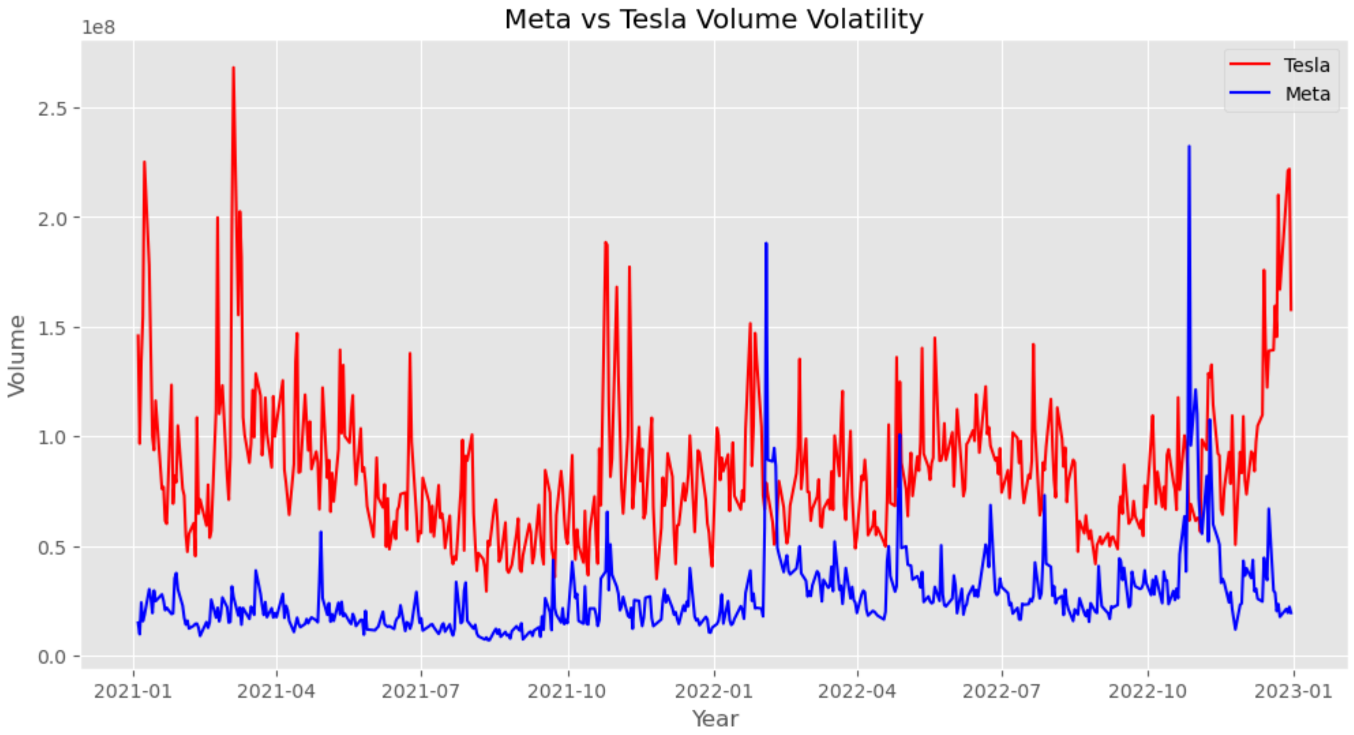

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In [ ]:
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Q5. Create a new variables for both Tesla and Meta stocks in the dataframe that measures the daily differential in price, defined as the difference between the High Price and Low Price for the day (2 points)

In [8]:

Out[8]:

	Open_meta	High_meta	Low_meta	Close_meta	Adj Close_meta	Volume_meta	Open_tsla	High_tsla
Date								
2021-01-04	274.779999	275.000000	265.200012	268.940002	268.940002	15106100	239.820007	248.163330
2021-01-05	268.290009	272.399994	268.209991	270.970001	270.970001	9871600	241.220001	246.946671
2021-01-06	262.000000	267.750000	260.010010	263.309998	263.309998	24354100	252.830002	258.000000
2021-01-07	265.899994	271.609985	264.779999	268.739990	268.739990	15789800	259.209991	272.329987
2021-01-08	268.309998	268.950012	263.179993	267.570007	267.570007	18528300	285.333344	294.829987

