

Description

This problem could be approached by analyzing the relationship between a car's features, market category, and pricing, and identifying which features and categories are most popular among consumers and most profitable for the manufacturer. By using data analysis techniques such as regression analysis and market segmentation, the manufacturer could develop a pricing strategy that balances consumer demand with profitability, and identify which product features to focus on in future product development efforts. This could help the manufacturer improve its competitiveness in the market and increase its profitability over time.

PRESENTATION TITLE

Tasks: Analysis

Insight Required: How does the popularity of a car model vary across different market categories?

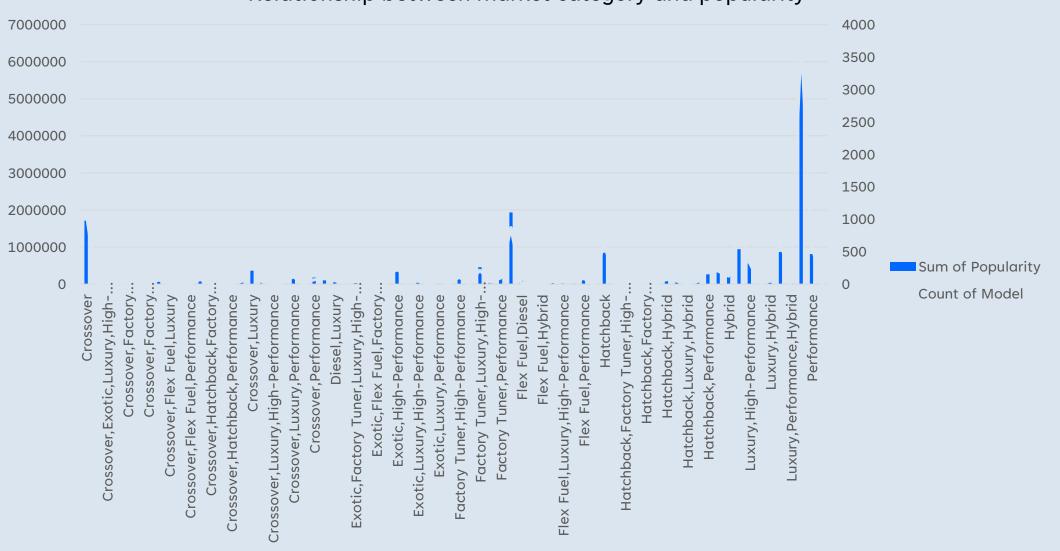
•Task 1.A: Create a pivot table that shows the number of car models in each market category and their corresponding popularity scores.

Task 1.B: Create a combo chart that visualizes the relationship between market category and popularity.

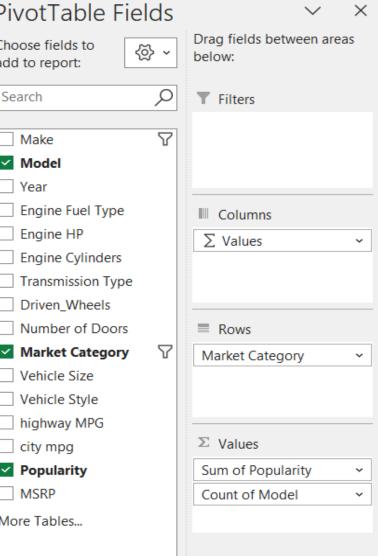
Approach: In this task, we use pivot table to analysis the data and insert the chart using given Data.



