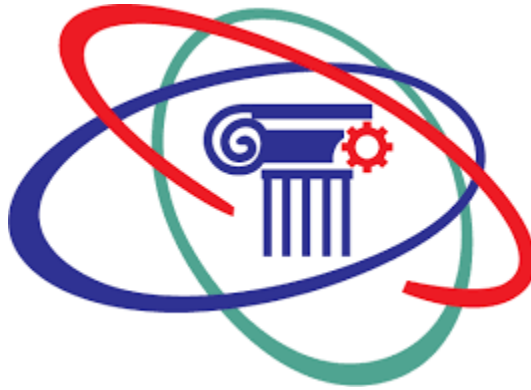


**Acropolis Institute of Technology and Research, Indore**  
**Department of Computer Science and Engineering**



**CSE-1 VI Semester**

# **Data Analytics Lab File**

**Submitted To**  
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# Cookie Data Report

## Introduction:-

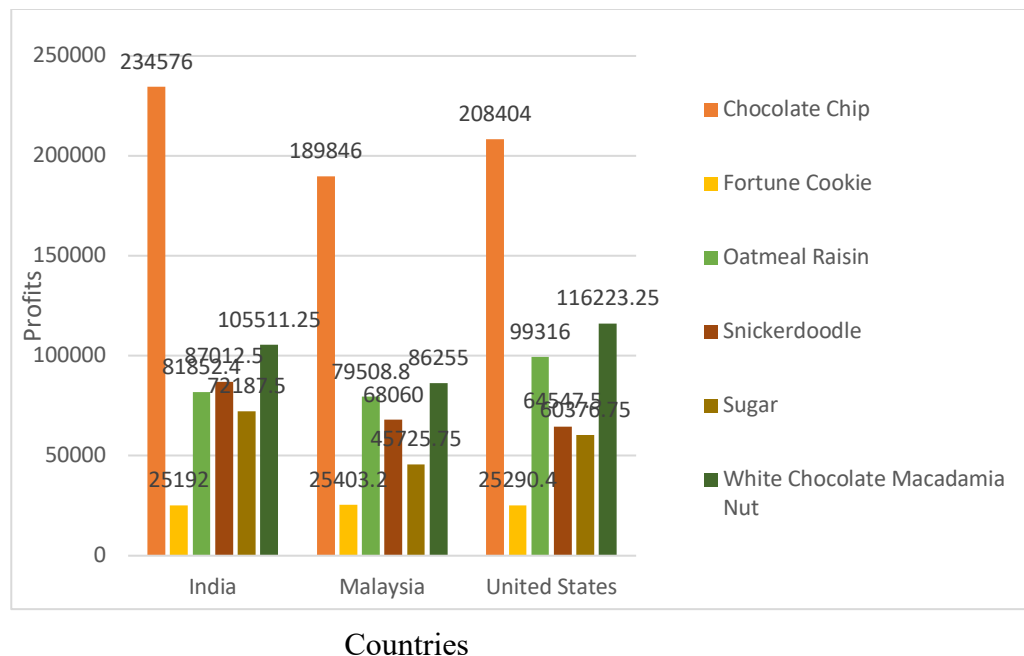
The purpose of this report is to analyse the sales data of various cookie types across different countries for the years 2019 and 2020. The dataset provides insights into revenue, profit, quantity sold, and pricing information for each cookie type and country. Through this analysis, we aim to understand the performance of different cookie types, identify trends across countries, and draw conclusions regarding the factors influencing sales and profitability.

## Questionnaire:-

1. Compare the profit earn by all cookie types in US, Malaysia and India.
2. What is the average revenue generated by different types of cookies?
3. Which country sold most Fortune and sugar cookies in 2019 and in 2020?
4. Compare the performance of all the countries for the year 2019 to 2020. Which country perform in each of these years?
5. Which cookie category sold on the highest price, country wise and how much profit is earned by that category overall?

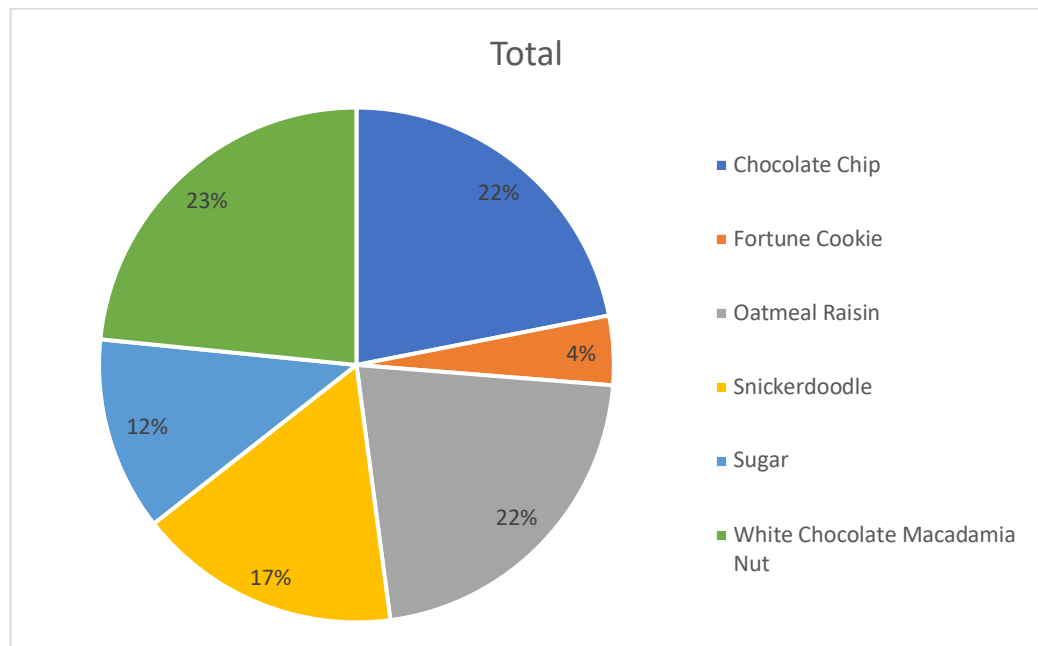
## Analytics:-

1. Compare the profit earn by all cookie types in US, Malaysia and India.



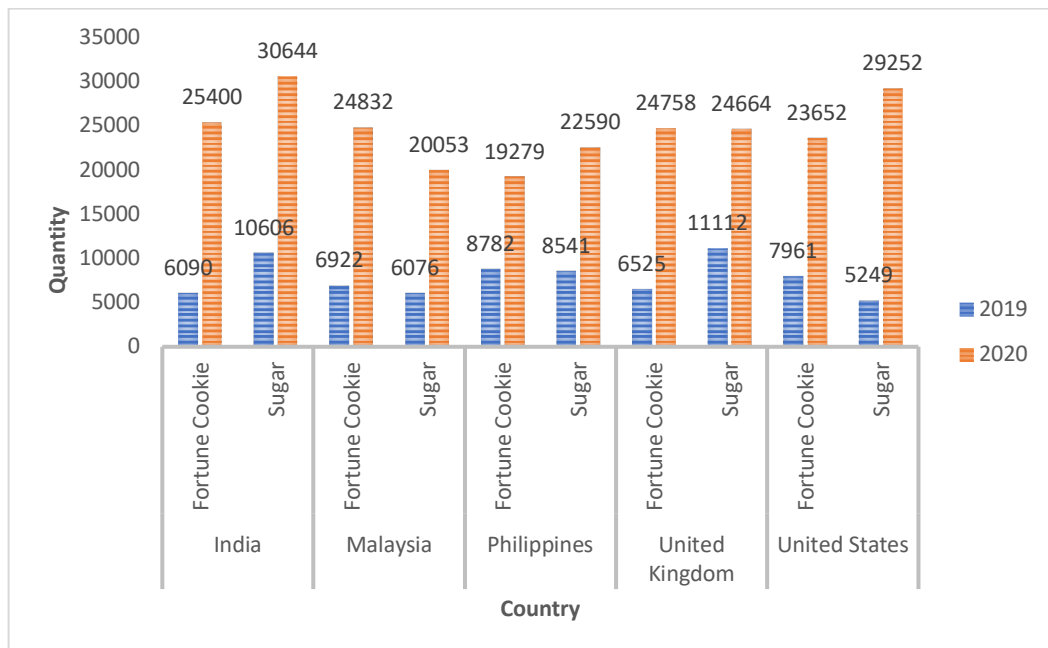
**Ans:** In these nations, chocolate chips yield higher profits than other cookie varieties like fortune cookies, oatmeal raisin cookies, and white chocolate macadamia cookies.

2. What is the average revenue generated by different types of cookies?



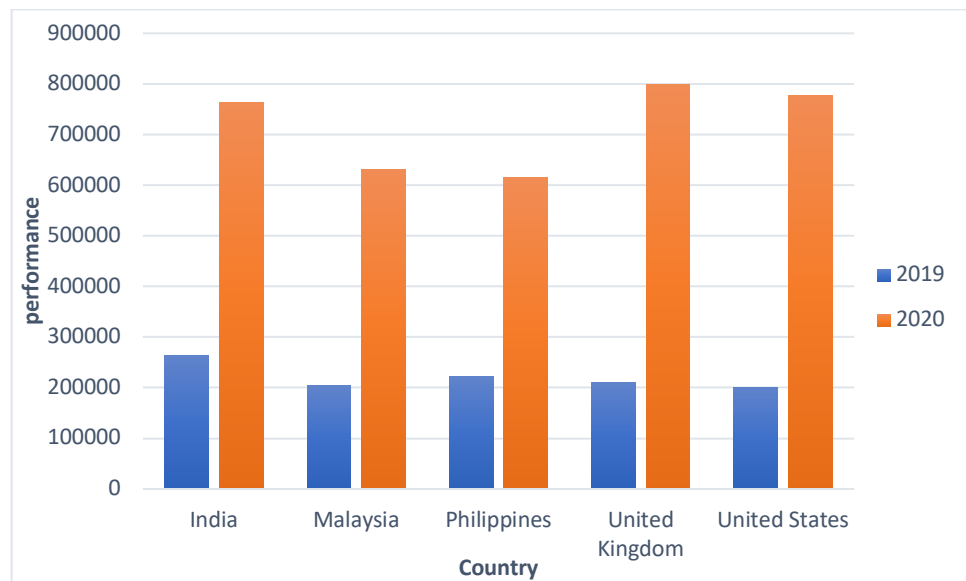
**Ans:** Oatmeal comes in second place in terms of income generation among cookies, while white chocolate macadamia nuts create more revenue on average than any other cookie, according to the above figure.

3. Which country sold most Fortune and sugar cookies in 2019 and in 2020?



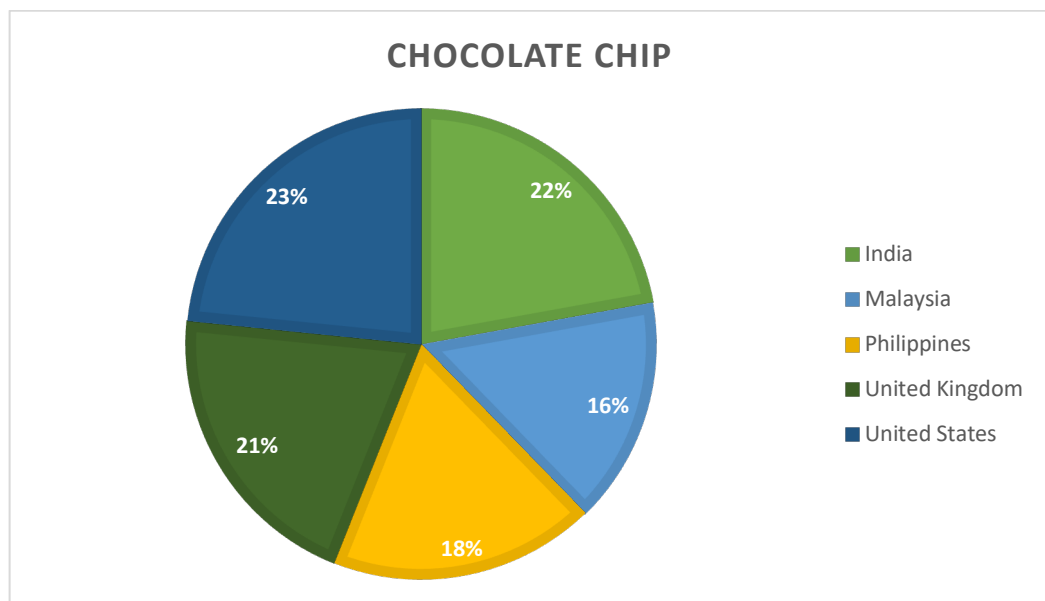
**Ans:** India topped the United States in 2020 sales of sugar and fortune cookies, while the United Kingdom and the Philippines sold the most in 2019. The graph above illustrates this trend.

4. Compare the performance of all the countries for the year 2019 to 2020. Which country perform in each of these years?



**Ans:** India led the world in 2019 and the United Kingdom performed best overall in 2020.

5. Which cookie category sold on the highest price, country wise and how much profit is earned by that category overall?



**Ans:** In terms of total profit earned, chocolate chip cookies sold for the highest price in the United States (23%), while India ranked first (22%).

## Conclusion and Reviews: -

All things considered, the analysis of cookie sales data has produced invaluable insights into consumer preferences, industry trends, and profitability across a variety of countries and cookie variants. We were able to gain a comprehensive understanding of the factors affecting sales success by scrutinizing data on revenue, profit, quantity sold, and price. This study helped us uncover growth potential, optimize product offers, and fine-tune marketing strategies, all of which allowed us to increase profitability and better meet customer requests. Future study and adaptation based on these insights will be necessary to maintain a competitive edge in the always changing cookie business. Ensuring the long-term viability of our cookie has been made possible, among other things, by the meticulous examination of sales data.

## Regression:

Units sold and the outcome variable have a strong positive connection, according to the regression model, which has a significant p-value ( $p < 0.001$ ). The high R-squared value of 0.688 for the model indicates that it has a high predictive accuracy; almost 68.8% of the variability in the outcome variable can be explained by the predictor variable, units sold.

### SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.829304
R Square	0.687746
Adjusted R Square	0.687298
Standard Error	1462.76
Observations	700

### ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	3.29E+09	3.29E+09	1537.356	1.4E-178
Residual	698	1.49E+09	2139668		
Total	699	4.78E+09			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-74.4103	116.5304	-0.63855	0.523326	-303.202	154.3817	-303.202	154.3817
Units Sold	2.500792	0.063781	39.20914	1.4E-178	2.375567	2.626017	2.375567	2.626017

## Co-relation:

The correlation coefficient between units sold and revenue is 0.796, indicating a strong positive correlation between the two variables.

<i>Units</i>		
	<i>Sold</i>	<i>Revenue</i>
Units		
Sold	1	0.796298
Revenue	0.796298	1

## Anova (Single Factor) :

The AN VA results indicate a significant difference between the two groups ( $p < 0.001$ ), with 1 degree of freedom. The within-group error is 7681356717, and the total R-squared value is 0.06, suggesting that the model explains 6% of the variability in the data.