Q6. Resample the data to create the average monthly price diffferences between Tesla and Meta Stock. (2 points)

In [9]:

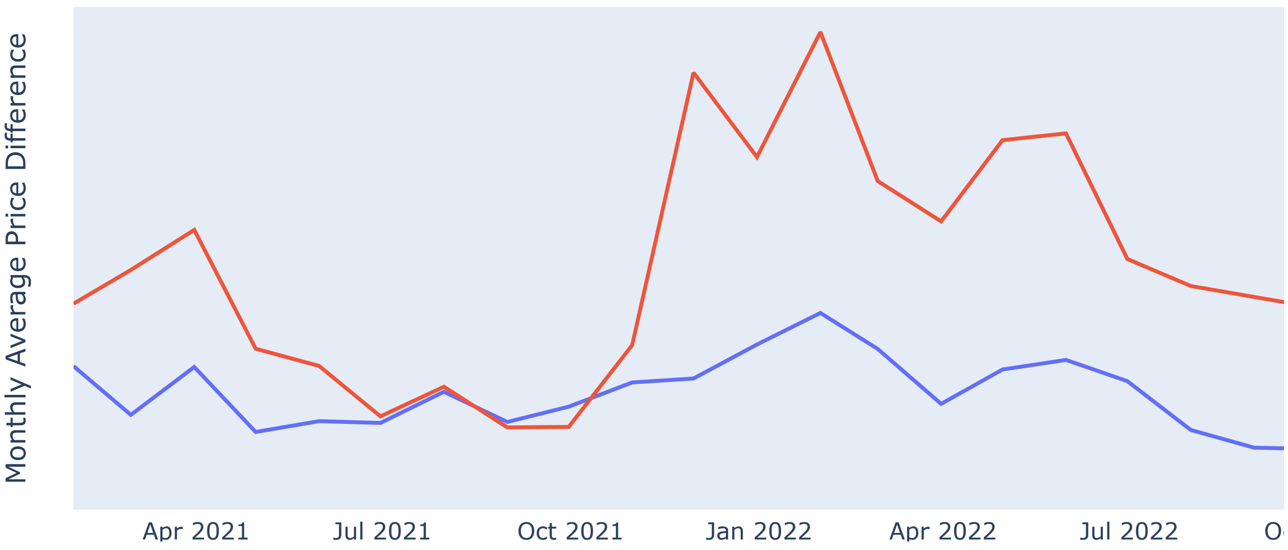
Out[9]:

	PriceDff_tsla	PriceDff_meta
Date		
2021-01-31	11.362281	8.803686
2021-02-28	12.744733	6.808423
2021-03-31	14.384638	8.769563
2021-04-30	9.516985	6.107147
2021-05-31	8.813497	6.550000

Q7. Using Plotly, create line graphs for the monthly price differences for Tesla and Meta stocks. Include the range slider. Don't show the gridlines but include the title and labels, including the legend showing both stocks (3 points)

In [10]:

Price Difference for Meta vs Tesla Stock



Import the datafile bmw and rename the DataFrame bmwSales

In [11]:

Out[11]:

	model	year	price	transmission	mileage	fuelType	tax	mpg	engineSize
0	5 Series	2014	11200	Automatic	67068	Diesel	125	57.6	2.0
1	6 Series	2018	27000	Automatic	14827	Petrol	145	42.8	2.0
2	5 Series	2016	16000	Automatic	62794	Diesel	160	51.4	3.0
3	1 Series	2017	12750	Automatic	26676	Diesel	145	72.4	1.5
4	7 Series	2014	14500	Automatic	39554	Diesel	160	50.4	3.0

In [57]:

Out[57]:

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array(['Automatic', 'Manual', 'Semi-Auto'], dtype=object)
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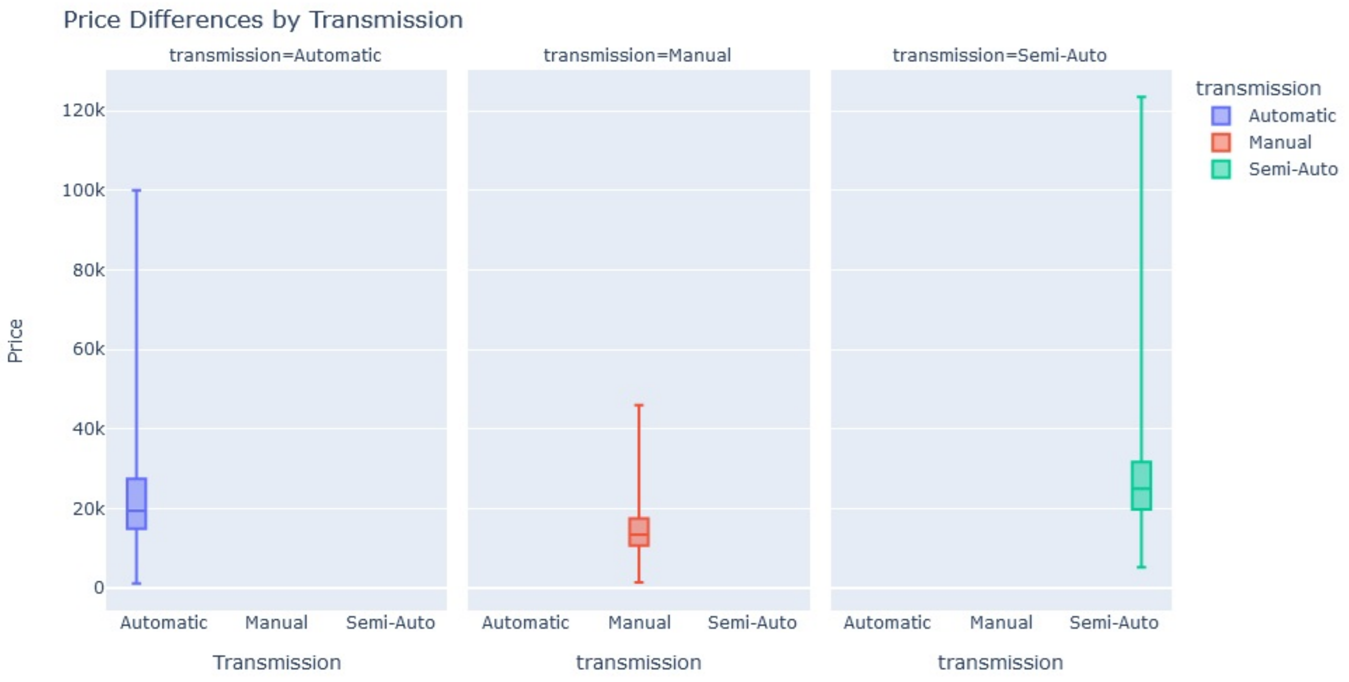
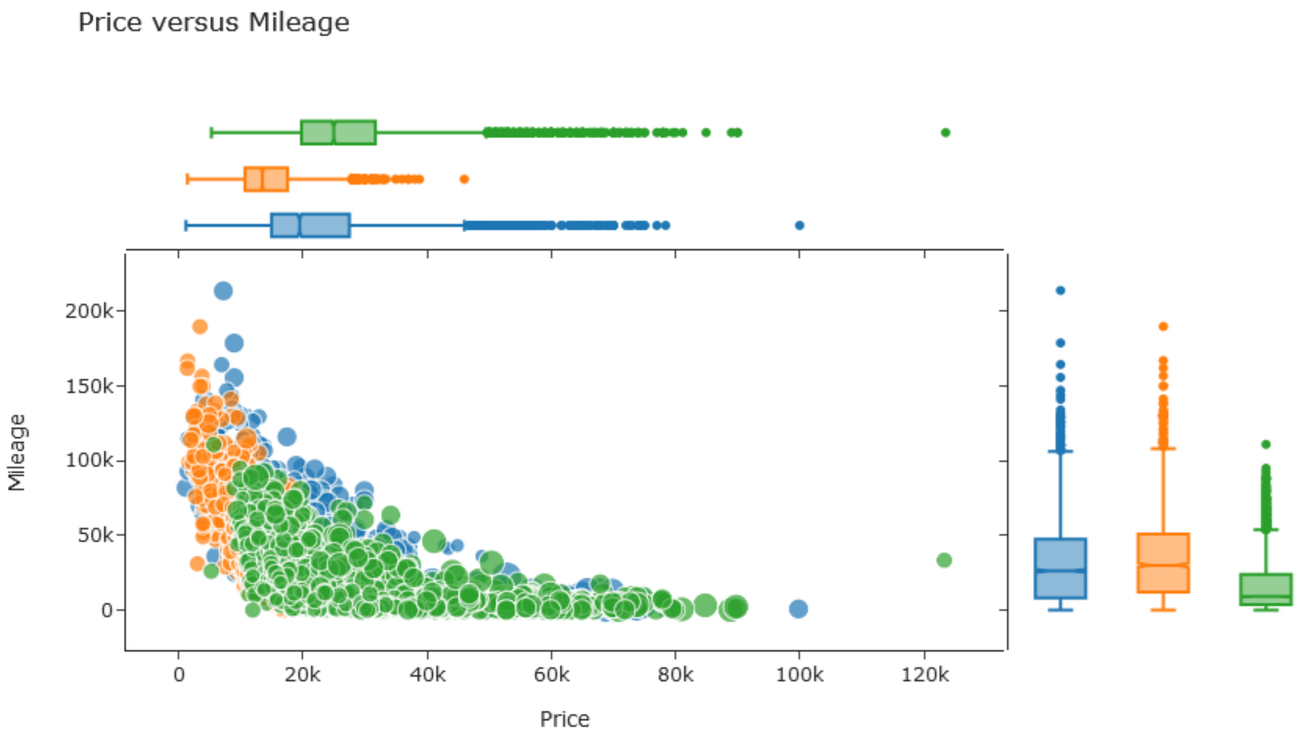
Q8. Using plotly create box-plots for Automatic, Manual and Semi-Automatic transmissions, as 3 separate plot. Include the title "Price Differences by Transmission." (2 points).