Relationship between market category and popularity



			PivotTable Fields	5
Row Labels	▼ Sum of Popularity	Count of Model	Choose fields to	Drag
Crossover	1715242	1110	add to report:	belo
Crossover, Diesel	6111	7	Search C	J _
Crossover,Exotic,Luxury,High-Performance	238	1	Search S	2
Crossover, Exotic, Luxury, Performance	238	1	Make V	7
Crossover,Factory Tuner,Luxury,High-Performance	47410	26	✓ Model	
Crossover, Factory Tuner, Luxury, Performance	13037	5		
Crossover, Factory Tuner, Performance	840	4	Year	
Crossover,Flex Fuel	132720	64	Engine Fuel Type	
Crossover,Flex Fuel,Luxury	11732	10	Engine HP	Σ
Crossover,Flex Fuel,Luxury,Performance	9744	6	Engine Cylinders	
Crossover,Flex Fuel,Performance	33942	6	☐ Transmission Type	
Crossover, Hatchback	120650	72	☐ Driven_Wheels	
Crossover, Hatchback, Factory Tuner, Performance	12054	6	☐ Number of Doors	
Crossover, Hatchback, Luxury	1428	7	✓ Market Category 🔽	Ma
Crossover, Hatchback, Performance	12054	6	☐ Vehicle Size	
Crossover,Hybrid	107662	42	☐ Vehicle Style	
Crossover,Luxury	362665	410	☐ highway MPG	
Crossover,Luxury,Diesel	73080	34	city mpg	Σ
Crossover,Luxury,High-Performance	9335	9	✓ Popularity	Sur
Crossover,Luxury,Hybrid	15142	24	MSRP	Co
Crossover, Luxury, Performance	151968	113		
Crossover,Luxury,Performance,Hybrid	7832	2	More Tables	
Crossover,Performance	178431	69		
B' 1	4.5005	~*		



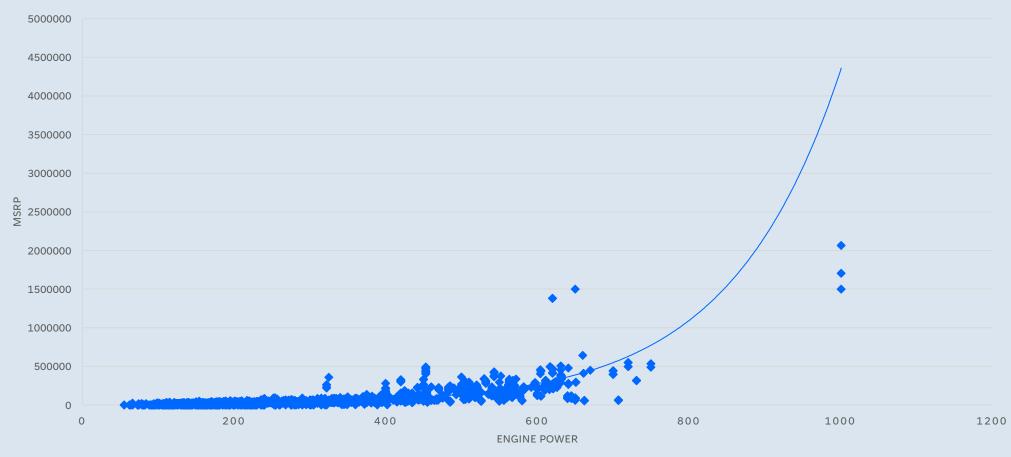
Insight Required: What is the relationship between a car's engine power and its price?

Task 2: Create a scatter chart that plots engine power on the x-axis and price on the y-axis. Add a trendline to the chart to visualize the relationship between these variables.

Approach: Plot the chart using the given data.



RELATIONSHIP BETWEEN A CAR ENGINE POWER AND PRICE



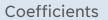
Insight Required: Which car features are most important in determining a car's price?

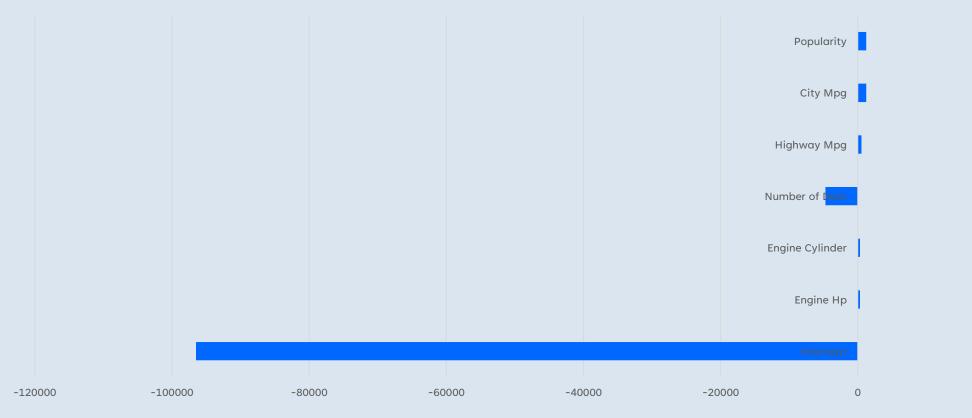
Task 3: Use regression analysis to identify the variables that have the strongest relationship with a car's price. Then create a bar chart that shows the coefficient values for each variable to visualize their relative importance.