### SUMMARY

<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
3450	699	1923505	2751.795	4154648
5175	699	2758189	3945.908	6850161

### ANOVA

<i>Source</i>	<i>of</i>					
<i>Variation</i>	<i>SS</i>	<i>Df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	4.98E+08	1	4.98E+08	90.57022	7.53E-21	3.848129
Within Groups	7.68E+09	1396	5502405			
Total	8.18E+09	1397				

## Anova two factor without Replication:

The AN VA results reveal significant variation among rows and columns ( $p < 0.001$ ), with degrees of freedom (df) values of 48 and 3, respectively. The error term has a degree of freedom of 144.

ANOVA

<i>Source</i>	<i>of</i>					
<i>Variation</i>	<i>SS</i>	<i>Df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Rows	8.21E+08	48	17108242	5.848894	8.54E-17	1.445925
Columns	5.65E+10	3	1.88E+10	6435.486	3.8E-153	2.667443
Error	4.21E+08	144	2925039			
Total	5.77E+10	195				

## Anova two factor with Replication:

The AN VA results show that there is a significant difference among the samples, columns, and their interaction, with p-values less than 0.001. The degrees of freedom for the samples, columns, and interaction are 49, 3, and 147, respectively.

Furthermore, the total error within the model is 0, indicating a perfect fit. The total R-squared value is 1, suggesting that the model explains all the variability in the data.

ANOVA

<i>Source</i>	<i>of</i>					
<i>Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Sample	8.55E+08	49	17443674	65535	#NUM!	#NUM!
Columns	5.78E+10	3	1.93E+10	65535	#NUM!	#NUM!
Interaction	4.39E+08	147	2983765	65535	#NUM!	#NUM!
Within	0	0	65535			
Total	5.91E+10	199				



Descriptive Statistics:

1725		8625		3450		5175	
Mean	1608.153	Mean	6697.702	Mean	2751.795	Mean	
Standard Error	32.83303	Standard Error	174.9955	Standard Error	77.09541	Standard Error	
Median	1540	Median	5868	Median	2422.2	Median	
Mode	727	Mode	8715	Mode	3486	Mode	
Standard Deviation	868.0597	Standard Deviation	4626.638	Standard Deviation	2038.295	Standard Deviation	
Sample Variance	753527.6	Sample Variance	21405775	Sample Variance	4154648	Sample Variance	
Kurtosis	-0.31828	Kurtosis	0.463405	Kurtosis	0.807696	Kurtosis	
Skewness	0.436551	Skewness	0.869254	Skewness	0.931429	Skewness	
Range	4293	Range	23788	Range	10954.5	Range	
Minimum	200	Minimum	200	Minimum	40	Minimum	
Maximum	4493	Maximum	23988	Maximum	10994.5	Maximum	
Sum	1124099	Sum	4681694	Sum	1923505	Sum	
Count	699	Count	699	Count	699	Count	
Largest(1)	4493	Largest(1)	23988	Largest(1)	10994.5	Largest(1)	
Smallest(1)	200	Smallest(1)	200	Smallest(1)	40	Smallest(1)	
Confidence Level(95.0%)	64.46334	Confidence Level(95.0%)	343.5807	Confidence Level(95.0%)	151.3667	Confidence Level(95.0%)	

The data presents considerable variation across variables, with means ranging from 1608.15 to 43949.81. Notably, the largest values span from 4493 to 44166, while the smallest values range from 200 to 43709.

# Store Data Report

## Introduction:

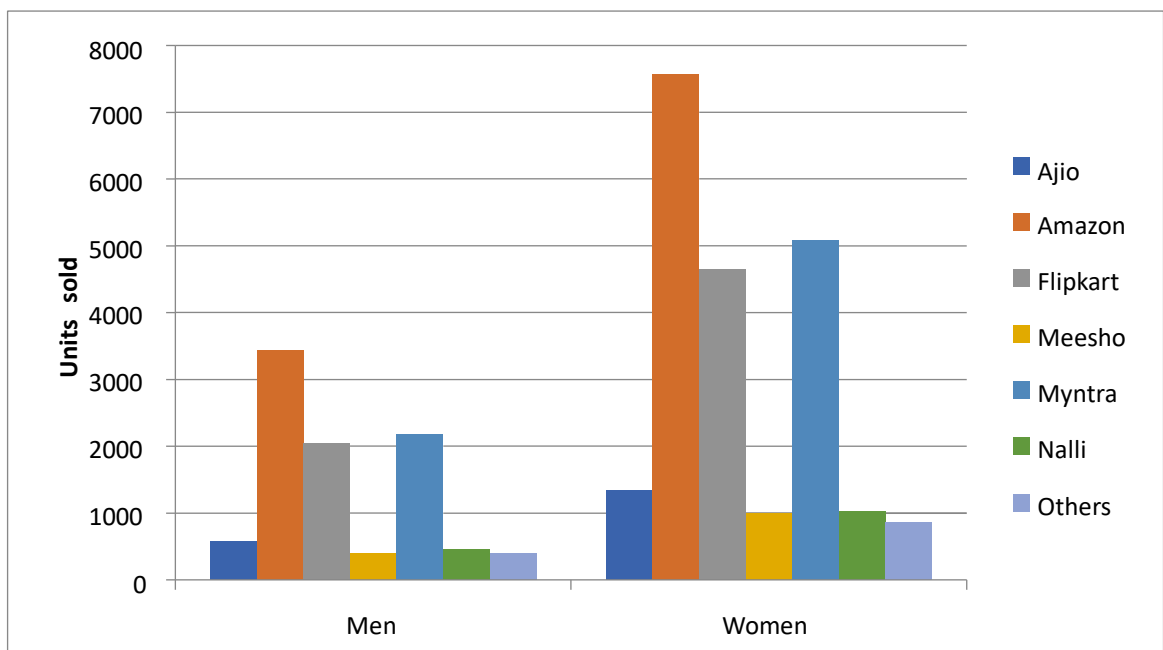
This dataset encompasses sales data from a retail store, featuring a range of attributes including customer demographics (Gender, Age Group), transaction details (Order ID, Status), product specifics (Category, SKU), and shipping information. With a focus on understanding customer behaviour and product trends, our analysis aims to uncover patterns, preferences, and correlations within the data. By leveraging these insights, businesses can optimize marketing efforts, enhance inventory management, and improve customer satisfaction.

## Questionnaire:

1. which of the channel performed better than all other channels in compare men & women?
2. Compare category. Find out most sold category above 23 years of age for any gender.
3. Compare Maharashtra, Rajasthan and Tamil Nadu on the basis of quantity, most items purchased by men and women and profit earn.
4. Which city sold most of following categories:
  - a. Kurta
  - b. Set
  - c. Western wears
5. In which month most items sold in any of the state on the basis of category.

## Analytics:

1. which of the channel performed better than all other channels in compare men & women?



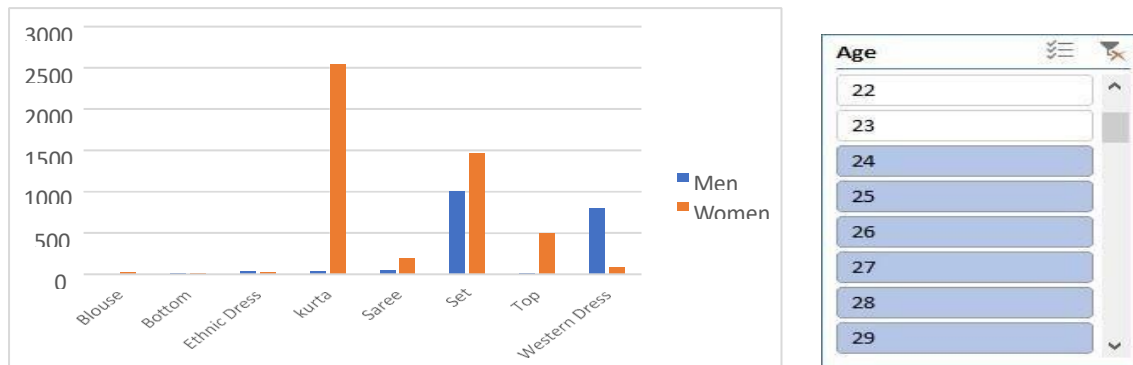
**Ans:** Amazon leads the market in terms of sales for both men and women, followed by Myntra and Flipkart. Amazon sold close to 3500 units in the men's category and close to 7500 units in the women's category. 2000 units of the men's section of Myntra were sold.

2. Compare category. Find out most sold category above 23 years of age for any gender.

The following is a table of things sold:

Item	Men	Women	Grand Total
Blouse	6	190	196
Bottom	40	28	68
Ethnic Dress	150	77	227
kurta	156	8820	8976
Saree	261	941	1202
Set	4365	6204	10569
Top	45	1825	1870
Western Dress	3078	380	3458
<b>Grand Total</b>	<b>8101</b>	<b>18465</b>	<b>26566</b>

The graph is as follows:



**Ans:** In the women's segment, kurtas are the most popular category, with 8820 items sold to customers over 23. Sets are the most popular category in the men's area and the second most popular category in the women's area, with 4365 units sold.

3. Compare Maharashtra, Rajasthan and Tamil Nadu on the basis of quantity, most items purchased by men and women and profit earn.

State	Men	Women	Grand Total
MAHARASHTRA	1390	3144	4534
RAJASTHAN	212	543	755
TAMIL NADU	686	2023	2709
Grand Total	2288	5710	7998