In [ ]:



Q9. Using plotly, create a scatterplot for BMW price (X) and mileage (Y), distinguishing between trasmission types by color. Include th box-plots for price and mileage on the margins of the plot. (2 points)

In [ ]:



Q10.Cars are considered efficient if their mpg is greater than 35 miles per galon. Use a function (Eff) to create a new categorical variable (Efficiency) with two levels: Efficient if the mpg is greater than 35 (mpg > 35), and Inefficient otherwise (mpg <=35). (2 points)

In [14]:

Out[14]:

	model	year	price	transmission	mileage	fuelType	tax	mpg	engineSize	Efficiency
0	5 Series	2014	11200	Automatic	67068	Diesel	125	57.6	2.0	Efficient
1	6 Series	2018	27000	Automatic	14827	Petrol	145	42.8	2.0	Efficient
2	5 Series	2016	16000	Automatic	62794	Diesel	160	51.4	3.0	Efficient
3	1 Series	2017	12750	Automatic	26676	Diesel	145	72.4	1.5	Efficient
4	7 Series	2014	14500	Automatic	39554	Diesel	160	50.4	3.0	Efficient

Q11. Extract the data for BMW cars with model year of 2018,2019 or 2020 and price of more than 20000 and create a new dataframe called bmwSales2. (2 points)

In [15]:

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Out[15]:

	model	year	price	transmission	mileage	fuelType	tax	mpg	engineSize	Efficiency
1	6 Series	2018	27000	Automatic	14827	Petrol	145	42.8	2.0	Efficient
125	5 Series	2018	22600	Automatic	23195	Diesel	145	65.7	2.0	Efficient
150	5 Series	2018	21950	Automatic	21947	Diesel	150	68.9	2.0	Efficient
166	X1	2020	31498	Semi-Auto	1560	Diesel	145	60.1	2.0	Efficient
167	2 Series	2020	27998	Manual	1580	Petrol	150	43.5	1.5	Efficient

Q12. For this new dataframe,using plotly, create box plots that show the mileage (Y) for the different fuel (X), and differentiated by color for "Efficiency.' Include the title and labels as shown. (2 points)

In [ ]:

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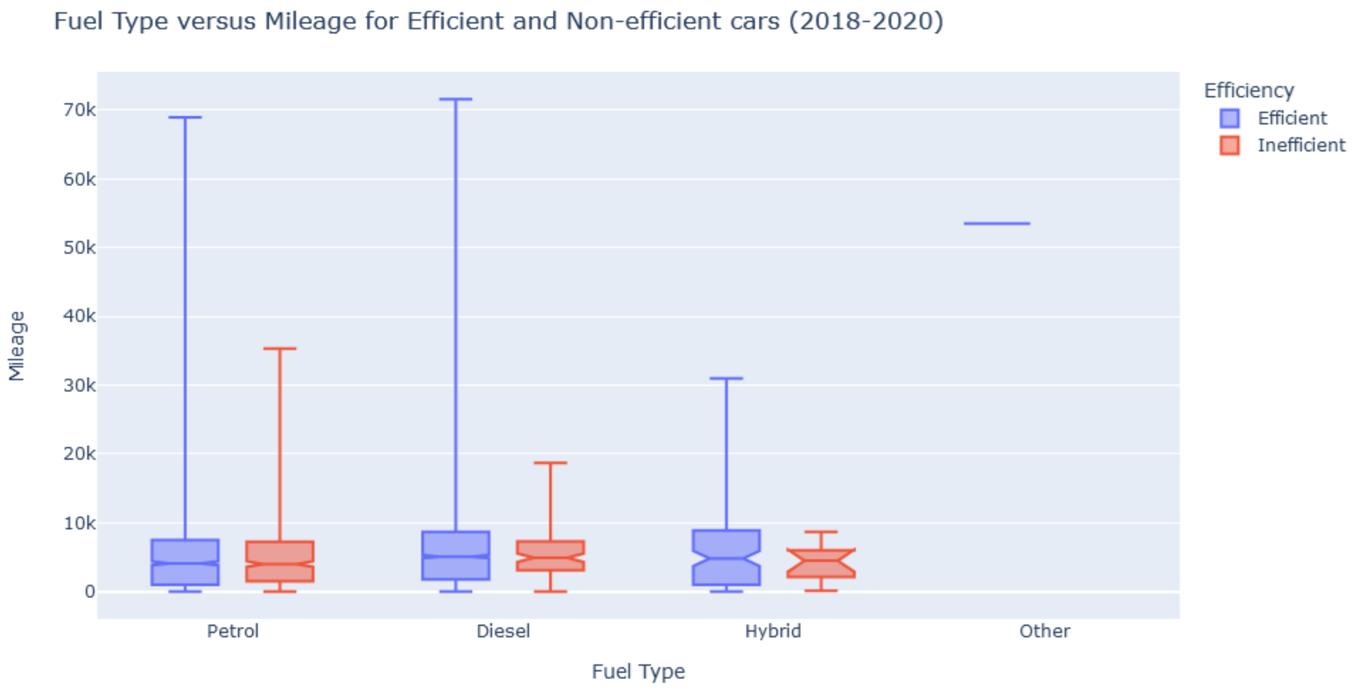
Import the datafile audi.csv and create the Dataframe audiSales.



In [17]:

Out[17]:

	model	year	price	transmission	mileage	fuelType	tax	mpg	engineSize
0	A1	2017	12500	Manual	15735	Petrol	150	55.4	1.4
1	A6	2016	16500	Automatic	36203	Diesel	20	64.2	2.0
2	A1	2016	11000	Manual	29946	Petrol	30	55.4	1.4
3	A4	2017	16800	Automatic	25952	Diesel	145	67.3	2.0
4	A3	2019	17300	Manual	1998	Petrol	145	49.6	1.0

In [42]:

Out[42]:

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Index(['model', 'year', 'price', 'transmission', 'mileage', 'fuelType', 'tax',
       'mpg', 'engineSize'],
      dtype='object')
```

Q13. Add a 'make' column to the bmwSales and audiSales DataFrames to show the make of the car, either "BMW' or 'Audi." Then concatenate both Dataframes (3 points)

In [18]:

Out[18]:

		model	year	price	transmission	mileage	fuelType	tax	mpg	engineSize	Efficiency	make
BMW	**0**	5 Series	2014	11200	Automatic	67068	Diesel	125	57.6	2.0	Efficient	BMW
	1	6 Series	2018	27000	Automatic	14827	Petrol	145	42.8	2.0	Efficient	BMW
	2	5 Series	2016	16000	Automatic	62794	Diesel	160	51.4	3.0	Efficient	BMW
	3	1 Series	2017	12750	Automatic	26676	Diesel	145	72.4	1.5	Efficient	BMW
	4	7 Series	2014	14500	Automatic	39554	Diesel	160	50.4	3.0	Efficient	BMW

Q14. Use the function (Eff) to create a new categorical variable (Efficiency) with two levels: Efficient if the mpg is greater than 35 (mpg > 35), and Inefficient otherwise (mpg <=35) and apply it to the concatenated dataframe SalesTTL. (2 points)

In [19]:

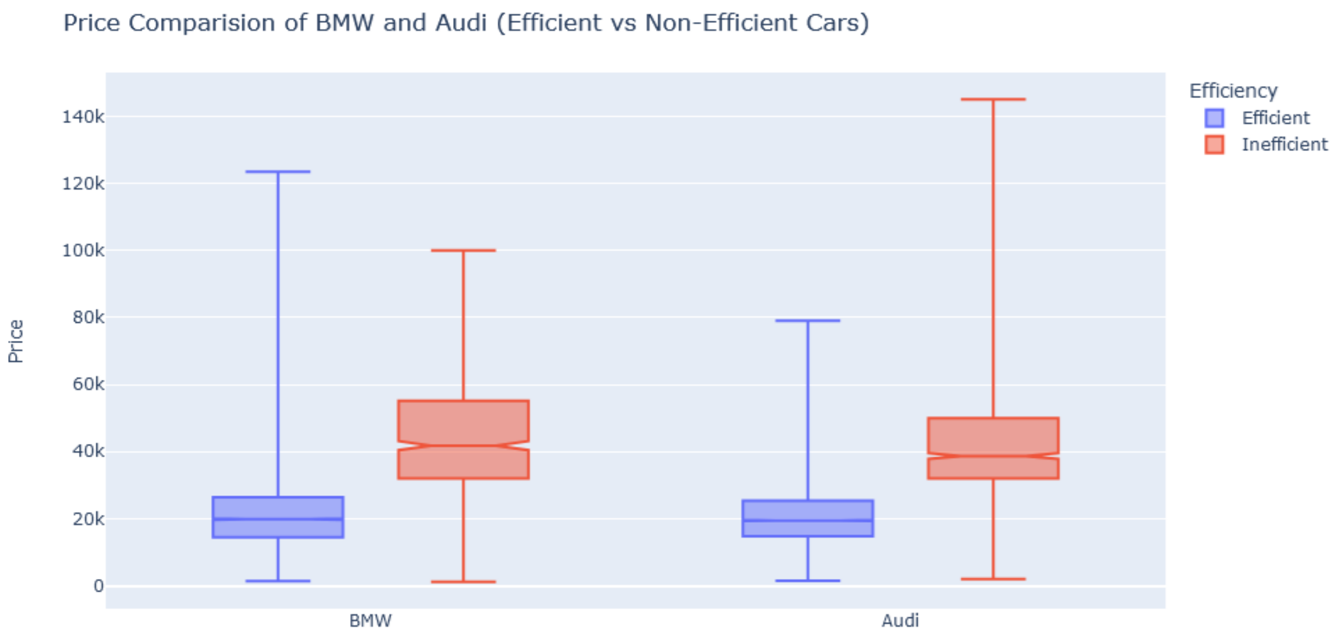
Out[19]:

		model	year	price	transmission	mileage	fuelType	tax	mpg	engineSize	Efficiency	make
BMW	**0**	5 Series	2014	11200	Automatic	67068	Diesel	125	57.6	2.0	Efficient	BMW
	1	6 Series	2018	27000	Automatic	14827	Petrol	145	42.8	2.0	Efficient	BMW