Approach: Here we use Data Analysis tool which located in tool bar.









SUMMARY OUTPUT								
Regression Sta	tistics							
Multiple R	0.685314933							
R Square	0.469656558							
Adjusted R Square	0.469387052							
Standard Error	43909.88965							
Observations	11814							
ANOVA								
	df	SS	MS	F	ignificance i	F		
Regression	6	2.01599E+13	3.36E+12	1742.655	0			
Residual	11807	2.27648E+13	1928078409					
Total	11813	4.29247E+13						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	ower 95.0%	pper 95.0%
Intercept	-96501.08874	3687.922772	-26.166787	9.3E-147	-103730	-89272.2	-103730	-89272.2
335	323.0750333	5.980356771	54.0227023	0	311.3525	334.7975	311.3525	334.7975
6	323.0750333	437.1009686	16.2821057	5.79E-59	6260.134	7973.714	6260.134	7973.714
2	-4724.977031	463.4755928	-10.194662	2.64E-24	-5633.47	-3816.49	-5633.47	-3816.49
26	533.9815012	105.2017563	5.07578505	3.92E-07	327.7687	740.1943	327.7687	740.1943
19	1219.774915	121.3673361	10.0502734	1.14E-23	981.8749	1457.675	981.8749	1457.675
3916	1219.774915	0.281354523	-11.809347	5.29E-32	-3.87411	-2.77111	-3.87411	-2.77111

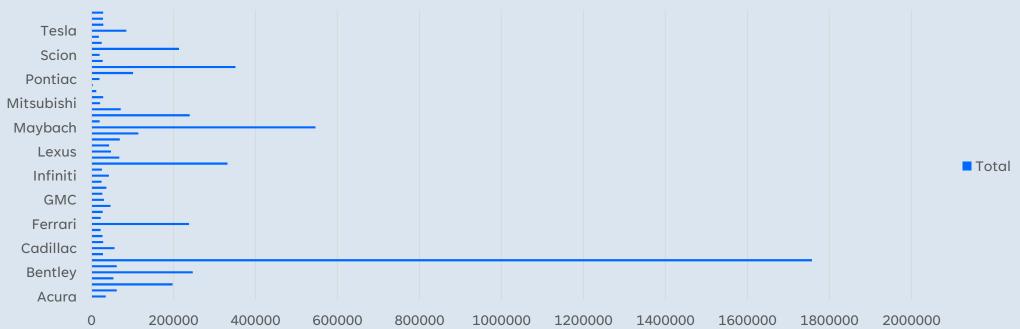
Insight Required: How does the average price of a car vary across different manufacturers? •Task 4.A: Create a pivot table that shows the average price of cars for each manufacturer.

Task 4.B: Create a bar chart or a horizontal stacked bar chart that visualizes the relationship between manufacturer and average price.

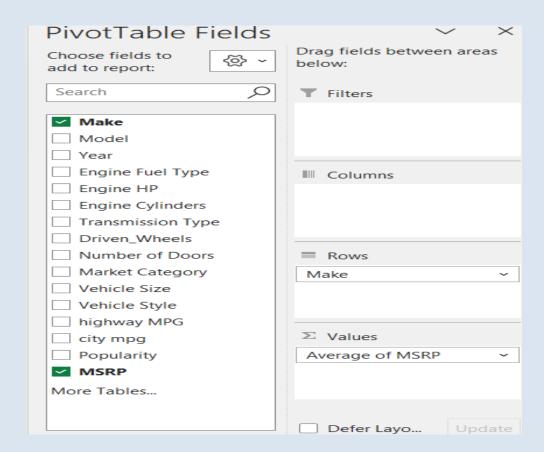
Approach: Using pivot table and create bar chat using the data.



Relationship Between cars and Prices





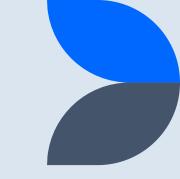


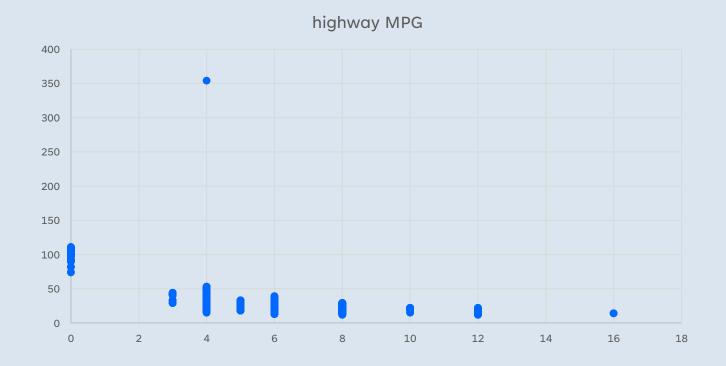
Insight Required: What is the relationship between fuel efficiency and the number of cylinders in a car's engine?

•Task 5.A: Create a scatter plot with the number of cylinders on the x-axis and highway MPG on the y-axis. Then create a trendline on the scatter plot to visually estimate the slope of the relationship and assess its significance.

Task 5.B: Calculate the correlation coefficient between the number of cylinders and highway MPG to quantify the strength and direction of the relationship.

Approach: =CORREL(M2:M11915,F2:F11915) is use to find the correlation.





Correlation		
	Cylinder	
Highway MPG	-0.62161	

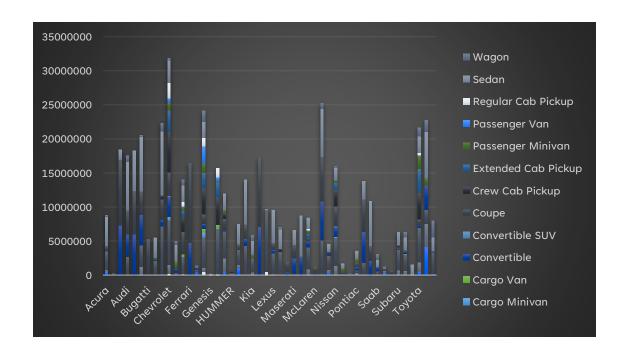
Building the Dashboard

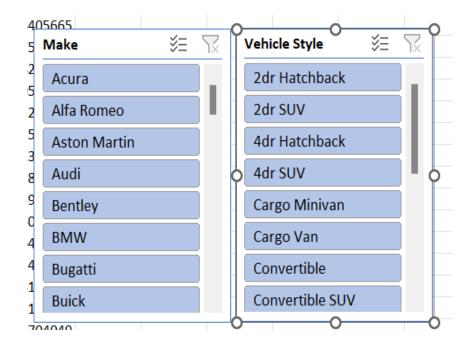
Task 1: How does the distribution of car prices vary by brand and body style?

Hints: Stacked column chart to show the distribution of car prices by brand and body style. Use filters and slicers to make the chart interactive. Calculate the total MSRP for each brand and body style using SUMIF or Pivot Tables.

Approach: Here we use pivot table and insert column chart.

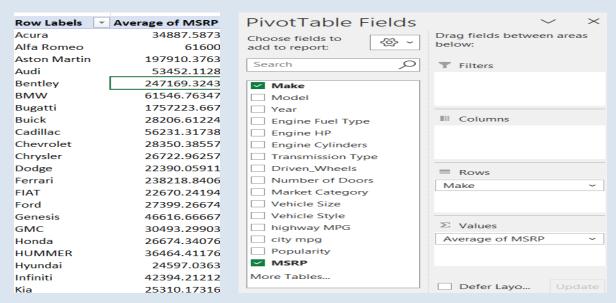
	Α	В	С	D	E	F	G	Н	1	J	K	L	M	N	0	Р
4	Row Labels	2dr Hatchback	2dr SUV	4dr Hatchback	4dr SUV	Cargo Minivan	Cargo Van	Convertible	Convertible SUV	Coupe	Crew Cab Pickup	Extended Cab Pickup	Passenger Minivan	Passenger Var	n Regular Cab Picku	Sedan
5	Acura	480917		357440	2663505					793748	3					42947
6	Alfa Romeo							129800		178200)					
7	Aston Martin	1						7321655		9635275	i					14487
8	Audi	4000			2674900			3291405		3556290)					71583
9	Bentley							6012870		6356760)					59209
10	BMW	80097		1144950	3160950			4502671		3419051	-					79893
11	Bugatti									5271671						
12	Buick				2141770			179325		18534	!		330065			28505
13	Cadillac				7182555			985607		2953574	599150	0				94188
14	Chevrolet	8000	213310	1287260	6569568	420150	78688	2953245	106300	3504525	5927617	7 3117951	1178515	60767	0 226003	2 33039
15	Chrysler	98805			250545			630105		114510)		922295			24798
16	Dodge	48000	44000	18000	2572405	60520	338497	12000		3264627	2235775	5 864172	557425	7070	8 71940	8 24175
17	Ferrari							4723811		11713289)					
18	FIAT	420715			369305			327965								
19	Ford	36000	479873	567615	4482771	702400	566351	730007		1398144	3812353	3 2285584	1411605	243189	8 129924	0 22993
20	Genesis															1398
21	GMC		144319		6641919	142750	468085				4062482	2 2183866	150630	60367	0 130632	8
22	Honda	413200		2088520	3953209			252135		1588705	787720	0	553185			23401
23	HUMMER				377490						242405 Sorios "S	5 ledan" Point "Cadillac"				
24	Hyundai	1038050		528880	2128890					724070	Value: 94		133075			28999
25	Infiniti				4340200			980050		2175750						64940
26	Kia			406960	2049645					142630)		494650)		19803
27	Lamborghini							7064450		10177050)					
28	Land Rover		476394		9076595				145731							

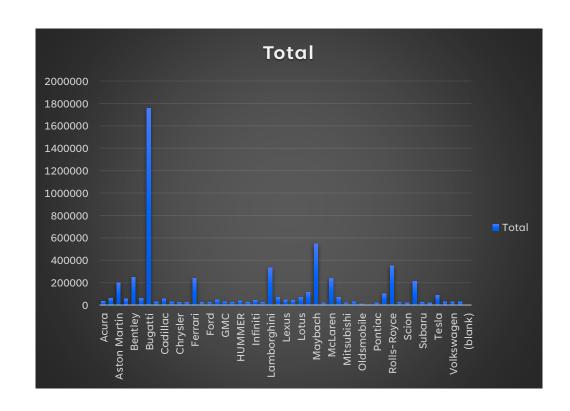


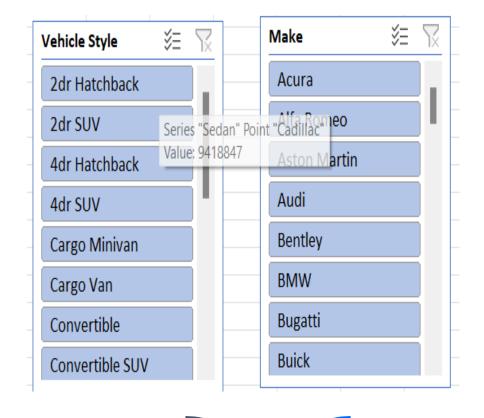


Task 2: Which car brands have the highest and lowest average MSRPs, and how does this vary by body style?

Hints: Clustered column chart to compare the average MSRPs across different car brands and body styles. Calculate the average MSRP for each brand and body style using AVERAGEIF or Pivot Tables.



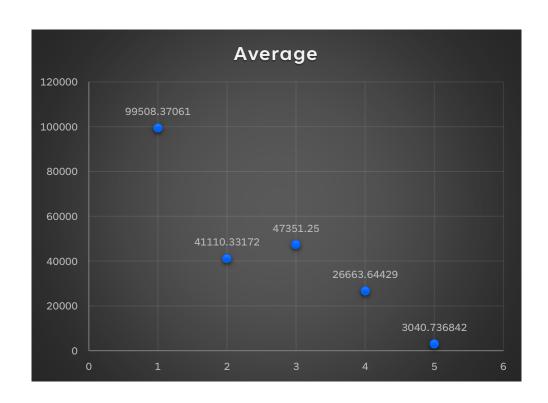




Task 3: How do the different feature such as transmission type affect the MSRP, and how does this vary by body style?

Hints: Scatter plot chart to visualize the relationship between MSRP and transmission type, with different symbols for each body style. Calculate the average MSRP for each combination of transmission type and body style using AVERAGEIFS or Pivot Tables.

Average of MSRP	Column Labels 🔻		•										
Row Labels	2dr Hatchback	2dr SUV	4dr Hatchback	4dr SUV	Cargo Minivan	Cargo Van	Convertible	Convertible SUV	Coupe	Crew Cab Pickup	Extended Cab Pickup	Passenger Minivan	Passenger Van Regul
AUTOMATED_MANUAL	27180.96491		29249.07407	40451.15385			121256.6444		245977.4252				
AUTOMATIC	20926.464	18615.20455	23833.67898	41535.60646	20920.98592	15280.22105	90637.3869	38925.5	63371.81076	37744.07154	30637.34973	26412.68159	29015.20313
DIRECT_DRIVE	31800		32799.72973	49800									
MANUAL	13353.65831	6303.811111	17594.41313	15426.46226			62357.75625	9233.142857	50484.37241	28360.52632	10884.19455	4405.333333	
UNKNOWN	7361.5	2371					5783.5		2000				
(blank)													
Grand Total	16867.71344	10115.18841	22420.8661	40421.87178	20920.98592	15280.22105	84224.28499	17424.13793	76248.32205	37220.46696	22488.77689	25621.05036	29015.20313

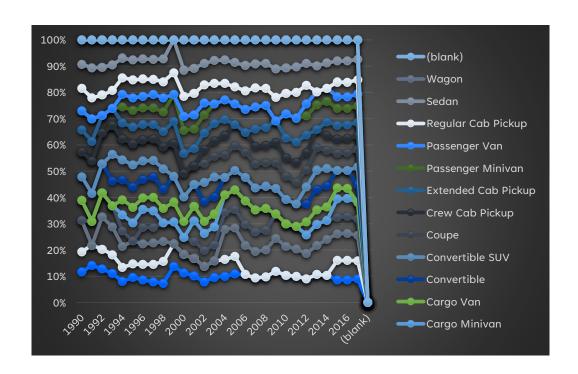


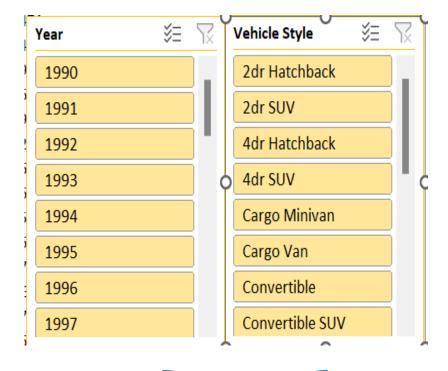
3	Transmission	Average
4	AUTOMATED_MANUAL	99508.37061
5	AUTOMATIC	41110.33172
6	DIRECT_DRIVE	47351.25
7	MANUAL	26663.64429
8	UNKNOWN	3040.736842
۵		

Task 4: How does the fuel efficiency of cars vary across different body styles and model years?

Hints: Line chart to show the trend of fuel efficiency (MPG) over time for each body style. Calculate the average MPG for each combination of body style and model year using AVERAGEIFS or Pivot Tables.

Average of highway MI	PG Column Labels 🔻												
Row Labels	2dr Hatchback	2dr SUV	4dr Hatchback	4dr SUV	Cargo Minivan	Cargo Van	Convertible	Convertible SUV	Coupe	Crew Cab Pickup	Extended Cab Pickup	Passenger Minivan	Passenger Van R
1990	30.4	20	31		20		23.5		24.5		22	18.85714286	
1991	30.06666667	16.25		19.33333333			22.625		26.15789474		15.83333333	18	
1992	29.6969697	17.47058824	28.375	21.33333333			25.5		27.28571429		15.6		
1993	28.53333333	18.47368421	27.3	21			24.46153846	26	28.25925926		16.71428571		
1994	27.35	18.42857143	27.14285714	20	21	19.33333333	26	26	27.29166667		20.28571429	21	16.4
1995	30.14285714	16	27.66666667		21.5	19	24.5	26	25.67741935		20	20.08333333	15
1996	29	20	26.125	21.6	23	14.5555556	23.8	24	26.72727273		20	20.7777778	15
1997	26.11111111	22	26.5	19.7	21	17.125	25.28571429	20.66666667	27.20689655		18.35714286	20.5555556	17
1998	23.2	26	24.5	22.11111111		17.2	23.66666667	24	26.26666667		18.625	23.4	17
1999	30.33333333	18.75		18.3		16.66666667	21.5		27.5555556		18.42307692	22.33333333	
2000	30.41666667	18.75		17.73333333		16.4	25.28571429		24.16666667		20.5	23.16666667	14.5
2001	29	18.66666667		18.72727273	22	15.8	23.4375		20.29411765		19	21.2	15
2002	25.25	19		19.79411765	21	14.6	24.07142857	23.28571429	23.6	17	20.2222222	21.6875	15



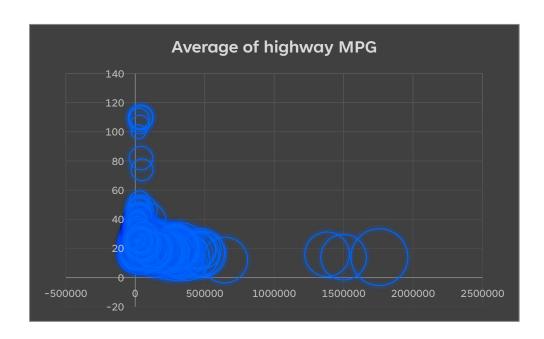


PRESENTATION TITLE



Task 5: How does the car's horsepower, MPG, and price vary across different Brands?

•Hints: Bubble chart to visualize the relationship between horsepower, MPG, and price across different car brands. Assign different colors to each brand and label the bubbles with the car model name. Calculate the average horsepower, MPG, and MSRP for each car brand using AVERAGEIFS or Pivot Tables.



1 Row Labels	Average of MSRP	Average of highway MPG	Average of Engine HP
2 1 Series	37853.125	27.625	267.5
3 1 Series M	46135	26	335
4 100	2000	22.26666667	172
5 124 Spider	Series "Sedan" 26895 Value: 941884	nt "Cadillac" 35	160
6 190-Class	value: 9418847 2000	25.5	144
7 2	15821.66667	34.5	100
8 2 Series	41697.05882	32.70588235	283.0588235
9 200	21496.2069	31.20689655	210.0344828
0 200SX	2008.111111	33.11111111	123.3333333
1 240	2000	25.5	114
2 240SX	4066.375	25.625	155
3 3	22195	38.47169811	165.9433962
4 3 Series	40897.05882	35.73529412	230
5 3 Series Gran Turismo	45250	31.85714286	269.7142857
6 300	38134.33333	28.83333333	294.6666667
7 3000GT	5035.777778	22.33333333	233
8 300-Class	2385.586207	21.4137931	182.7931034
9 300M	30600.83333	24.66666667	251.6666667
0 300ZX	2968.583333	22	241.5
<u>1 323</u>	2000	32.8	82
2 350-Class	2182.75	23	134
23 350Z	36442.35294	24.02941176	306
4 360	161978.5385	15	401.9230769
.5 370Z	40654.11765	25.58823529	336.2352941

Reference

Link Part 1:

https://docs.google.com/spreadsheets/d/1_t3gwXU1WfDTs3jW rXYrVJXUHYOSroQO/edit?usp=drive_link&ouid=1012062293071 91695705&rtpof=true&sd=true

Link Part 2:

https://docs.google.com/spreadsheets/d/1qKRpVOM5J28nm X gVJEmHy-

1JiPzM9lm/edit?usp=drive_link&ouid=10120622930719169570 5&rtpof=true&sd=true

Thank you