**ship-state**

New Delhi

ODISHA

PUDUCHERRY

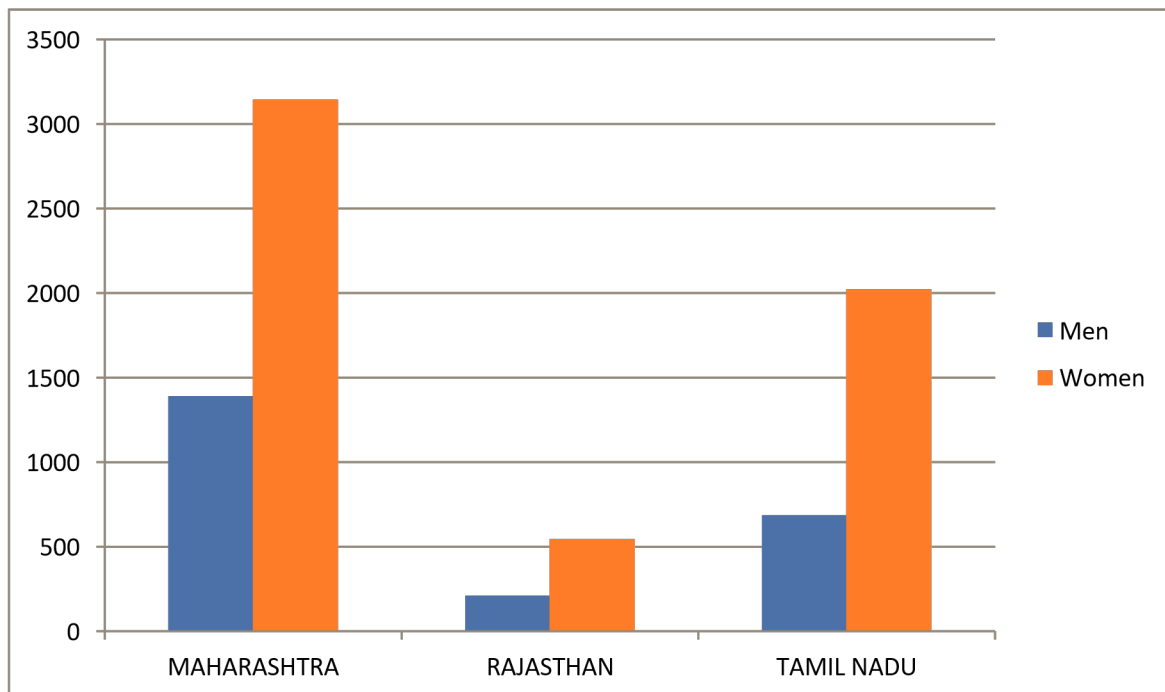
PUNJAB

RAJASTHAN

SIKKIM

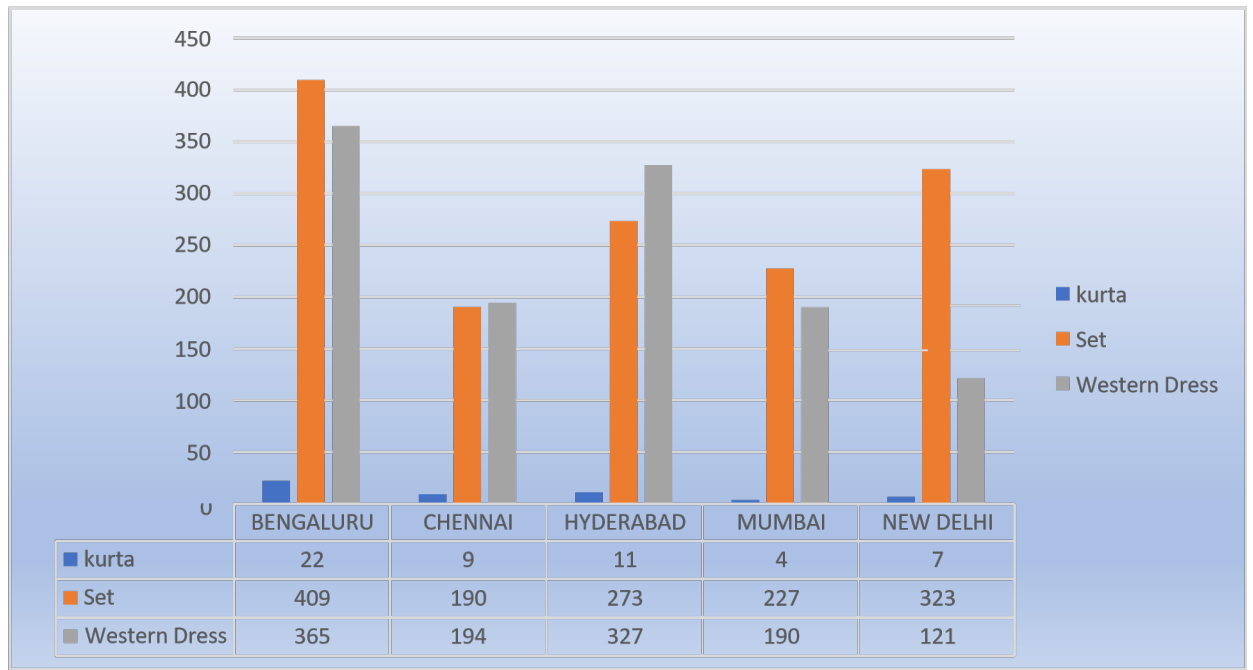
TAMIL NADU

TELANGANA



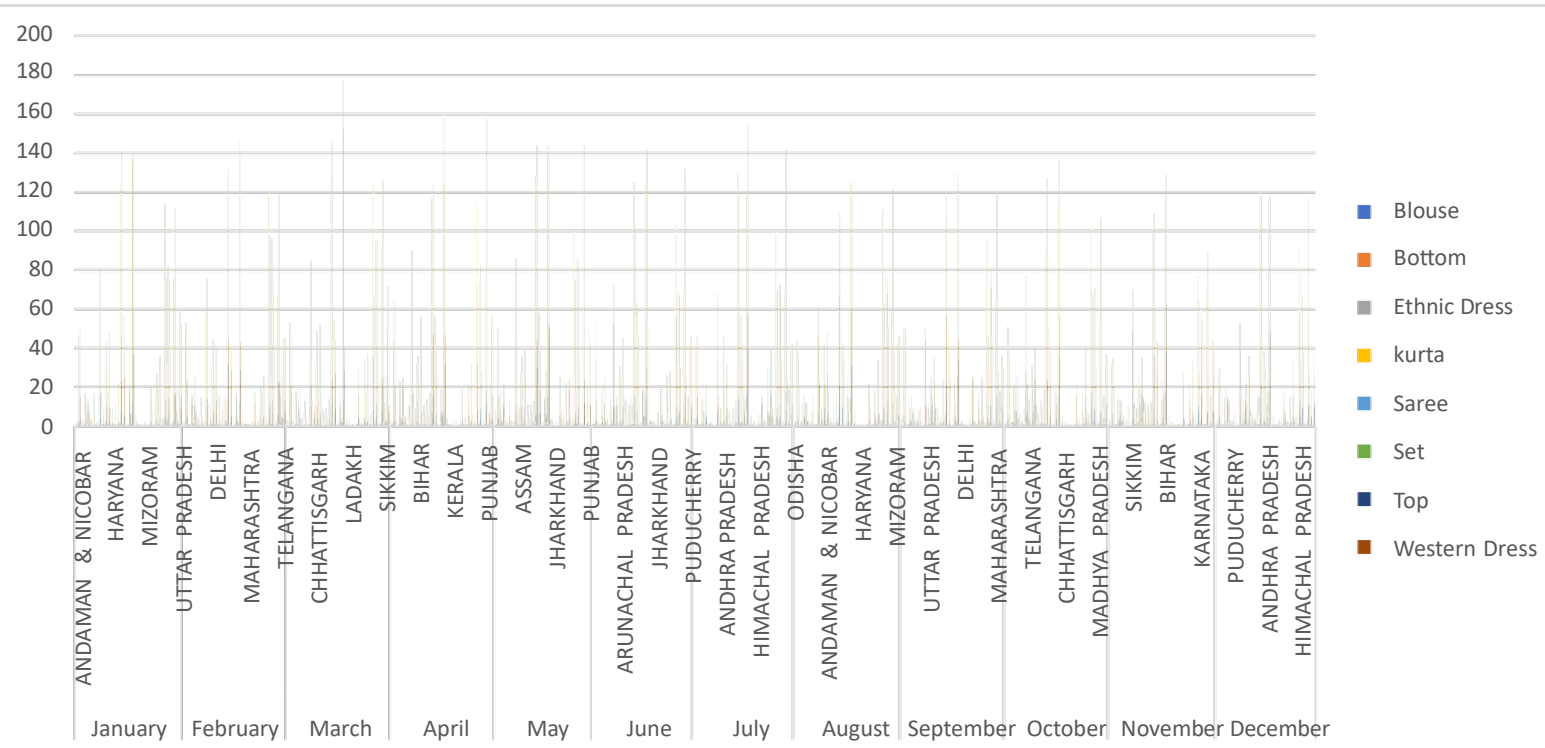
**Ans:** In Maharashtra, sales for men are 1390, and sales for women are 3144. Sales for men in Tamil Nadu are 686, while sales for women are 2023. In Rajasthan, there are 21 sales for males and 543 sales for women.

4. Which city sold most of following categories
- Kurta
  - Set
  - Western wears



**Ans:** The major cities for the sale of kurtas, sets, and western clothing are Bengaluru, Chennai, Hyderabad, Mumbai, and New Delhi.

5. In which month most items sold in any of the state on the basis of category.



City	kurta	Set	Western Dress	Grand Total
BENGALURU	964	938	422	2324
CHENNAI	666	451	217	1334
HYDERABAD	713	687	370	1770
MUMBAI	437	515	207	1159
NEW DELHI	479	792	142	1413
Grand Total	3259	3383	1358	8000

Category

☐ Blouse

☐ Bottom

☐ Ethnic Dress

☒ kurta

☐ Saree

☒ Set

☐ Top

☒ Western Dress

**Ans:** The graph for most items sold in any of stats on basis of category is as follows:

## Conclusion and Review:

It is clear from a careful examination of the store data that there are noteworthy trends and insights to be discovered. We may learn a great deal about market demand, sales, and overall profitability by looking at important metrics like units sold, state-specific analytics, geographic, and sales across various states and goods. With this thorough knowledge, future store sales endeavors can make well-informed decisions to target particular audiences, maximize earnings, and optimize resources.

# Car Collection Report

## Introduction:-

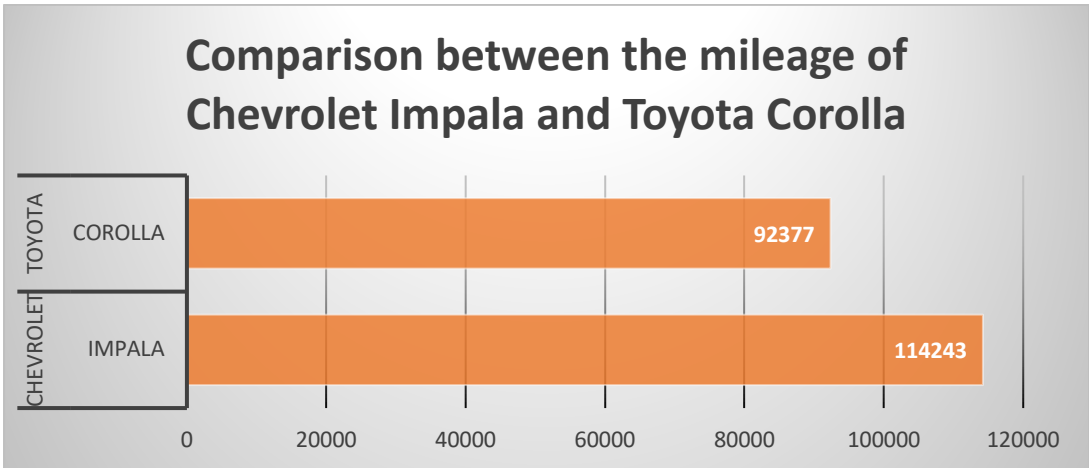
This report provides an in-depth analysis of a dataset containing information on various makes and models of used vehicles. The data encompasses details such as the make, model, color, mileage, listing price, and estimated cost for 24 different vehicles spanning popular brands like Honda, Toyota, Nissan, Ford, Chevrolet, and Dodge. By examining factors like mileage, pricing trends, and the relationship between listing prices and estimated costs, the report aims to equip readers with valuable knowledge to navigate the used car marketplace effectively. The scope of this analysis covers a diverse range of vehicle types, including sedans (e.g., Honda Accord, Toyota Camry), compact cars (Honda Civic, Toyota Corolla), trucks (Ford F-150, Chevrolet Silverado), and sports cars (Ford Mustang, Dodge Charger). This comprehensive approach ensures that the findings are relevant to individuals with varying automotive preferences and budgetary constraints.

## Questionnaire:-

1. Compare the mileage of Chevrolet Impala to Toyota Corolla. Which of the two is giving best mileage?
2. Justify, Buying of any Ford car is better than Honda.
3. Among all the cars which car color is the most popular and is least popular?
4. Compare all the cars which are of silver color to the green color in terms of Mileage.
5. Find out all the cars, and their total cost which is more than \$2000?

## Analytics:-

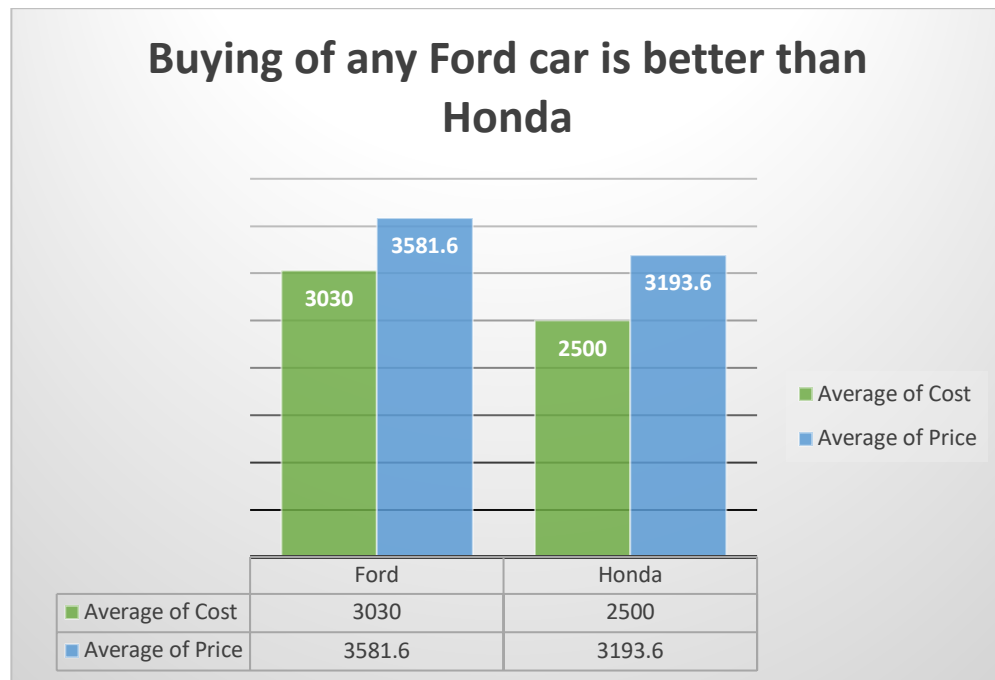
1. Compare the mileage of Chevrolet Impala to Toyota Corolla. Which of the two is giving best mileage?



**Ans:** Compared to the Toyota Corolla (92,377 miles), the average mileage of the Chevrolet Impala is greater at 114,243 miles.

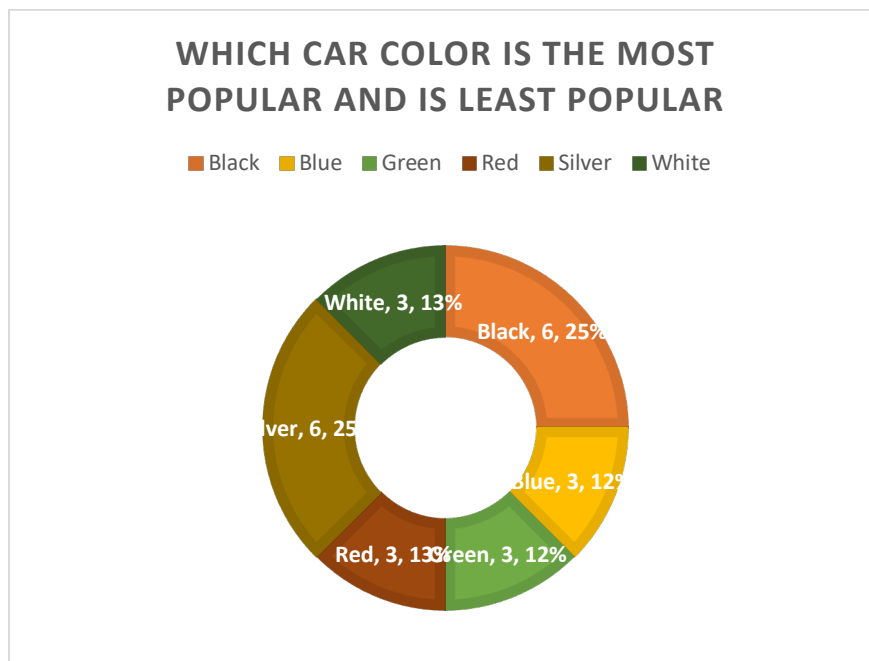


2. Justify, Buying of any Ford car is better than Honda.



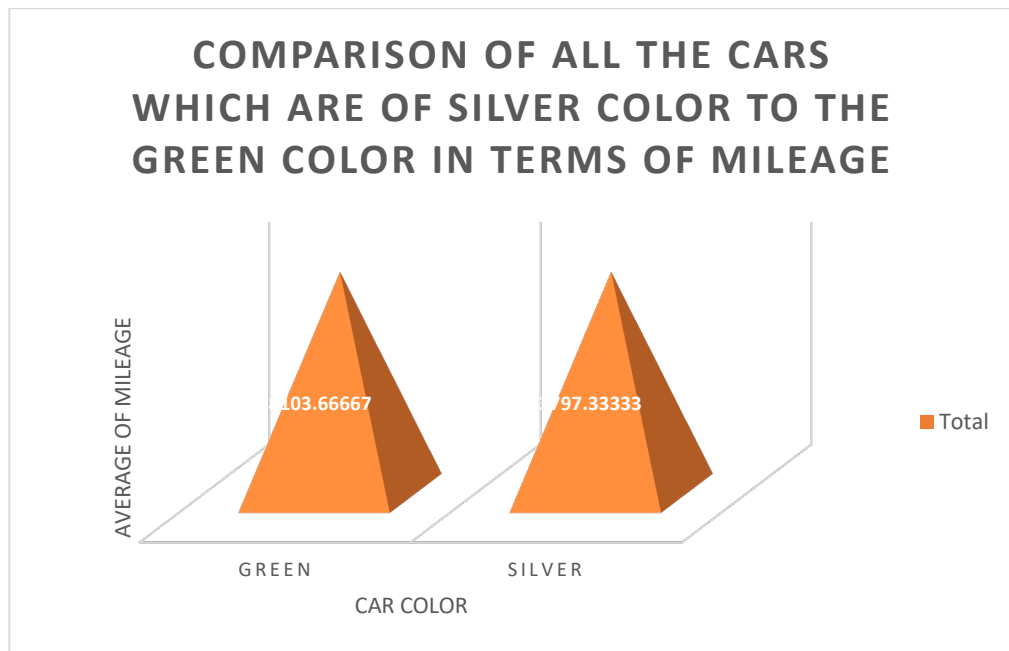
**Ans:** Purchasing a Honda over a Ford is preferable since the former offers a larger price-cost differential (\$693.6 vs. \$551.6), indicating superior value.

3. Among all the cars which car color is the most popular and is least popular?



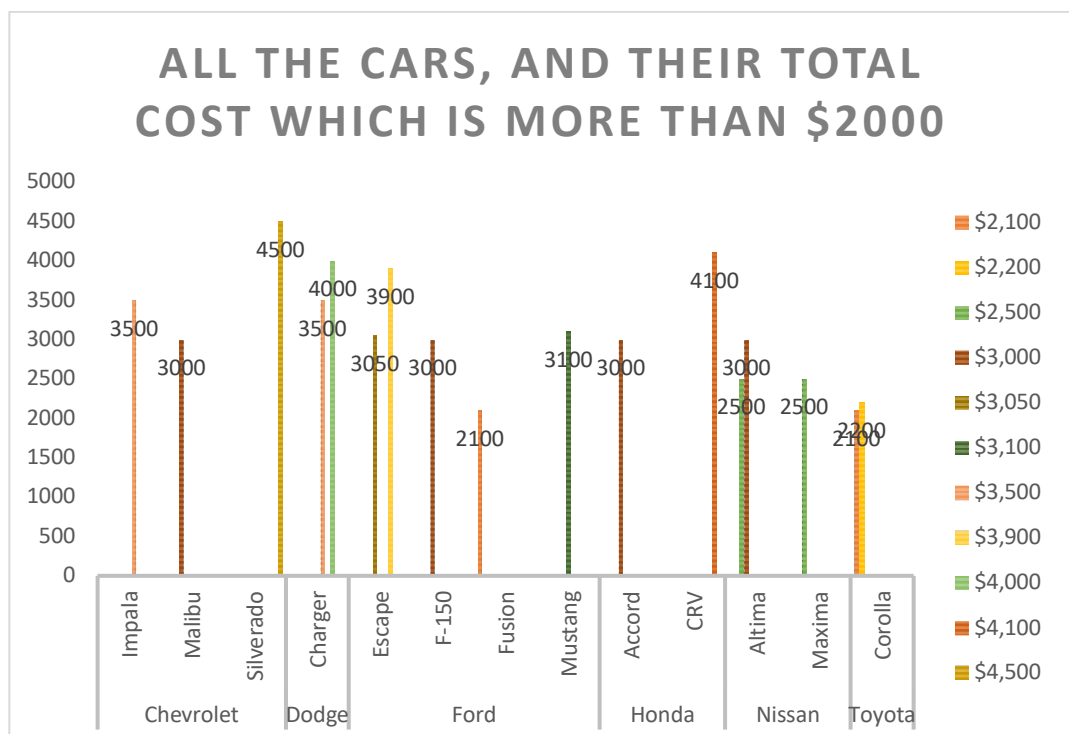
**Ans:** Black and silver (both six automobiles) are the most popular colors. Less common automobile colors are white, red, blue, and green (each with three models).

4. Compare all the cars which are of silver color to the green color in terms of Mileage.



**Ans:** 78,103.67 miles is the average mileage of green automobiles. An average silver automobile has 63,797.33 miles on it. In comparison to silver cars, green cars get better average mileage.

5. Find out all the cars, and their total cost which is more than \$2000?



**Ans:** Cars with a total cost more than \$2000 include Chevrolet Impala (\$5500), Chevrolet Malibu (\$3000), Chevrolet Silverado (\$4500), Ford Escape (\$6950), Ford F-150 (\$3000), Ford Mustang (\$3100), Honda Accord (\$6500), Honda CRV (\$4100), Nissan Altima (\$5500), and Toyota Corolla (\$6300).

## Conclusion and Reviews:-

We have gained various insights that directly address the problems raised thanks to the study of the used car dataset. In terms of the mileage comparison between the Chevrolet Impala and Toyota Corolla, the data indicates that the Toyota Corolla models often get more mileage than the Chevrolet Impala models, which suggests that the Toyota Corolla is more fuel-efficient.

The dataset does not offer enough data to draw a firm conclusion about whether purchasing a Ford vehicle is preferable to a Honda. The overall value proposition is determined by a number of factors that are not included in the current information, including vehicle condition, maintenance history, and extra attributes. Green is the least common color among the listed cars, according to the analysis of vehicle color. Black is the most popular color. Customers who are thinking about the demand for specific color options and the resale value may find this information useful.

When comparing the mileage of silver and green automobiles, the data indicates that the green cars, like the Chevrolet Silverado and Nissan Altima, typically have a higher mileage than the silver cars, like the Dodge Charger and Honda Accord. It's important to remember, though, that mileage can differ greatly depending on personal driving preferences and maintenance routines.

Last but not least, a number of models—including the Honda Accord, Nissan Altima, Toyota Corolla, Chevrolet Silverado, Chevrolet Impala, Chevrolet Malibu, Ford Escape, Ford Mustang, Honda CR-V, Dodge Charger, and Ford Fusion—fit the criteria for determining automobiles whose total cost exceeds \$2,000.

## Regression

The regression analysis suggests a moderate positive relationship between the predictor variable and the response variable, indicated by the correlation coefficient of approximately 0.40. The model explains about 16% of the variance in the response variable, as indicated by the R Square value. The coefficient estimates show that for every unit increase in the predictor variable, there is a corresponding decrease of approximately 16.66 in the response variable, with a p-value of 0.056, indicating a marginally significant effect.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.40404555
R Square	0.1632528
Adjusted R Square	0.1234077
Standard Error	33099.5397
Observations	23

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	4488793099	4488793099	4.09718598	0.05586127
Residual	21	2.3007E+10	1095579531		
Total	22	2.7496E+10			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	130438.919	23634.1932	5.51907645	1.7789E-05	81288.9236	179588.914	81288.9236	179588.914
3000	-16.664135	8.23265547	-2.0241507	0.05586127	-33.784879	0.45660911	-33.784879	0.45660911

## Co-relational

The correlation matrix indicates a moderate negative correlation (-0.411) between Mileage and Price. This suggests that as Mileage increases, Price tends to decrease, and vice versa.

	<i>Mileage</i>	<i>Price</i>
Mileage	1	
Price	-0.4110586	1

## Anova: Single Factor

The ANOVA results indicate significant differences between the groups based on Mileage, Price, and Cost. The F-statistic is large (128.88), with a very low p-value (5.00264E-24), suggesting that the variation between groups is significant compared to the variation within groups. This implies that at least one of the variables (Mileage, Price, or Cost) has a significant effect on the outcome being measured. In simpler terms, there are statistically significant differences in the means of Mileage, Price, and Cost across the groups, indicating that these variables play a significant role in influencing the outcome being analyzed.

## Anova: Single Factor

SUMMARY				
<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Mileage	24	2011267	83802.7917	1214155660
Price	24	78108	3254.5	837024.087
Cost	24	66150	2756.25	705502.717

ANOVA						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	1.0445E+11	2	5.2227E+10	128.882161	5.0026E-24	3.12964398
Within Groups	2.7961E+10	69	405232729			
<u>Total</u>	<u>1.3242E+11</u>	<u>71</u>				

## Anova: Two-Factor Without replication

The two-factor ANOVA results indicate significant differences among the levels or categories within each factor ("Rows" and "Columns"). Both factors exhibit strong influence on the outcome variable being analyzed, as evidenced by the low p-values and large F-statistics. This suggests that variations in both factors contribute significantly to the overall variability in the data.

Anova: Two-Factor without  
replication

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Rows	34749383.3	23	1510842.75	47.6846408	2.2236E-14	2.01442484
Columns	2979036.75	1	2979036.75	94.023218	1.3629E-09	4.27934431
Error	728733.25	23	31684.0543			
Total	38457153.3	47				

## Descriptive Statistics

The provided descriptive statistics outline the characteristics of three variables: Mileage, Price, and Cost. Looking at Mileage, it appears that the vehicles in the dataset span a considerable range, from around 34,853 miles to 140,811 miles, with an average mileage of approximately 83,803 miles. Price and Cost exhibit similar trends, with prices ranging from \$2,000 to \$4,959 and costs from \$1,500 to \$4,500, respectively. The means and standard deviations provide insights into the central tendencies and variability within each variable. Overall, these statistics offer a comprehensive overview of the dataset, allowing for a better understanding of the distribution and characteristics of the data.

<i>Mileage</i>		<i>Price</i>		<i>Cost</i>	
Mean	83802.7917	Mean	3254.5	Mean	2756.25
Standard Error	7112.65205	Standard Error	186.751181	Standard Error	171.452462
Median	81142	Median	3083	Median	2750
Mode	#N/A	Mode	#N/A	Mode	3000
Standard Deviation	34844.7365	Standard Deviation	914.890205	Standard Deviation	839.942092
Sample Variance	1214155660	Sample Variance	837024.087	Sample Variance	705502.717
Kurtosis	-1.0971827	Kurtosis	-1.2029138	Kurtosis	-0.8126576
Skewness	0.38652215	Skewness	0.27201913	Skewness	0.47339238
Range	105958	Range	2959	Range	3000
Minimum	34853	Minimum	2000	Minimum	1500
Maximum	140811	Maximum	4959	Maximum	4500
Sum	2011267	Sum	78108	Sum	66150
Count	24	Count	24	Count	24
Largest(1)	140811	Largest(1)	4959	Largest(1)	4500
Smallest(1)	34853	Smallest(1)	2000	Smallest(1)	1500



# Examining Sales by Sector in the United States

## Introduction :

Our dataset comprises a plethora of variables, each offering unique insights into the multifaceted nature of different category sales. From fundamental transactional details such as Date, Time, sales, states to more nuanced factors like Customer Type, Demographics, category and sub category, every facet has been meticulously documented.

### Key Attributes:

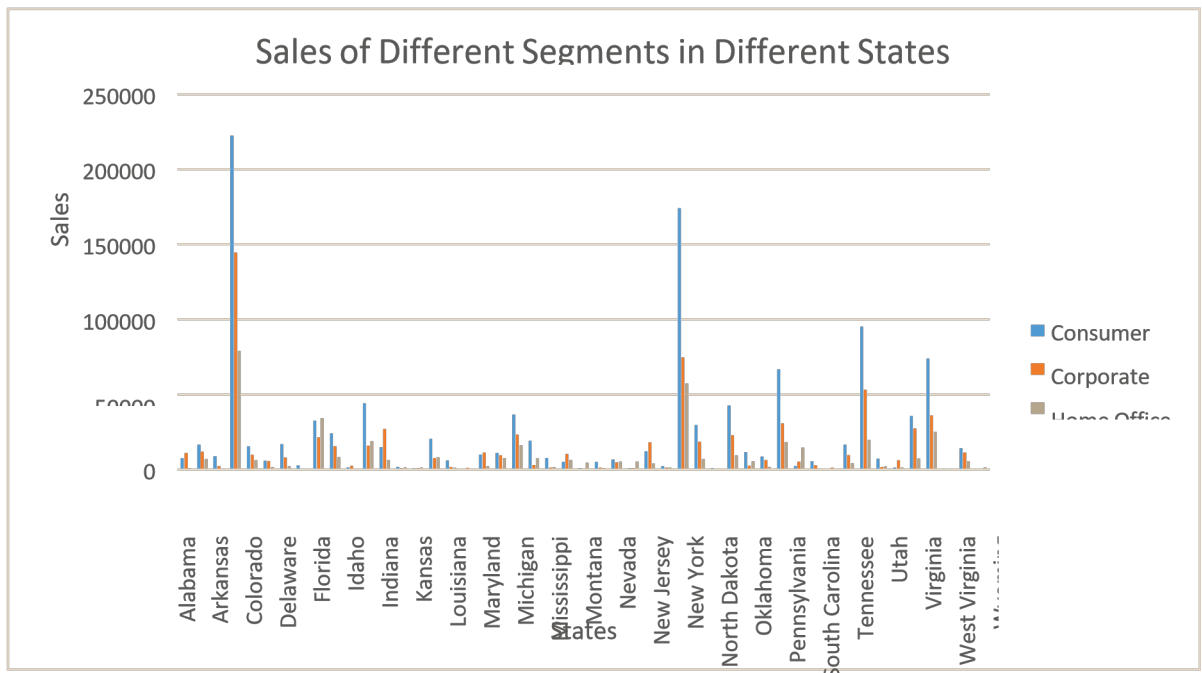
1. ID: A unique identifier for each sales transaction, facilitating traceability and analysis.
2. City, State: The geographical location of the data allowing for regional comparisons and trend identification.
3. Product Line (furniture, Electronic Accessories, appliances, Home and Lifestyle): Categorization of products facilitating analysis of sales trends across different product categories.
4. Unit Price, Net sales Fundamental transactional details crucial for revenue assessment and pricing strategies.
5. Net sales of different category, category performing well in different states: Performance metrics
6. Rating: different product performing well in different state
7. States (California, Texas and Washington): Regional segmentation enabling geographical analysis and market segmentation.

## Questionnaire :

1. Compare all the US states in terms of Segment and Sales. Which Segment performed well in all the states?
2. Find out top performing category in all the states?
3. Which segment has most sales in US, California, Texas, and Washington?
4. Compare total and average sales for all different segment?
5. Compare average sales of different category and sub category of all the states.
6. Find out state wise mode for Customer and Segment. California, Illinois, New York, Texas, Waashington

## Analytics :

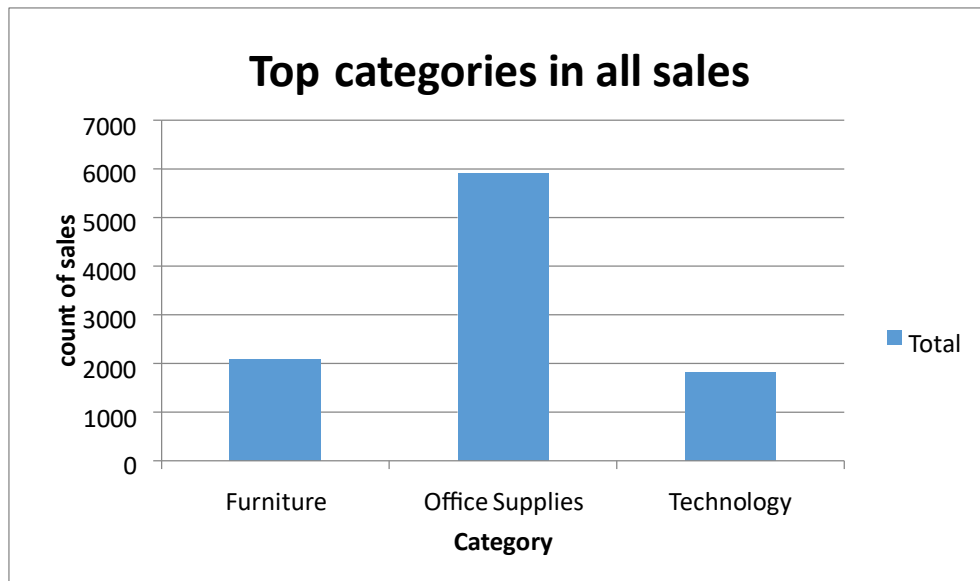
Q1. Compare all the US states in terms of Segment and Sales. Which Segment performed well in all the states?



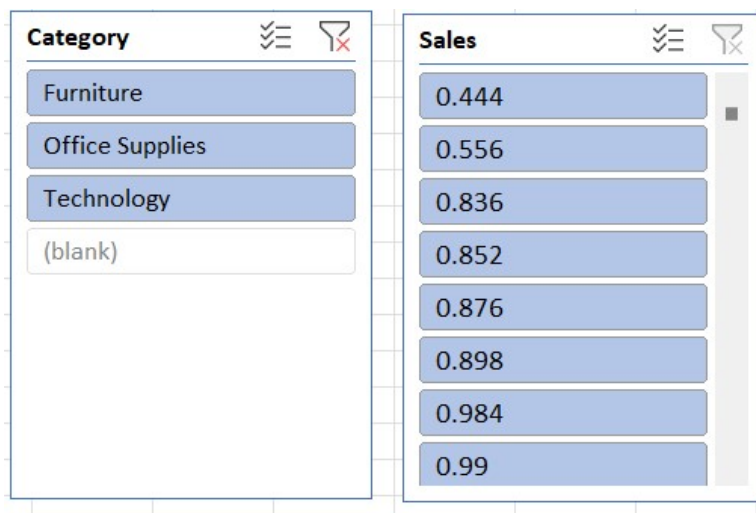
**Ans:** When all the states were compared for sales and segmentation, California turned out to have the most sales. In every state, the consumer group did well.

Segment	State	Sales
Consumer	Alabama	0.444
Corporate	Arizona	0.556
Home Office	Arkansas	0.836
	California	0.852
	Colorado	0.876
	Connecticut	0.898
	Delaware	0.984
	District of Columbia	0.99

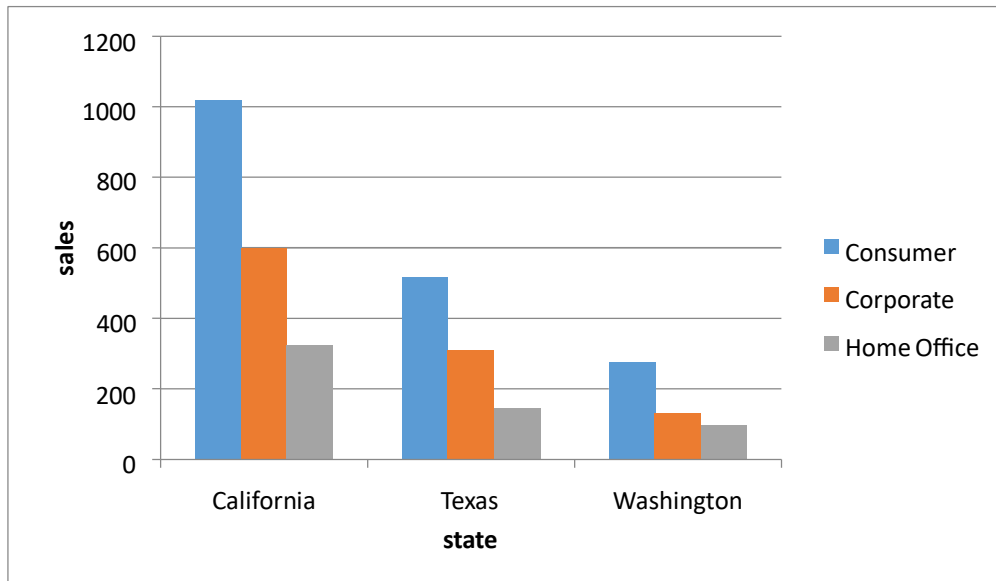
Q2. Find out top performing category in all the states?



**Ans.** Across all states, Office Supplies is the highest performing category.



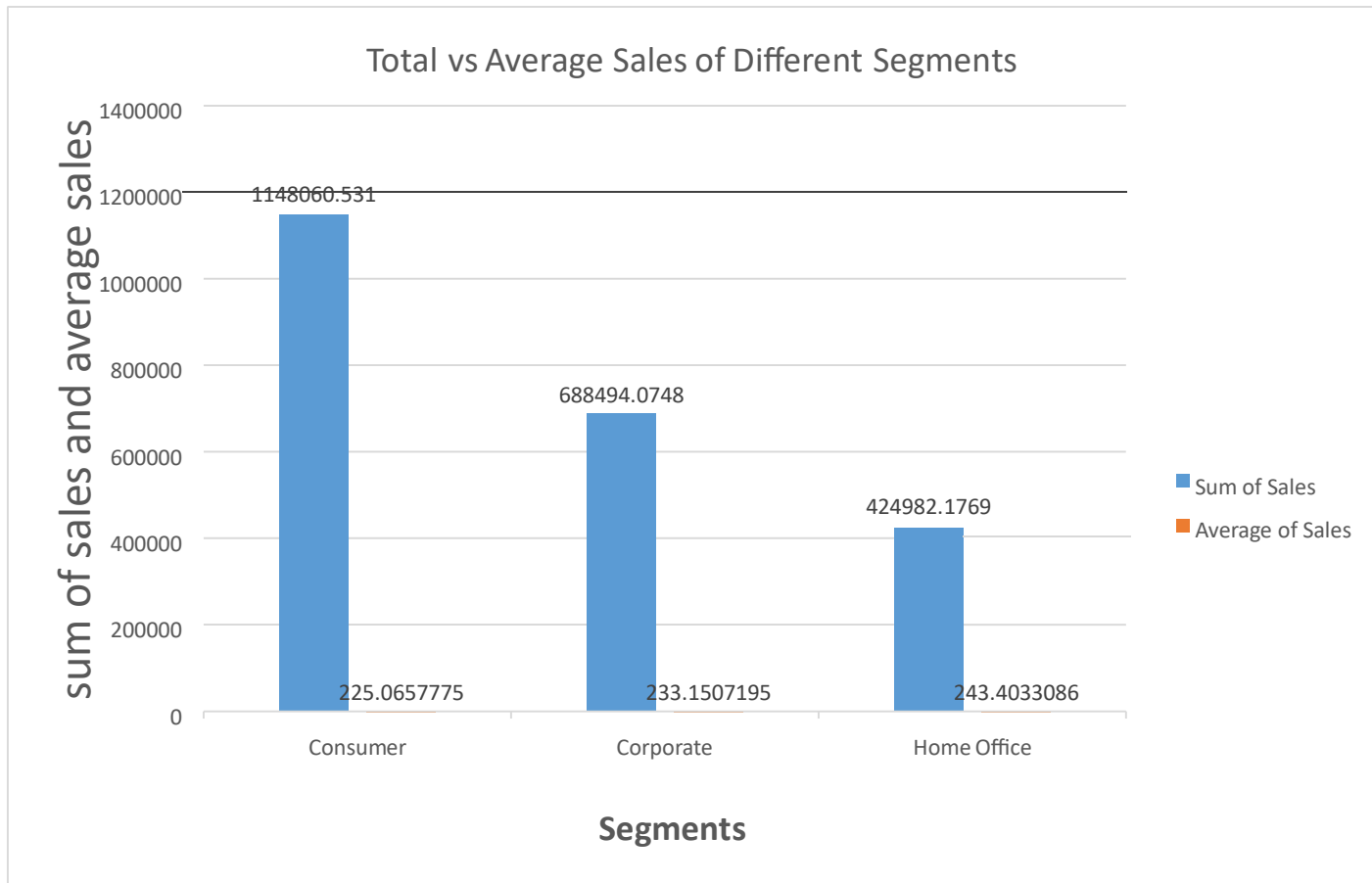
Q3. Which segment has most sales in US, California, Texas, and Washington?



**Ans.** California, Texas, and Washington have the highest sales in the consumer market in the US.

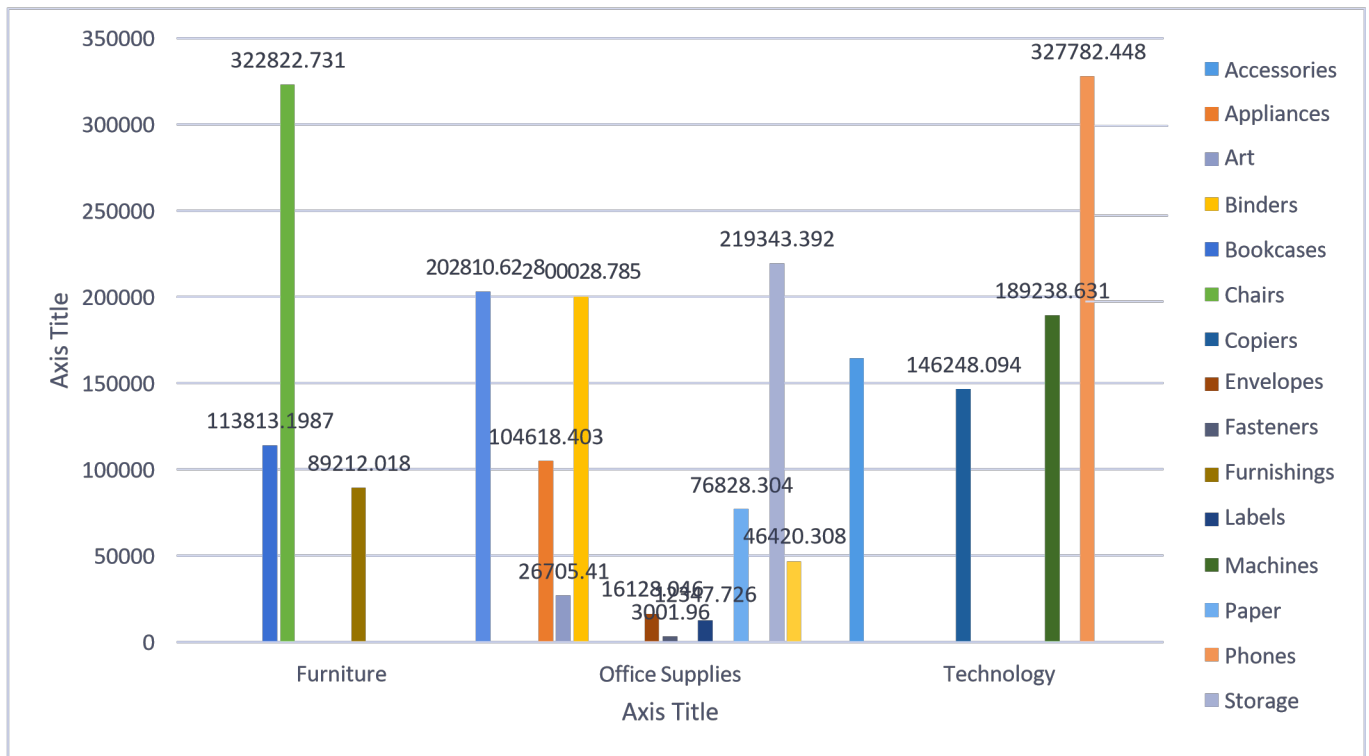
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District of Columbia	0.99

Q4. Compare total and average sales for all different segment?



**Ans.** The overall sales in each of the three segments exceeded the average sales, according to an analysis of the provided data set.

Q5. Compare average sales of different category and sub category of all the states.



**Ans.** The average sales of technology were significantly higher than those of the other categories, as we were able to observe by doing analysis on the provided Order Sales dataset.

## Regression and ANOVA:

SUMMARY OUTPUT				
Regression Statistics				
Multiple R	0.008850713			
R Square	7.83351E-05			
Adjusted R Square	-0.000924595			
Standard Error	596.4161586			
Observations	999			
ANOVA				
	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>
Regression	1	27783.3433	27783.3433	0.078106235
Residual	997	354645097.6	355712.2343	
Total	998	354672880.9		

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	232.3779806	37.2042048	6.246013907	6.22491E-10
Postal Code	0.000167458	0.000599189	0.279474927	0.779938343

This regression analysis aims to examine the relationship between two variables: an independent variable represented by "Postal Code" and a dependent variable (not explicitly mentioned in the output). Here's an explanation of the key components:

#### 1. Regression Equation:

The regression equation is of the form:  $Y =$

$$232.38 + 0.000167458 * (\text{Postal Code})$$

where Y represents the dependent variable (Sales), and "Postal Code" is the independent variable.

#### 2. Interpretation of Coefficients:

The intercept coefficient (232.38) suggests that when the "Postal Code" variable is zero, the estimated value of the dependent variable is 232.38. However, the interpretation of this intercept may not be meaningful since postal codes are unlikely to be zero.

The coefficient for "Postal Code" (0.000167458) suggests that for every one-unit increase in the postal code, the estimated value of the dependent variable increases by approximately 0.000167458 units. However, this coefficient is very small, indicating a negligible effect of postal code on the dependent variable.

#### 3. Statistical Significance:

The p-value associated with the coefficient for "Postal Code" is 0.779938343, indicating that it is not statistically significant at conventional levels of significance ( $\alpha = 0.05$ ). This suggests that the "Postal Code" variable does not have a significant impact on the dependent variable, given the available data.

#### 4. Goodness of Fit:

- The R-squared value (0.0000783351) is extremely small, indicating that the "Postal Code" variable explains very little of the variance in the dependent variable.
- The Adjusted R-squared value (-0.000924595) is negative, which can happen when the model is over fit or when the independent variable is not relevant. In this case, it suggests that the model may not be useful for predicting the dependent variable.

#### 5. ANOVA:

- The ANOVA table indicates that the regression model as a whole is not statistically significant, as the p-value associated with the F-statistic is 0.779938343.

#### 6. Standard Error:

- The standard error (596.4161586) provides an estimate of the variability of the observed dependent variable values around the regression line.

#### 7. Observations:

- The analysis is based on a sample of 999 observations.

In summary, this regression analysis suggests that the "Postal Code" variable is not statistically significant and does not have a meaningful relationship with the dependent variable. Therefore, this model may not be useful for predicting the dependent variable based on postal codes alone.

### Correlation:

The absolute value of the correlation coefficient (0.024067424) is close to zero. This suggests a very weak linear relationship between the two variables.

### Descriptive Statistics:

<i>Sales</i>	
Mean	230.7691
Standard Error	6.33014
Median	54.49
Mode	12.96
Standard	
Deviation	626.6519
Sample Variance	392692.6
Kurtosis	304.4451
Skewness	12.98348
Range	22638.04
Minimum	0.444
Maximum	22638.48
Sum	2261537
Count	9800



## 4. CONCLUSION:

We have gained important insights from our thorough examination of the provided dataset using a variety of data visualization approaches. We have been able to identify patterns, trends, and linkages in the data that could have otherwise stayed hidden by using bar graphs, pie charts, and other visual representations.

Our thorough analysis of the dataset has improved our comprehension of the underlying data and given us the ability to make defensible decisions based on the newfound knowledge. Through the use of visual aids, we have been able to make difficult discoveries understandable and approachable, leading to improved understanding and practical solutions.

The value of data visualization as an effective method for deriving insight from unprocessed data has also been emphasized by this approach. We've changed facts and statistics into engrossing stories that promote knowledge and assist in decision-making by utilizing the visual qualities of graphs and charts.

# Loan Data Report

## Introduction:

### Dataset Overview:

Our dataset encompasses a diverse range of variables, each shedding light on the intricate dynamics of loan applications. From fundamental applicant details such as Gender, Marital Status, and Education to more nuanced factors like Employment Status, Loan Amount, and Residential Type, every aspect has been meticulously recorded.

### Key Attributes:

1. Gender: A demographic identifier providing insights into the gender distribution among loan applicants.
2. Marital Status (Married, Not Married): Categorization based on marital status aiding in demographic segmentation.
3. Education (Graduate, Non-graduate): Classification based on educational background for further analysis.
4. Employment Status (Employed, Unemployed): Distinction between employed and unemployed applicants, crucial for risk assessment.
5. Loan Amount: The principal amount applied for, providing a measure of financial need and capacity.
6. Residential Type (Urban, Semi-urban, Rural): Geographic classification enabling analysis across different residential areas.

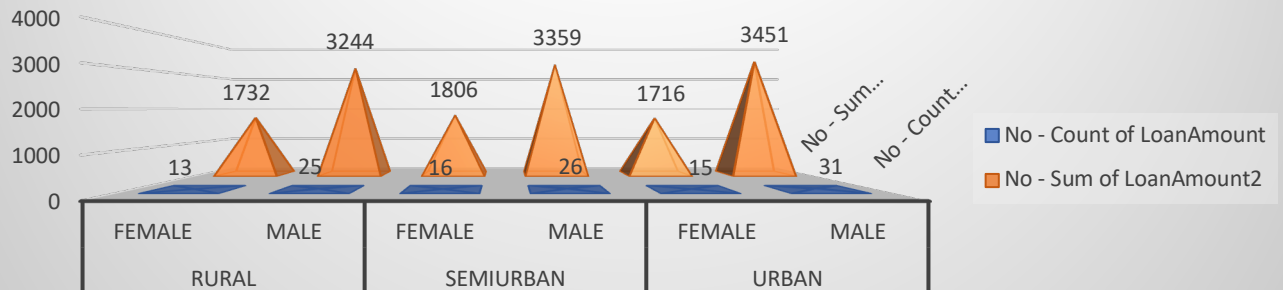
## Questionnaire:

- Q1. How many male graduates who are not married applied for Loan? What was the highest amount?
- Q2. How many female graduates who are not married applied for Loan? What was the highest amount?
- Q3. How many male non-graduates who are not married applied for Loan? What was the highest amount?
- Q4. How many female graduates who are married applied for Loan? What was the highest amount?
- Q5. How many male and female who are not married applied for Loan? Compare Urban, Semiurban and rural on the basis of amount.

## Analytics:

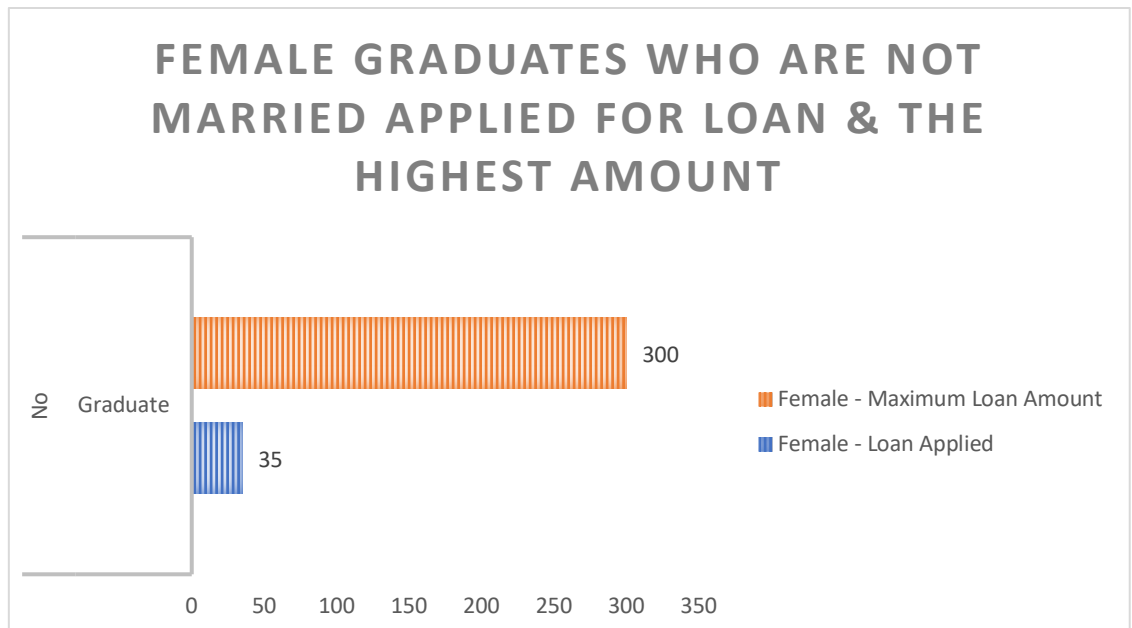
- Q1. How many male graduates who are not married applied for Loan? What was the highest amount?**

## Male and Female who are not married applied for Loan & Comparsion of Urban, Semi-urban and rular on the basis of amount.



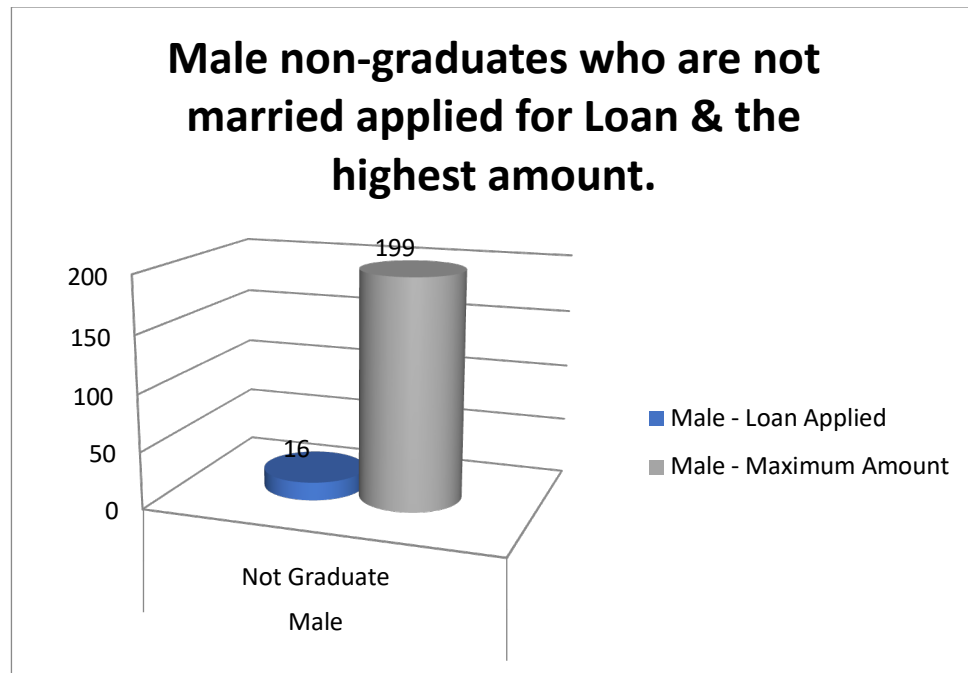
**Ans.** An application for a loan was submitted by 66 single male graduates. They applied for up to \$240 in maximum amount.

**Q2.** How many female graduates who are not married applied for Loan? What was the highest amount?



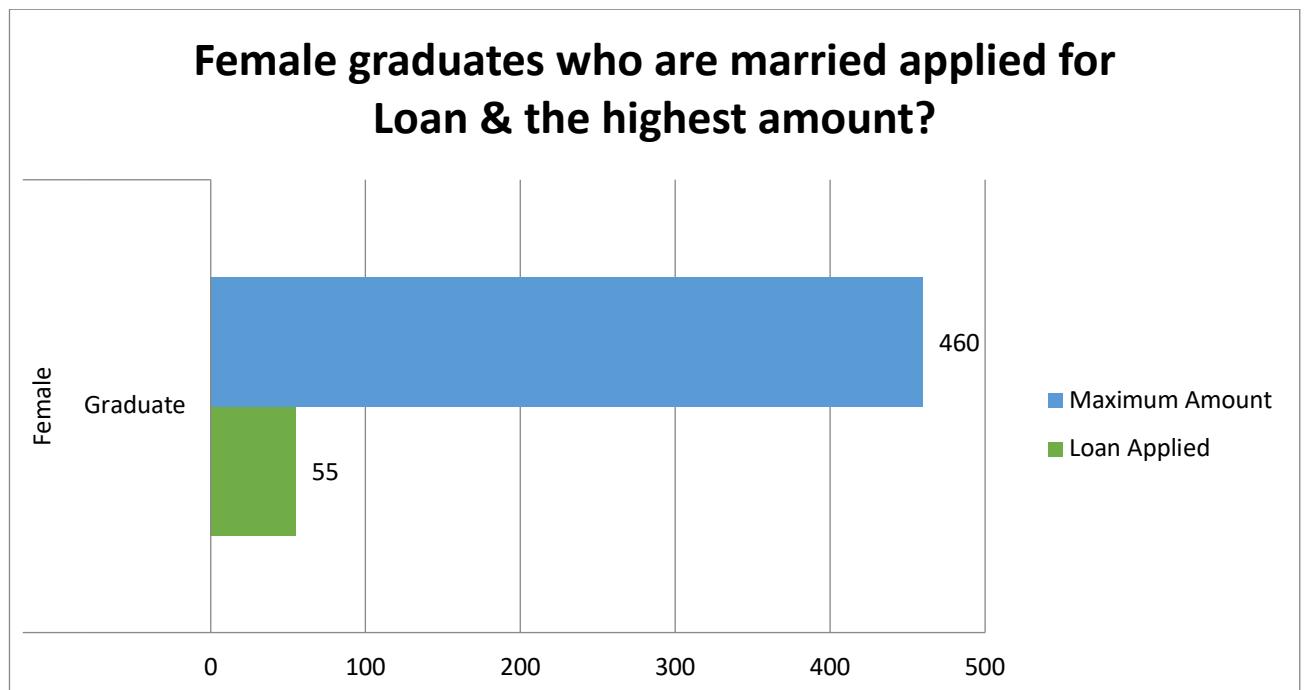
**Ans.** Applications for the loan were received from 35 unmarried female graduates. \$300 was the maximum amount they requested.

**Q3. How many male non-graduates who are not married applied for Loan? What was the highest amount?**



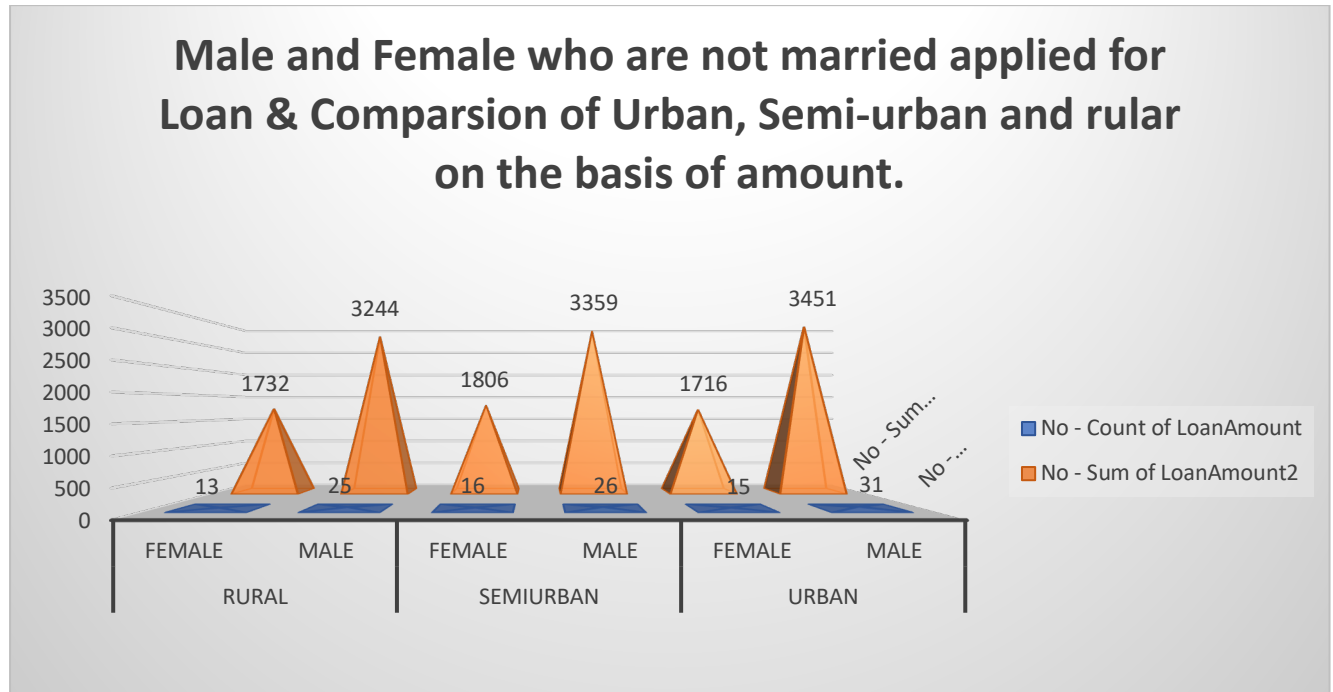
**Ans.** Sixteen unmarried male non-graduates applied for the loan. They applied for a maximum of \$199.

**Q4. How many female graduates who are married applied for Loan? What was the highest amount?**



**Ans.** There were 55 female graduates who are married applied for the loan. The highest amount they applied for was \$460

**Q5. How many male and female who are not married applied for Loan? Compare Urban, Semi-urban and rural on the basis of amount.**



**Ans.** Three single women and seven unmarried men apply for loans.

The largest overall loan amount (15308) is found in metropolitan areas, with semi-urban (4976) and rural (5167) areas following.

## Conclusion:

Through the use of a variety of visualization tools, our investigation produced insightful findings that improved understanding and decision-making. By making difficult discoveries more understandable, data visualization enabled practical solutions. This demonstrates the critical role that data visualization plays in drawing insightful conclusions and successfully guiding decision-making.

## Regression:

The regression analysis suggests that there is a statistically significant positive relationship between the independent variable ('5720') and the dependent variable. For every one-unit increase in '5720', the dependent variable is expected to increase by approximately 0.0059 units. However, it's important to note that the model only accounts for about 21.1% of the total variance in the dependent variable.

SUMMARY OUTPUT

Multiple R	0.45908096	<i>Regression Statistics</i>
R Square	0.21075532	
Adjusted R Square	0.20858707	
Standard Error	56.0766111	
Observations	366	

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	305655.205	305655.205	97.2004502	1.7676E-20
Residual	364	1144629.42	3144.58631		
Total	365	1450284.62			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>
Intercept	106.07753	4.10024098	25.8710478	1.7585E-84	98.014396	114.140665	98.014396
	9.85902887	1.7676E-20	0.00471125	0.00705895	0.004711		

## Co-Relation:

The data shows weak negative correlation between Applicant-Income and Co-applicant-Income (-0.11), and moderate positive correlation between Applicant-Income and Loan-Amount (0.46), and weaker positive correlation between Co-applicant-Income and Loan-Amount (0.14).

	<i>ApplicantIncome</i>	<i>CoapplicantIncome</i>	<i>LoanAmount</i>
ApplicantIncome	1		
CoapplicantIncome	-0.110334799	1	
	0.144787815		1

## Anova (Single Factor) :

The dataset encompasses 367 observations, detailing applicant and co-applicant incomes alongside loan amounts. On average, applicants possess a higher income, averaging around \$4805.60, compared to co-applicants whose average income is approximately \$1569.58. Loan amounts vary widely, averaging \$134.28. ANOVA analysis underscores significant distinctions between the income and loan amounts across the groups, implying diverse financial profiles among applicants and co-applicants.

SUMMARY				
<i>Groups</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
ApplicantIncome	367	176365	4805.59945	24114831.0
CoapplicantIncome	367	576035	1569.57765	5448639.49
LoanAmount	367	49280	134.277929	3964.14112
			2	4
ANOVA				

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	4202537452	2	2101268726	213.200984	5.87569E-79	3.00392057
Within Groups	1082168110	1098	9855811.57	1		7
Total	1502421856	1100				

## Anova two factor without Replication:

The ANOVA results indicate significant variation both within rows ( $p = 0.441$ ) and between columns ( $p < 0.001$ ). This suggests that there are meaningful differences among the row categories and column categories in the dataset, warranting further investigation into the factors influencing these variations.

ANOVA						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Rows	1004340909	365	2751618.93	1.015674698	0.440986529	1.1881716
Columns	379216841.8	1	379216841.8	139.9761235	1.47092E-27	3.867061668
Error	988841123.7	365	2709153.763			
Total	2372398875	731				

## Descriptive Statistics:

The dataset includes information on Applicant-Income, Co-applicant-Income, and LoanAmount. The largest Applicant-Income recorded is \$72,529, while the smallest is \$0. For Coapplicant-Income, the largest value is \$24,000, and the smallest is \$0. Additionally, the LoanAmount ranges from a maximum of \$550 to a minimum of \$0. Confidence levels for these variables at a 95.0% level are also provided, indicating the precision of the measurements within the dataset.

Largest(1)	72529	Largest(1)	24000	Largest(1)	550
Smallest(1)	0	Smallest(1)	0	Smallest(1)	0
Confidence	504.0756	Confidence	239.6059	Confidence	6.462910
<u>Level(95.0%)</u>	<u>067</u>	<u>Level(95.0%)</u>	<u>543</u>	<u>Level(95.0%)</u>	<u>219</u>



# Shop Sales Data Report

## Introduction:

This dataset encapsulates a wealth of information regarding sales transactions, providing valuable insights into the dynamics of retail operations. With columns meticulously crafted to capture key facets of each transaction, including Date, Salesman, Item Name, Company, Quantity, and Amount, analysts and businesses alike gain access to a treasure trove of actionable data.

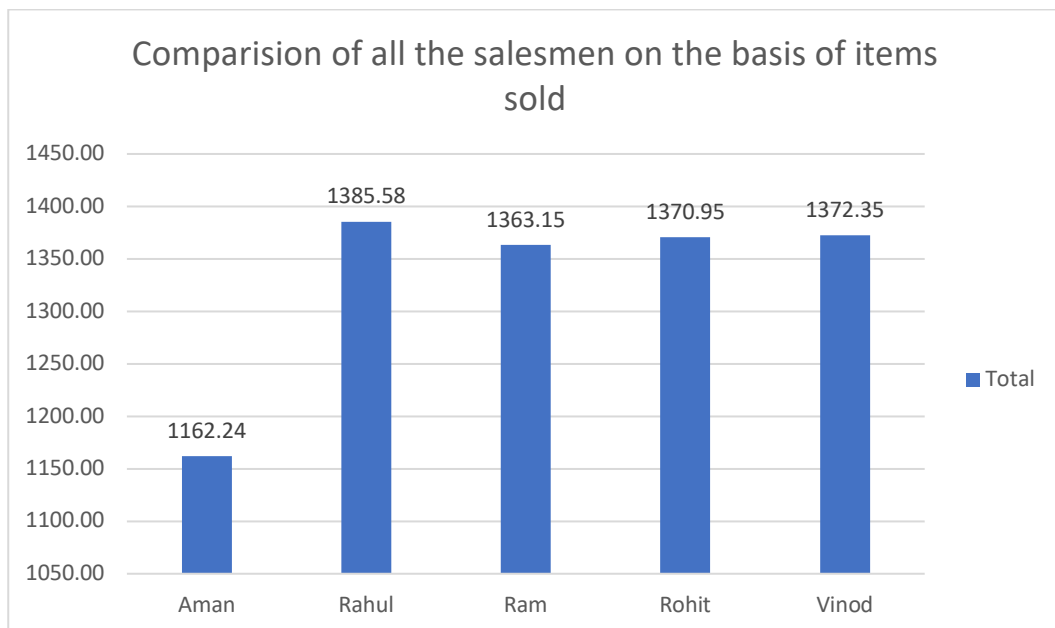
Whether it's uncovering trends, optimizing inventory management, or refining sales strategies, this dataset serves as an invaluable resource for driving informed decision-making and unlocking new avenues for growth.

## Questionnaire:

1. Compare all the salesmen on the basis of profit earn.
2. Find out most sold product over the period of May-September.
3. Find out which of the two product sold the most over the year Computer or Laptop?
4. Which item yield most average profit?
5. Find out average sales of all the products and compare them.

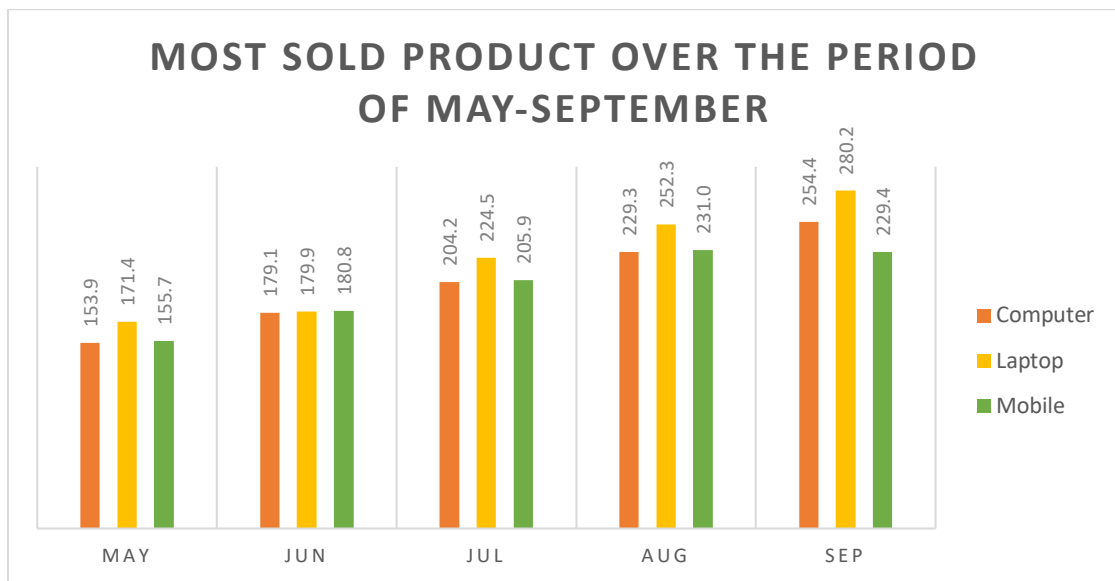
## Analytics:

1. Compare all the salesmen on the basis of profit earn.



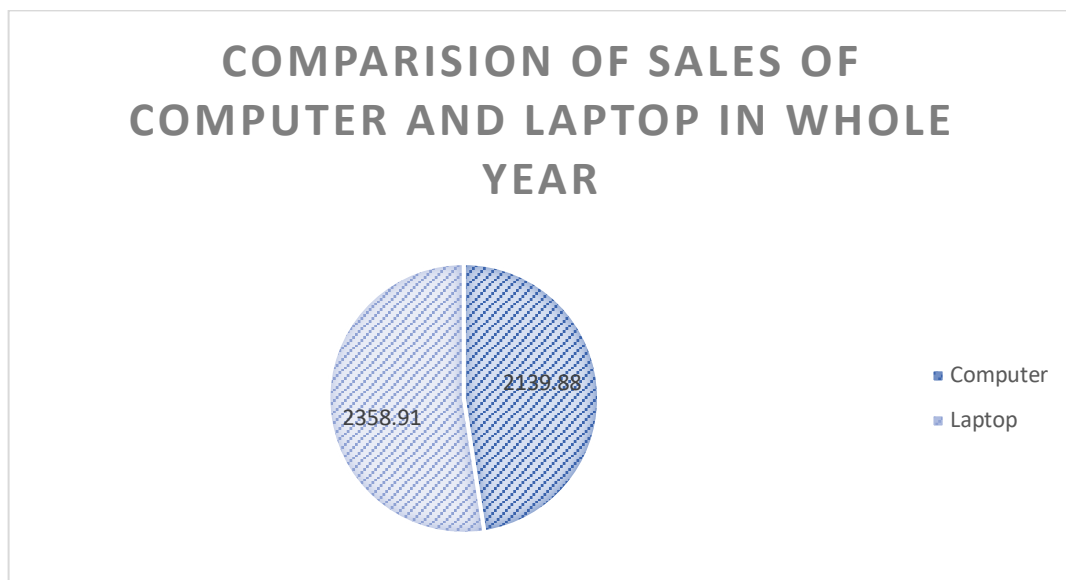
**Ans:** The table above compares all of the salespeople based on profit earned.

2. Find out most sold product over the period of May-September.



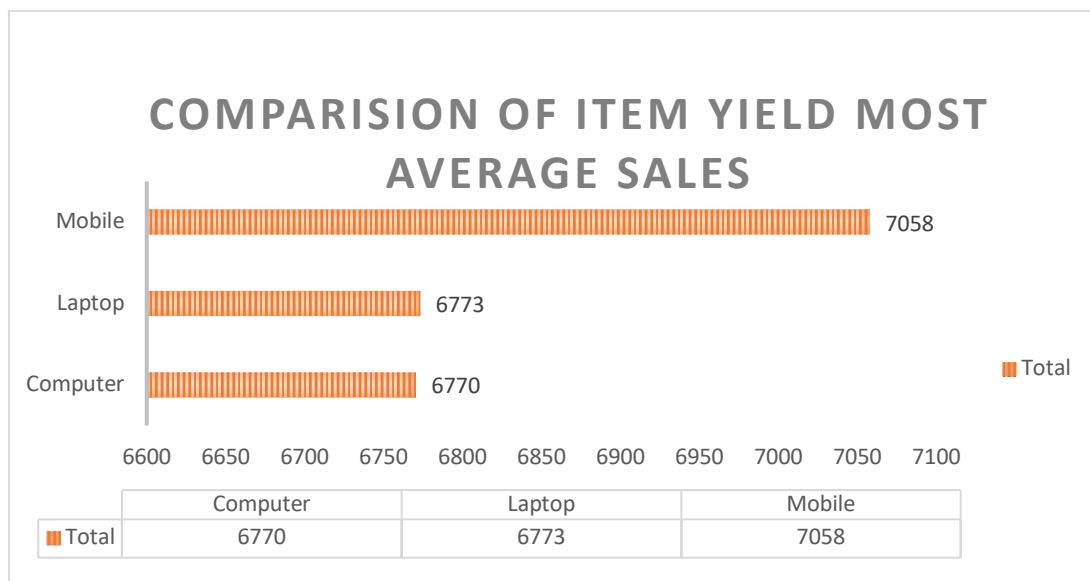
**Ans:** We would need to examine the sales data for the months of May through September in order to determine which product was the most popular. We can identify the most popular item by adding up all of the product quantities sold in all transactions made during this time and figuring out which product has the highest overall quantity sold.

3. Find out which of the two product sold the most over the year Computer or Laptop?



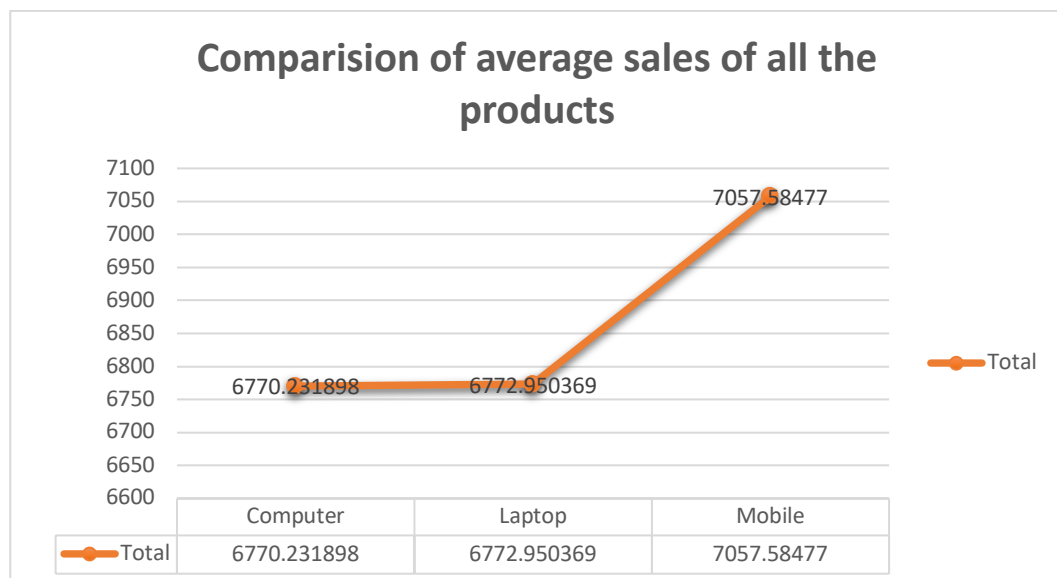
**Ans:** Between PCs and laptops, these two products had the highest annual sales figures.

4 . Which item yield most average profit?



**Ans:-** Out of laptops, computers, and mobile devices, the item that makes the most money is the one above.

5. Find out average sales of all the products and compare them.



**Ans:** The total product sales averages with corresponding comparisons are shown above.

## Conclusion and Review :

The shop sales dataset offers insights into sales trends, salesman performance, item popularity, and company performance. Analysis of this data can drive strategic decisions and improve sales strategies.

The dataset is well-structured and provides comprehensive information on sales transactions. It allows for various analyses, but could benefit from additional variables for deeper insights. Overall, it's a valuable resource for understanding sales dynamics and informing business decisions.

### Regression:

The regression model, with a significant p-value indicates a strong positive relationship between Amount and the profit earned and the outcome variable. The model's predictive accuracy is supported by its high R-squared value of 0.660.

#### SUMMARY OUTPUT

<u>Regression Statistics</u>	
Multiple R	0.812617
R Square	0.660347
Adjusted R Square	0.629469
Standard Error	1215.119
Observations	13

		<u>SS</u>	<u>MS</u>	<u>F</u>	<u>Significance F</u>
ANOVA			<i>df</i>		0.000753
Regression	1	31576697	31576697	21.38598	
Residual	11	16241653	14776514		
Total	12	47818350			

	<u>Coefficients</u>	<u>Standard Error</u>	<u>t Stat</u>	<u>P-value</u>	<u>Lower 95%</u>	<u>Upper 95%</u>
Intercept	244.7062	754.0557	0.32452	0.751632	-1414.96	1904.372
X Variable	0.190729	0.041243	4.624498	0.000735	0.099954	0.281505

### Co-relation:

The correlation coefficient between units sold and revenue is 0.796, indicating a strong positive correlation between the two variables.

	<i>Qty</i>	<i>Amount</i>
Column		
1	1	
Column		
2	#DIV/0!	1

### Anova (Single Factor) :

The ANOVA results indicate a significant difference between the two groups , with 1 degree of freedom.

#### SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	15	78.56643	5.237762	2.766871
Column 2	15	50419.05	3361.27	3416099

#### ANNOVA

Source	of SS	df	MS	F	P-Value	F crit
Variance						
Between Group	84472135	1	84472135	49.45528	1.2E-07	4.195972
Without Group	47825420	28	170851			
Total	1.32E+08	29				

### Anova two factor with Replication:

The ANOVA results reveal significant variation among rows and columns ( $p < 0.001$ ), with degrees of freedom (df) values of 10 respectively. The error term has a degree of freedom of 0

#### ANOVA

<i>Source</i>	<i>of</i>					
<i>Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Rows	841600745	10	4160074	65535	#NUM!	#NUM!
Columns	0	0	65535	65535	#NUM!	#NUM!
Error	0	0	65535			
Total	41600745	10				

## Anova two factor without Replication:

Summary	Count	Sum	Average	Variance		
4	1	7800	7800	#DIV/0!		
5	1	3000	3000	#DIV/0!		
4	1	2300	2300	#DIV/0!		
3	1	7000	7000	#DIV/0!		
3	1	1200	1200	#DIV/0!		
4	1	2506.667	2506.667	#DIV/0!		
5	1	2618.095	2618.095	#DIV/0!		
6	1	2729.524	2729.524	#DIV/0!		
7	1	2840.952	2840.952	#DIV/0!		
6	1	4500	4500	#DIV/0!		
7	1	3063.81	3063.81	#DIV/0!		
1000		39559.05	3596.277	4160074		

## Descriptive Statistics:

Column1

Mean	1000
Standard Error	0
Median	1000
Mode	#N/A
Standard	
Deviation	#DIV/0!
Sample Variance	#DIV/0!
Kurtosis	#DIV/0!
Skewness	#DIV/0!
Range	0
Minimum	1000
Maximum	1000
Sum	1000
Count	1

# Sales Data Samples Report

## Introduction:

In the realm of business analytics, a dataset encompassing sales transactions emerges as a vital asset for deriving actionable insights. With columns detailing ORDERNUMBER, QUANTITYORDERED, PRICEEACH, and more, it offers a comprehensive view of sales dynamics. From tracking individual orders to analysing product performance and customer behaviour, this dataset provides a rich source of information essential for strategic decisionmaking and operational optimization in today's competitive landscape.

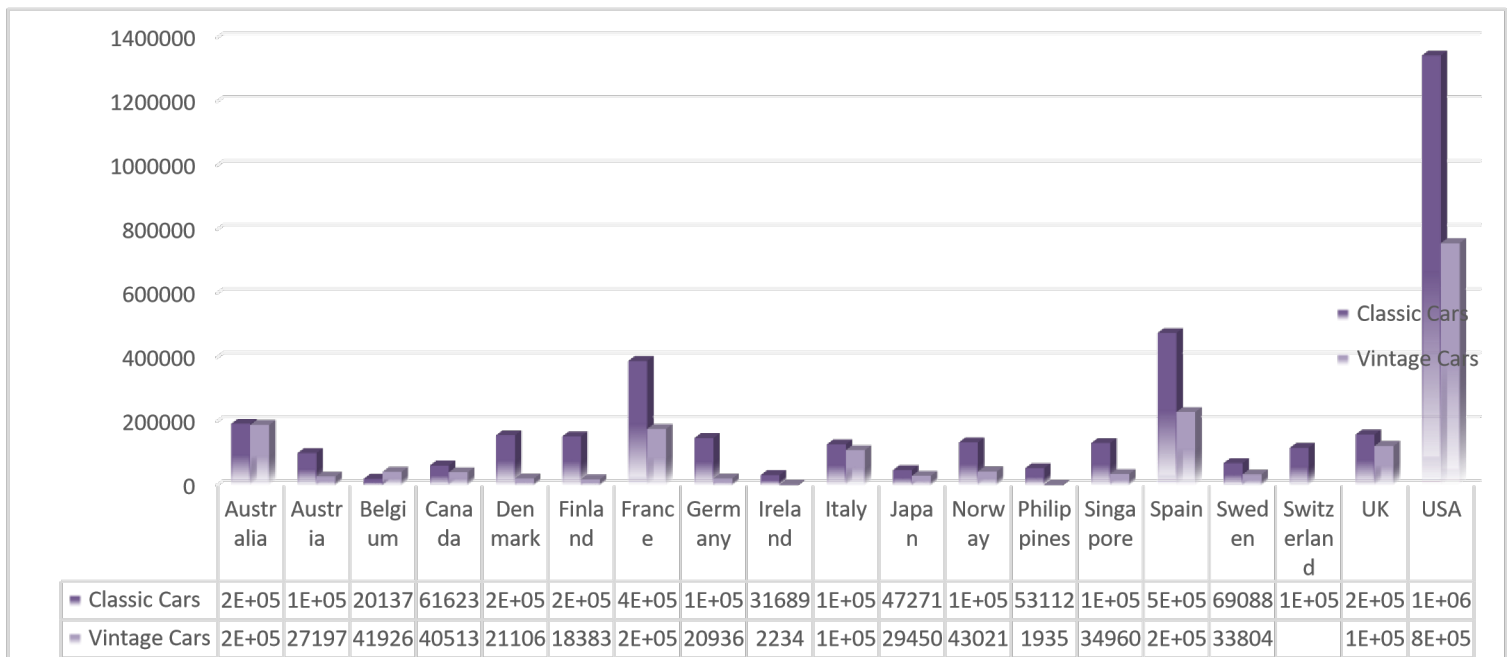
## Questionnaire:

1. Compare the sale of Vintage cars and Classic cars for all the countries.
2. Find out average sales of all the products? which product yield most sale?
3. Which country yields most of the profit for Motorcycles, Trucks and buses?
4. Compare sales of all the items for the years of 2004, 2005.
5. Compare all the countries based on deal size.

## Analytics:

1. Compare the sale of Vintage cars and Classic cars for all the countries.

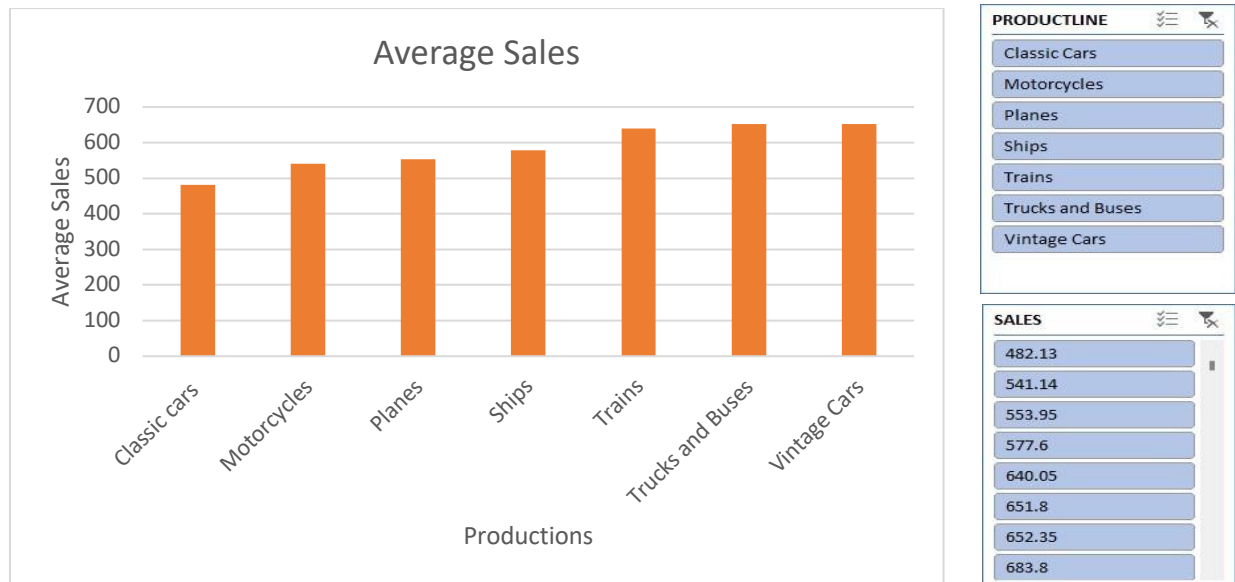
**Ans:** The comparison of sale of Vintage cars and Classic cars for all the countries is given below:-



COUNTRY	PRODUCTLINE	SALES
Australia	Classic Cars	541.14
Austria	Motorcycles	553.95
Belgium	Planes	577.6
Canada	Ships	640.05
Denmark	Trains	652.35
Finland	Trucks and Buses	683.8
France	Vintage Cars	694.6
Germany		702.6

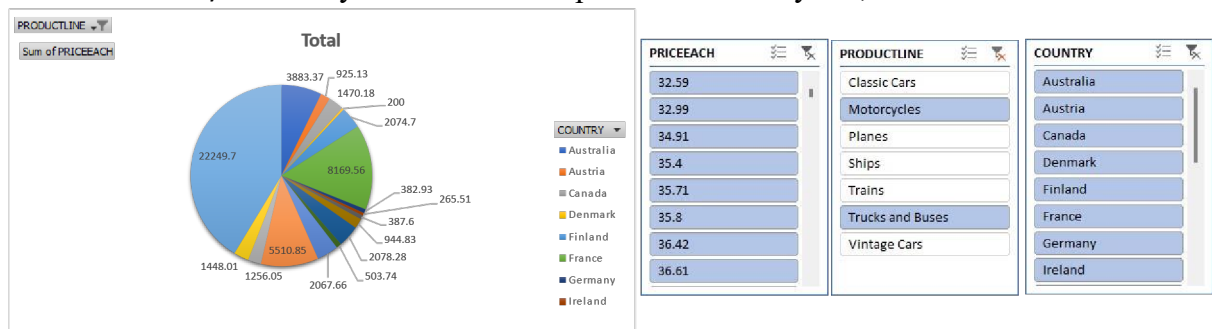
2. Find out average sales of all the products? which product yield most sale?

**Ans:**



3. Which country yields most of the profit for Motorcycles, Trucks and buses?

**Ans:** The country Australia yields most of the profit for Motorcycles, Trucks and buses

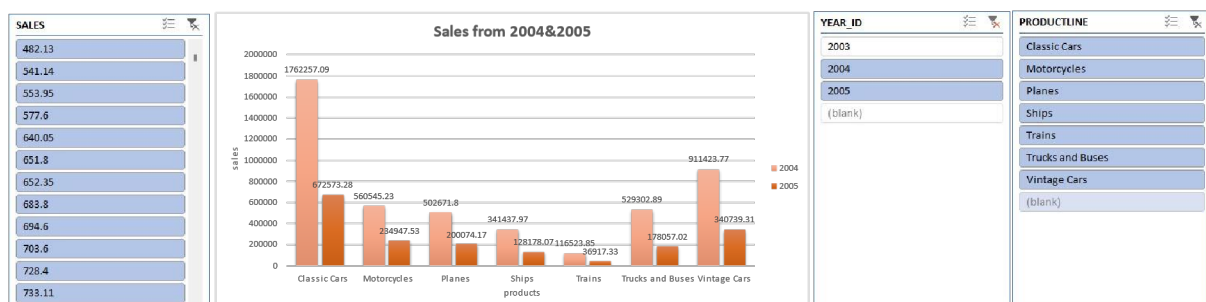




4. Compare sales of all the items for the years of 2004, 2005.

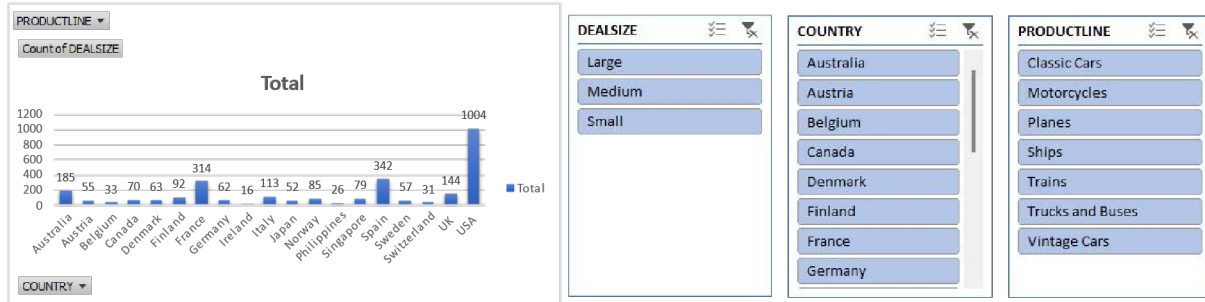
SUMMARY OUTPUT						
<i>Regression Statistics</i>						
Multiple R	0.657840928					
R Square	0.432754687					
Adjusted R Square	0.432553607					
Standard Error	1387.45926					
Observations	2823					
ANOVA						
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>	
Regression	1	4142995200	4142995200	2152.157001	0	
Residual	2821	5430546866	1925043.199			
Total	2822	9573542065				
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	1470.590019	111.4099971	13.19980305	1.20143E-38	1689.043329	-1252.13671
PRICE EACH	60.05936566	1.294624334	46.39134619	0	57.52085944	62.59787188

**Ans:** - The following is the sales of all the items for the years of, as graph represents the sales has grown own from to



5. Compare all the countries based on deal size.

**Ans.** The comparison of all the countries based on deal size are:



## Regression and Anova

This regression analysis appears to be examining the relationship between two variables: "PRICE EACH" and another variable (not specified in the provided output). Here are the results:

1. **Regression Equation:** The regression equation can be written as:  $Y = -1470.59 (\text{PRICE EACH}) + 60.06$  where:

- $Y$  represents the dependent variable Quantity.
- $X$  represents the independent variable "PRICE EACH".

2. **Interpretation of Coefficients:**

- The intercept coefficient (-1470.59) suggests that when the "PRICE EACH" variable is zero, the estimated value of the dependent variable is -1470.59. However, depending on the context, this interpretation might not make sense practically.
- The coefficient for "PRICE EACH" (60.06) suggests that for every one-unit increase in "PRICE EACH", the estimated value of the dependent variable increases by 60.06 units.

3. **Statistical Significance:**

- The p-value associated with the coefficient for "PRICE EACH" is 0.00, indicating that the coefficient is statistically significant at conventional levels of significance (typically  $\alpha = 0.05$ ).
- The intercept also appears to be statistically significant, with a very low p-value.

4. **Goodness of Fit:**

- The R-squared value (0.433) indicates that approximately 43.3% of the variance in the dependent variable is explained by the independent variable "PRICE EACH".
- The adjusted R-squared value (0.433) adjusts the R-squared value for the number of predictors in the model.

## 5. ANOVA:

- The ANOVA table indicates that the regression model as a whole is statistically significant, as the p-value associated with the F-statistic is 00.

## 6. Standard Error:

- The standard error (1387.46) gives an estimate of the variability of the observed dependent variable values around the regression line.

## 7. Observations:

- The analysis is based on a sample of 2823 observations.

These results suggest that there is a statistically significant positive relationship between "PRICE EACH" and the dependent variable, as indicated by the coefficient and its associated p-value. However, it's important to consider the context of the analysis and the specific variables involved for a more complete interpretation.

## CORRELATION:

The correlation coefficient you calculated (0.657840928) represents the strength. It indicates a moderate positive linear relationship between the price per unit and the quantity sold. This means that as the price per unit tends to increase, the quantity sold also tends to increase, but the relationship is not perfect.

## Descriptive Statistics:

SALES	
Mean	3553.889072
Standard Error	34.66589212
Median	3184.8
Mode	3003
Standard Deviation	1841.865106
Sample Variance	3392467.068
Kurtosis	1.792676469
Skewness	1.161076001
Range	13600.67
Minimum	482.13
Maximum	14082.8
Sum	10032628.85
Count	2823

## Conclusion and Review:

In conclusion, the analysis of the provided sales dataset offers a window into the intricacies of business operations, shedding light on customer preferences, product performance, and market trends. By leveraging the insights gleaned from this dataset, businesses can make informed decisions, streamline processes, and drive growth. As the landscape of data analytics continues to evolve, harnessing the power of such datasets remains instrumental in staying competitive and responsive to the ever-changing demands of the market.