	2	5 Series	2016	16000	Automatic	62794	Diesel	160	51.4	3.0	Efficient	BMW
	3	1 Series	2017	12750	Automatic	26676	Diesel	145	72.4	1.5	Efficient	BMW
	4	7 Series	2014	14500	Automatic	39554	Diesel	160	50.4	3.0	Efficient	BMW

Q15. Using plotly, create box plots that show the Price (Y) for the 'make (X), and differentiated by color for

"Efficiency." Include the title and y-label as shown (3 points)

In [ ]:



Q16. Extract the data for BMW or Audi cars and with model years of 2019 or 2020 and store to a new dataframe SalesTTL2 (2 points)

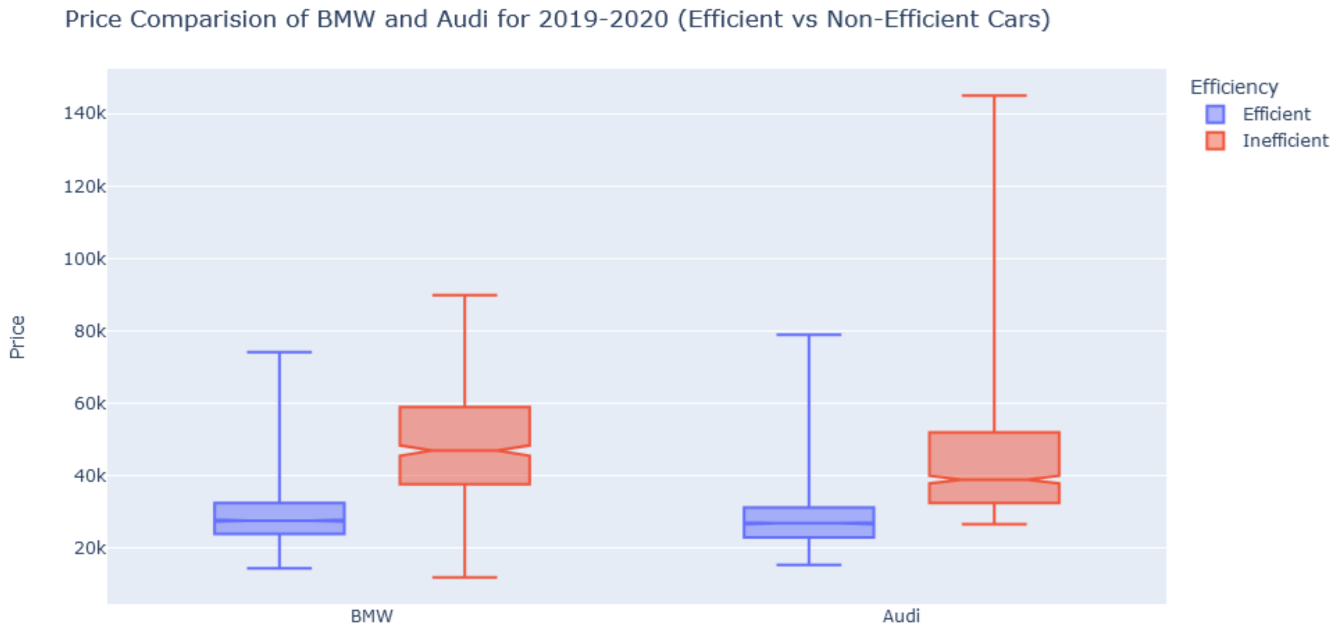
In [21]:

Out[21]:

		model	year	price	transmission	mileage	fuelType	tax	mpg	engineSize	Efficiency	make
BMW	**26**	3 Series	2019	17800	Automatic	22310	Diesel	145	64.2	2.0	Efficient	BMW
	166	X1	2020	31498	Semi-Auto	1560	Diesel	145	60.1	2.0	Efficient	BMW
	167	2 Series	2020	27998	Manual	1580	Petrol	150	43.5	1.5	Efficient	BMW
	168	X5	2020	54998	Semi-Auto	1500	Diesel	150	37.7	3.0	Efficient	BMW
	170	2 Series	2020	25998	Automatic	3160	Hybrid	140	113.0	1.5	Efficient	BMW

Q17. Using plotly, create box plots that show the Price (Y) for the 'make (X), and differentiated by color for "Efficiency." Include the title and y-axis label as shown. (3 points)

In [ ]:



Can we conclude that for BMW and Audi Cars that are efficient, the median and IQR of in price are somewhat similar? Explain

In [ ]: