Data Analysis Lab Report

A Project Report Submitted to

Acropolis Institute of Technology and Research Indore Towards Partial Fulfilment for the Award of

Bachelor of Technology

(Computer Science and Engineering)

Under the Supervision of

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1. Data Analysis Principles:

Data analysis is a comprehensive field that involves various methods, techniques, and principles to collect, process, and interpret data. Here are some key principles and concepts in data analysis:

i. Data Collection: Gathering raw data from relevant sources.
ii. Data Cleaning: Removing inaccuracies and inconsistencies to ensure data quality.
iii. Data Exploration: Understanding the structure, patterns, and anomalies in the data.
iv. Data Modeling: Creating models that represent the data's underlying structure.
v. Statistical Analysis: Applying statistical methods to infer properties of the population.
vi. Machine Learning: Using algorithms to predict outcomes and discover patterns.
vii. Data Interpretation: Drawing conclusions and making decisions based on data analysis.
viii. Data Visualization: Presenting data in graphical format to communicate information clearly and efficiently.

There are also different types of data analysis, such as:

i. Descriptive Analytics: Describes what has happened using historical data.
ii. Diagnostic Analytics: Explains why something happened.
iii. Predictive Analytics: Predicts what is likely to happen in the future.
iv. Prescriptive Analytics: Suggests actions to achieve desired outcomes.

Each type of analysis serves a different purpose and requires specific techniques and tools. For instance, regression analysis is used to understand relationships between variables, while cluster analysis groups similar data points together.

2. Statistical Analysis:

Statistical analysis is the process of collecting, organizing, interpreting, and presenting data to uncover patterns and trends. It is a fundamental component of data science and research, allowing researchers to make informed decisions based on empirical evidence.

Steps in Statistical Analysis:

i. Define the Research Question: Identify what you want to investigate.
ii. Collect Data: Gather data via surveys, experiments, etc.
iii. Data Cleaning and Preparation: Handle missing values and outliers.
iv. Exploratory Data Analysis (EDA): Summarize data using descriptive stats and visualizations.
v. Choose Statistical Methods: Select appropriate tests and models.
vi. Perform Statistical Analysis: Use tools like R, Python, SPSS.
vii. Interpret Results: Draw conclusions from the analysis.
viii. Report Findings: Present results clearly with tables, charts, and explanations.

3. Hypothesis Testing:

Hypothesis testing is a core component of inferential statistics, used to determine whether there is enough evidence to reject a null hypothesis in favor of an alternative hypothesis. The process begins with formulating two hypotheses: the null hypothesis (H_0), which represents no effect or status quo, and the alternative hypothesis (H_1), which suggests a significant effect or difference. Researchers collect sample data and calculate a test statistic, which is then compared against a critical value from a probability distribution (such as the t-distribution or chi-square distribution) to determine statistical significance.

A p-value is calculated, representing the probability of obtaining the observed results if the null hypothesis is true. A p-value below a predetermined significance level (usually 0.05) indicates strong evidence against the null hypothesis, leading to its rejection. Common tests include the t-test (for comparing means), ANOVA (for comparing means among multiple groups), chi-square test (for categorical data), and regression analysis (for examining relationships between variables).

Assumptions underlying the chosen test, such as normality, independence, and homoscedasticity, must be validated to ensure accurate results. Hypothesis testing provides a structured method for making data-driven decisions, distinguishing between random variation and genuine effects in scientific and practical research.

4. Regression:

Regression analysis is a statistical method used to examine the relationship between a dependent variable and one or more independent variables. The simplest form, linear regression, models the relationship between two continuous variables with a linear equation, allowing predictions of the dependent variable based on the independent variable. Multiple regression extends this to include multiple predictors.

The regression equation takes the form y = beta0 + beta1x1 + beta2x2 + ... +beta nxn + epsilon), where (y) is the dependent variable, (beta)s are coefficients, (x)s are independent variables, and (epsilon) represents the error term. The coefficients represent the change in the dependent variable for a one-unit change in the predictor.

Regression analysis helps identify the strength and type of relationships, control for confounding variables, and make forecasts. Assumptions such as linearity, independence, homoscedasticity, and normality of residuals must be checked to validate the model. It's widely used in fields like economics, biology, engineering, and social sciences for predictive and explanatory purposes.

5. Correlation:

Correlation measures the strength and direction of the relationship between two continuous variables. The correlation coefficient, denoted as rrr, ranges from -1 to 1. An r value of 1 indicates a perfect positive linear relationship, -1 indicates a perfect negative linear relationship, and 0 indicates no linear relationship. The most common method for calculating correlation is the Pearson correlation coefficient, which assesses linear relationships. For non-linear relationships or ordinal data, Spearman's rank correlation can be used. Interpreting correlation involves examining both the sign (positive or negative) and the magnitude of r.

A positive correlation means that as one variable increases, the other also increases, while a negative correlation means that as one variable increases, the other decreases .It's important to note that correlation does not imply causation. While it can show that two variables are related, it cannot determine if one variable causes the other to change. Correlation analysis is frequently used in fields like finance, medicine, and social sciences to identify and quantify relationships between variables.

6. ANOVA:

ANOVA is a statistical method used to compare the means of three or more groups to see if there is a significant difference among them. It extends the t-test to multiple groups by examining the variability within groups and between groups. The null hypothesis (H_0) in ANOVA states that all group means are equal, while the alternative hypothesis (H_1) suggests that at least one group mean is different.

The test involves calculating the F-statistic, which is the ratio of the variance between the group means to the variance within the groups. A high F-value indicates a greater likelihood that the observed differences among group means are real and not due to random chance. If the p-value associated with the F-statistic is below a predetermined significance level (commonly 0.05), the null hypothesis is rejected.

ANOVA assumptions include independence of observations, normally distributed groups, and homogeneity of variances. It's widely used in experimental and observational studies across various fields like psychology, biology, and marketing to compare multiple treatments or conditions.

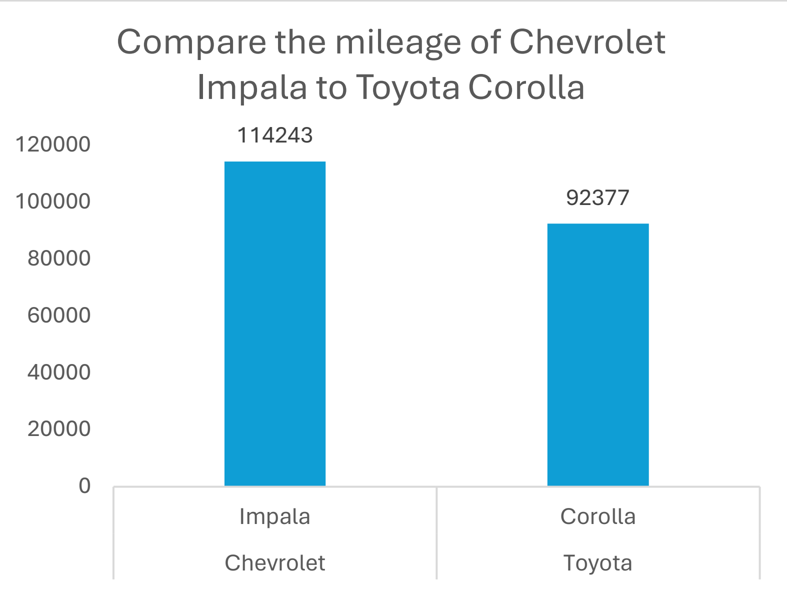
Assumptions of ANOVA

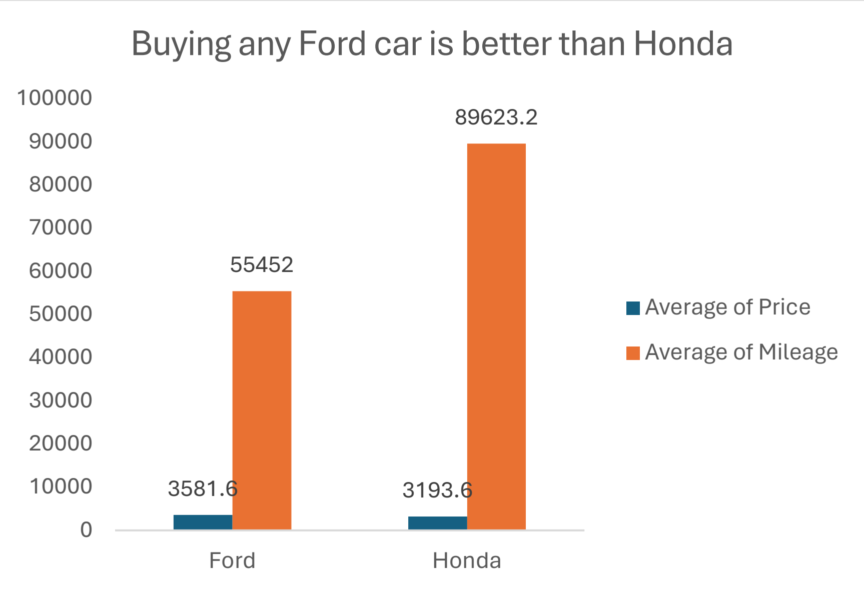
i. Independence of observations: Each group sample must be independent of the others.

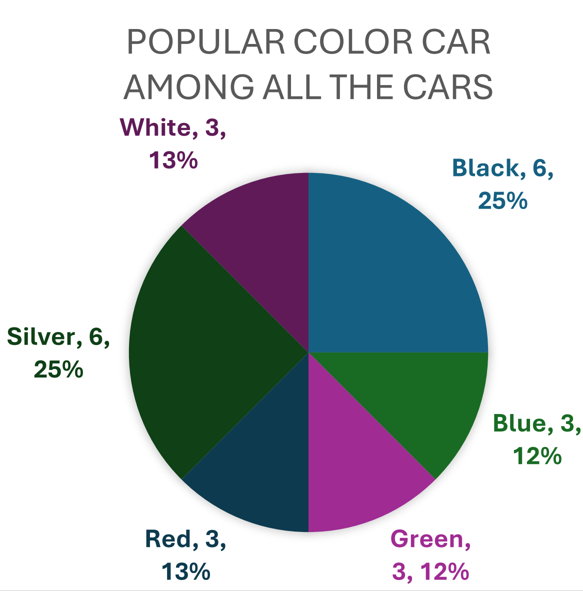
ii. Normality: The data within each group should be approximately normally distributed.

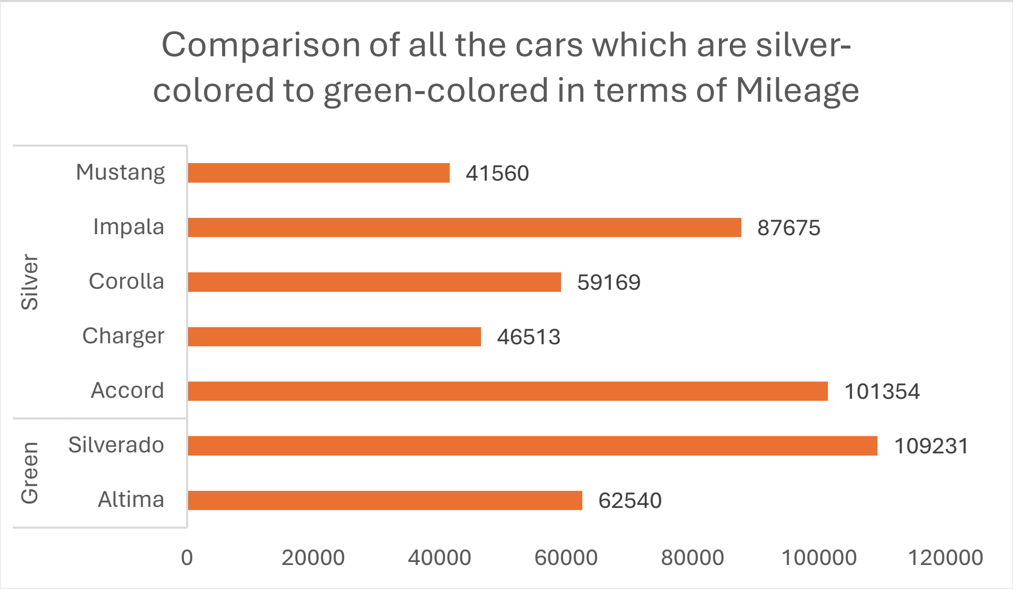
iii. Homogeneity of variances: The variance among the groups should be roughly equal.

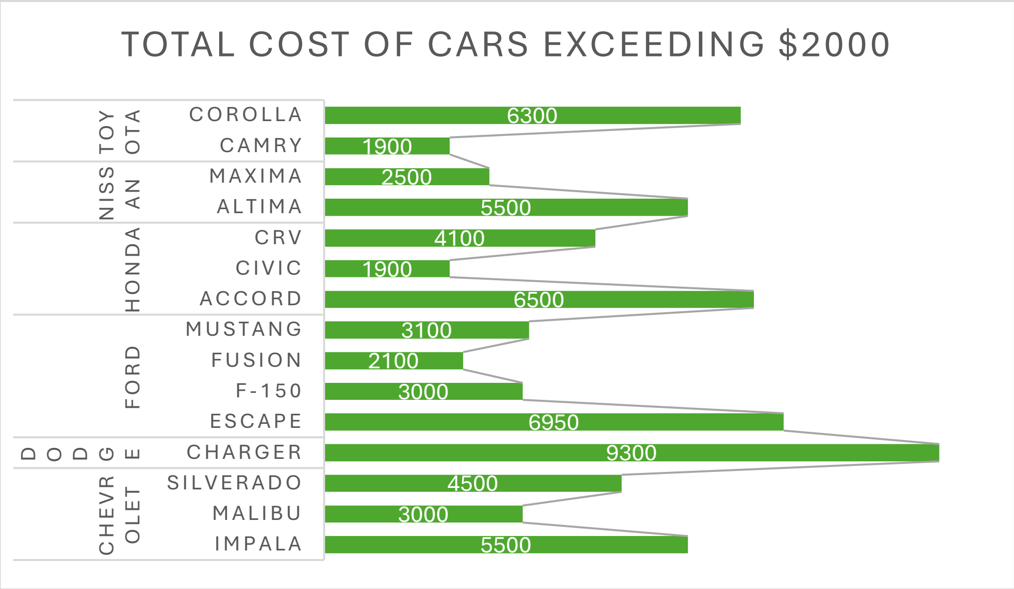
DASHBOARD OF CAR COLLECTION


Compare the mileage of Chevrolet Impala to Toyota Corolla

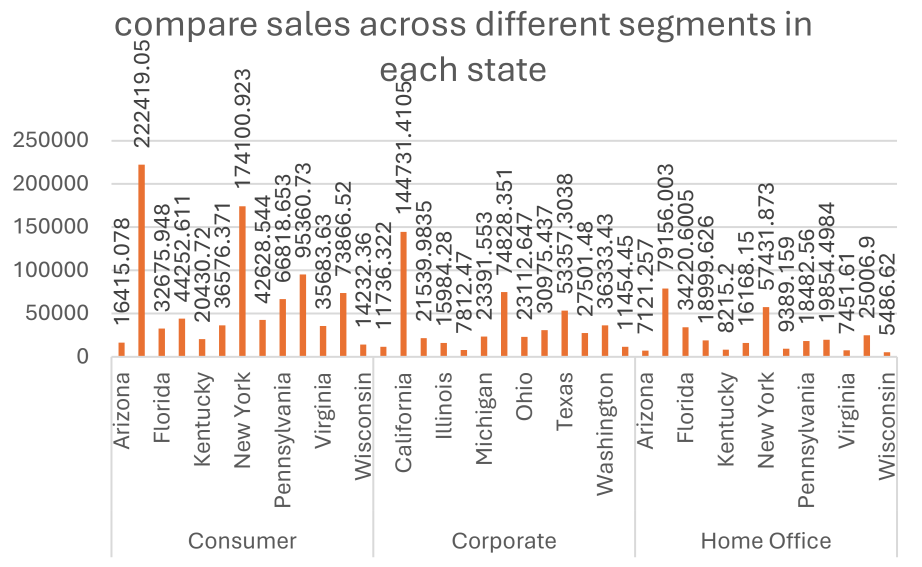

Buying any Ford car is better than Honda


POPULAR COLOR CAR AMONG ALL THE CARS

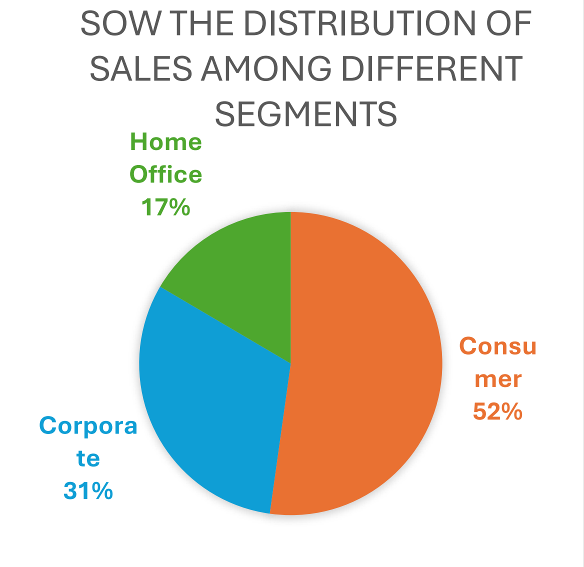

Comparison of all the cars which are silver-colored to green-colored in terms of Mileage


TOTAL COST OF CARS EXCEEDING $2000

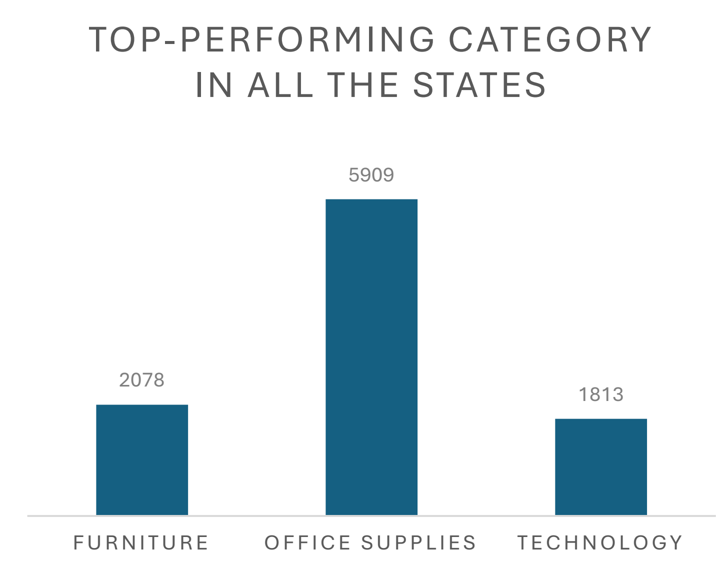
DASHBOARD OF ORDER DATA



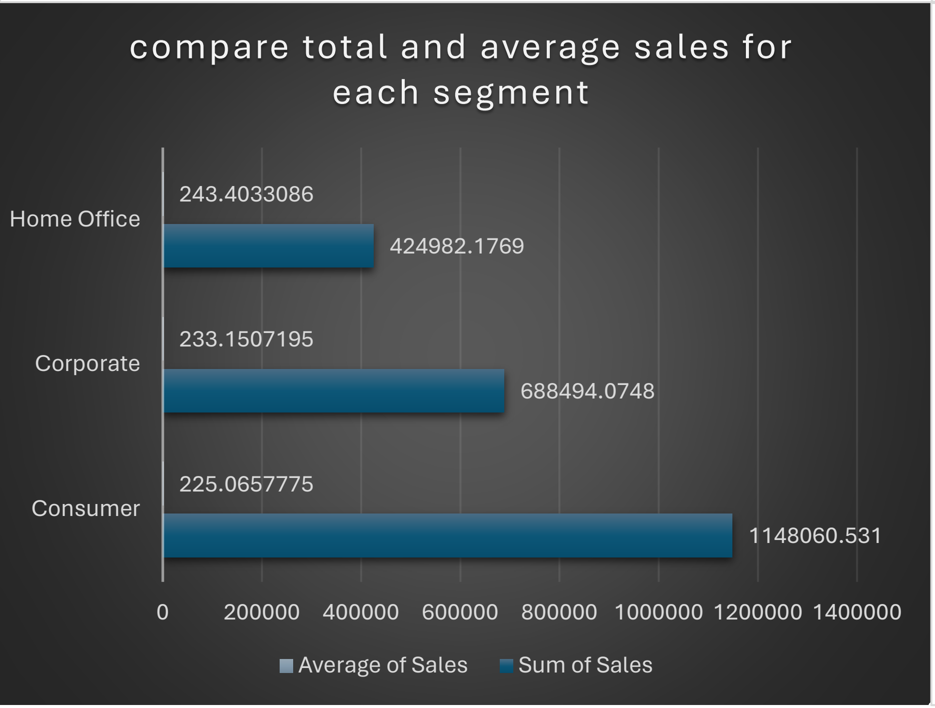
compare sales across different segments in each state



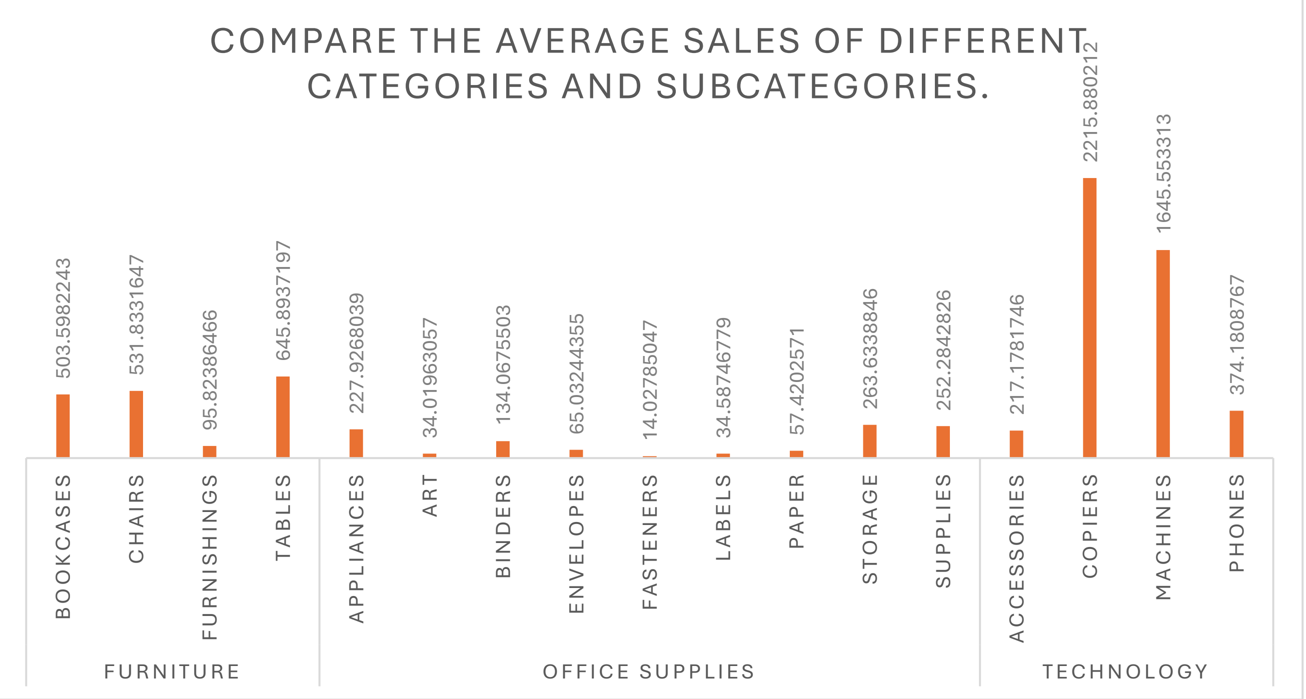
SOW THE DISTRIBUTION OF SALES AMONG DIFFERENT SEGMENTS



TOP-PERFORMING CATEGORY IN ALL THE STATES

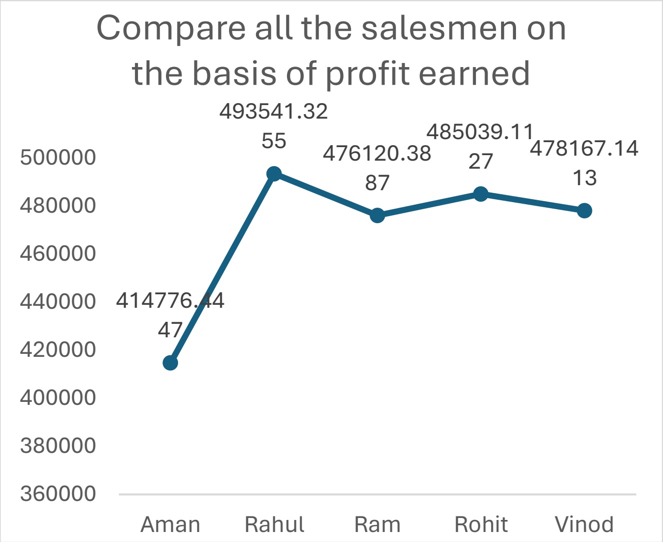


compare total and average sales for each segment

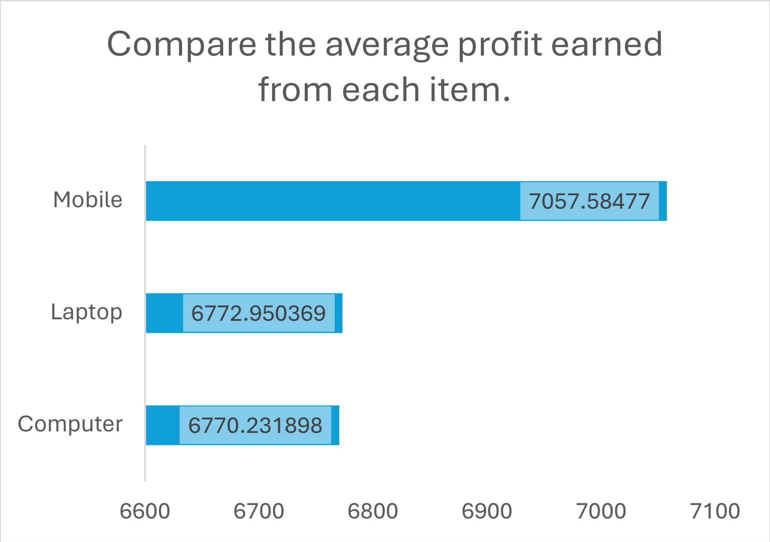


COMPARE THE AVERAGE SALES OF DIFFERENT CATEGORIES AND SUBCATEGORIES.

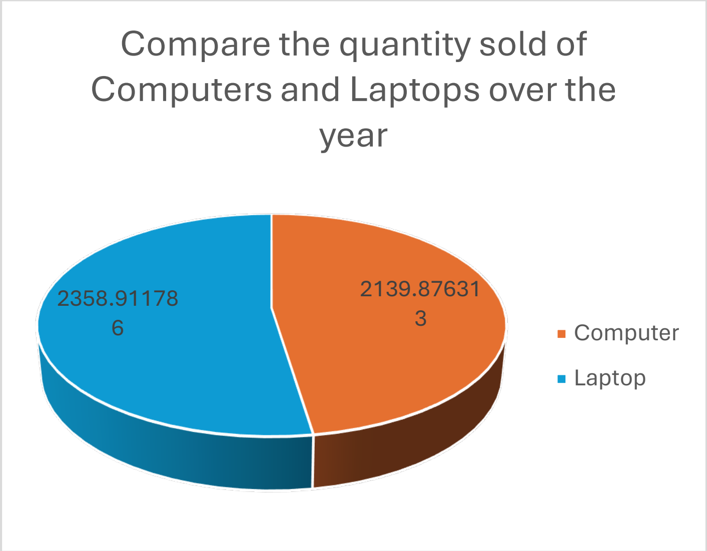
DASHBOARD OF SHOP SALES



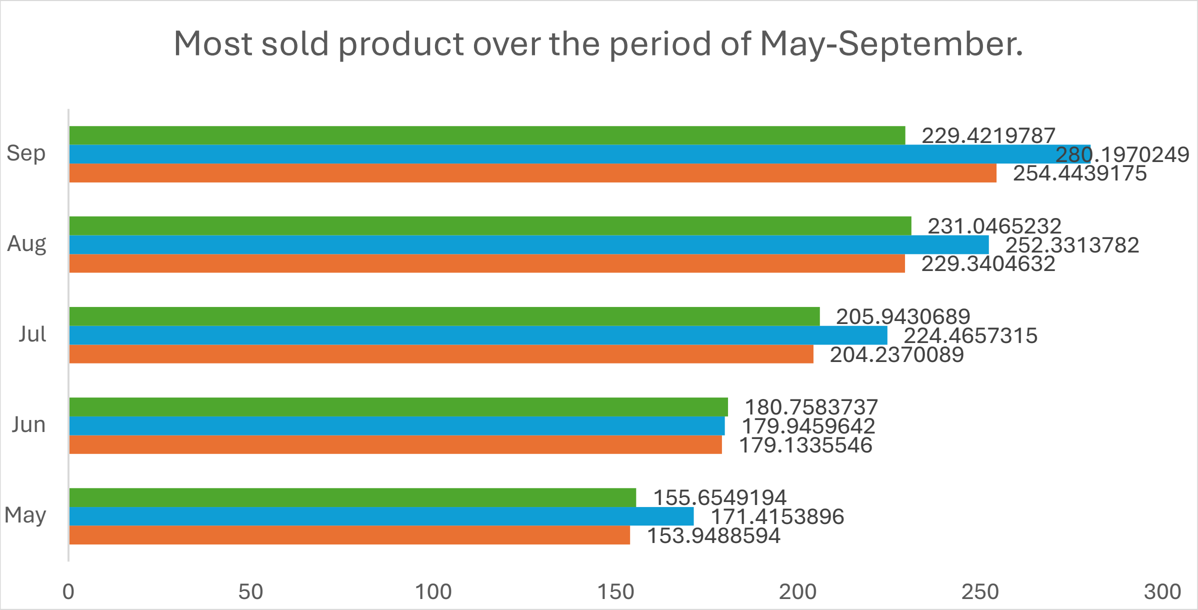
Compare all the salesmen on the basis of profit earned



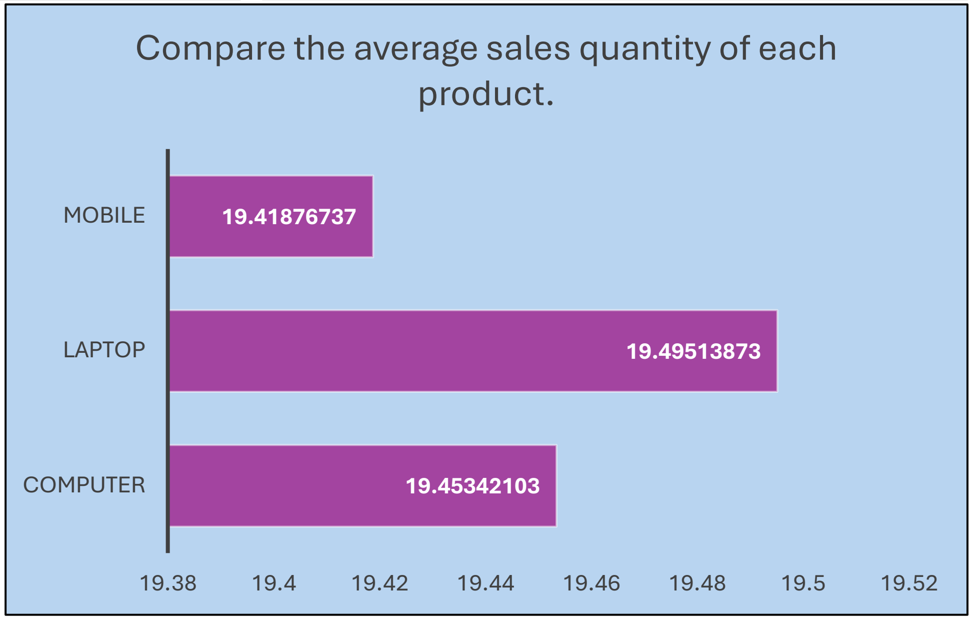
Compare the average profit earned from each item.



Compare the quantity sold of Computers and Laptops over the year

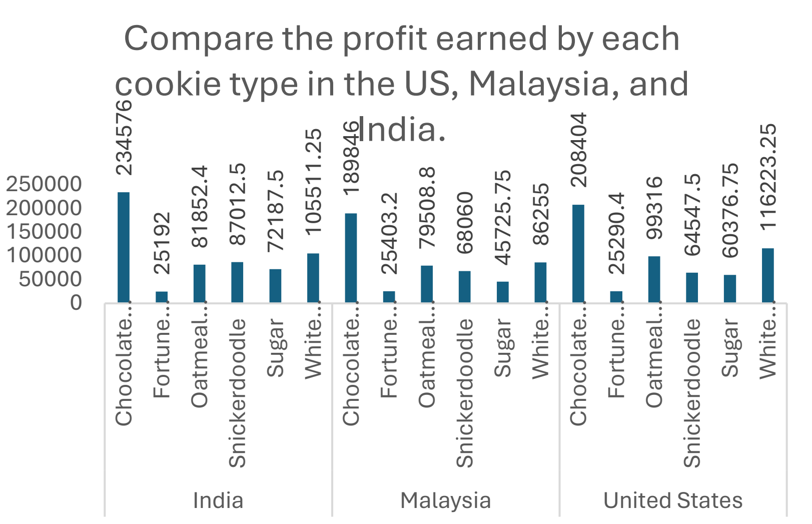


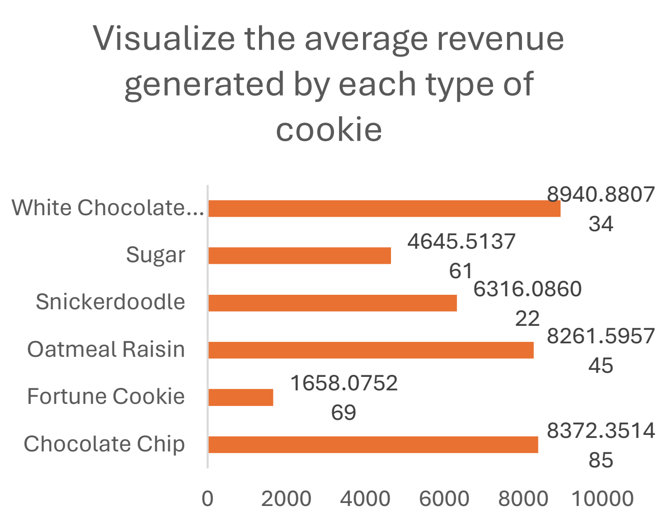
Most sold product over the period of May-September.

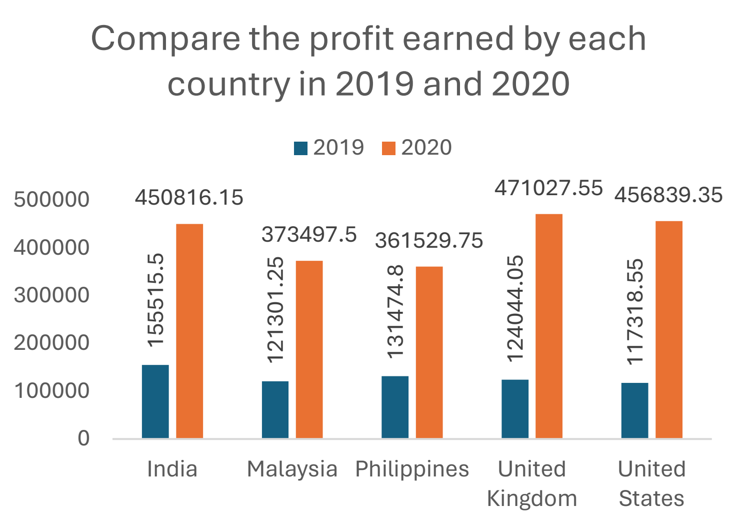


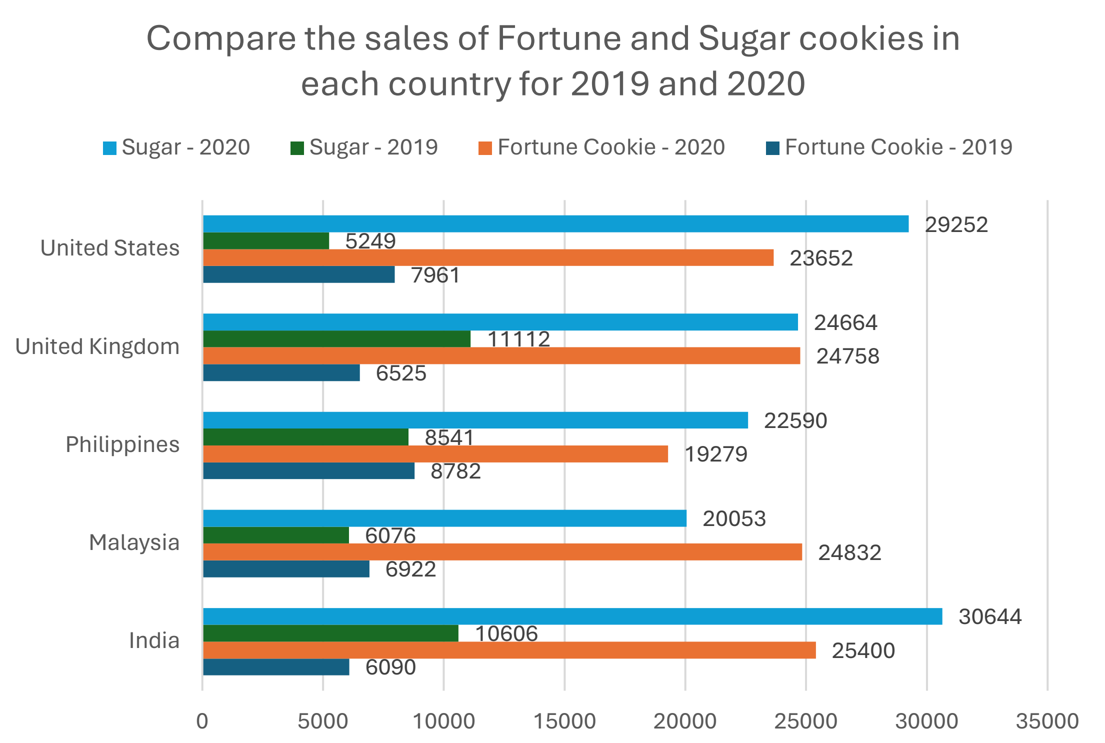
Compare the average sales quantity of each product.

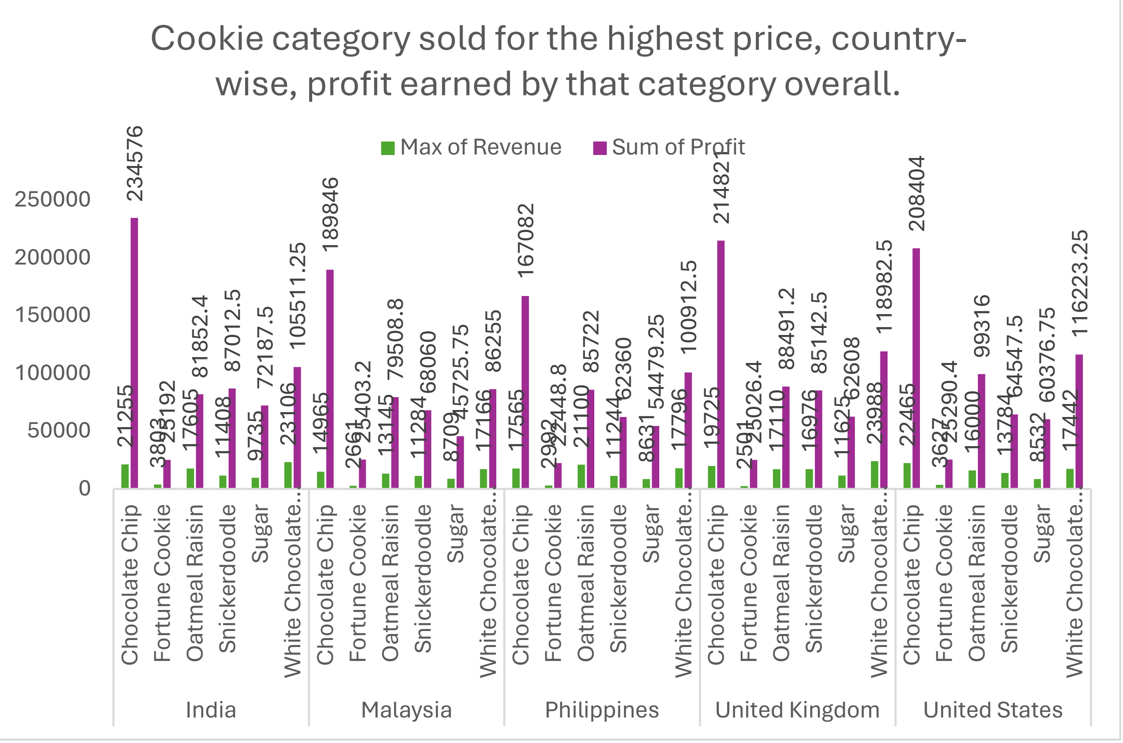
DASHBOARD OF COOKIE DATA


Compare the profit earned by each cookie type in the US, Malaysia, and India.


Visualize the average revenue generated by each type of cookie

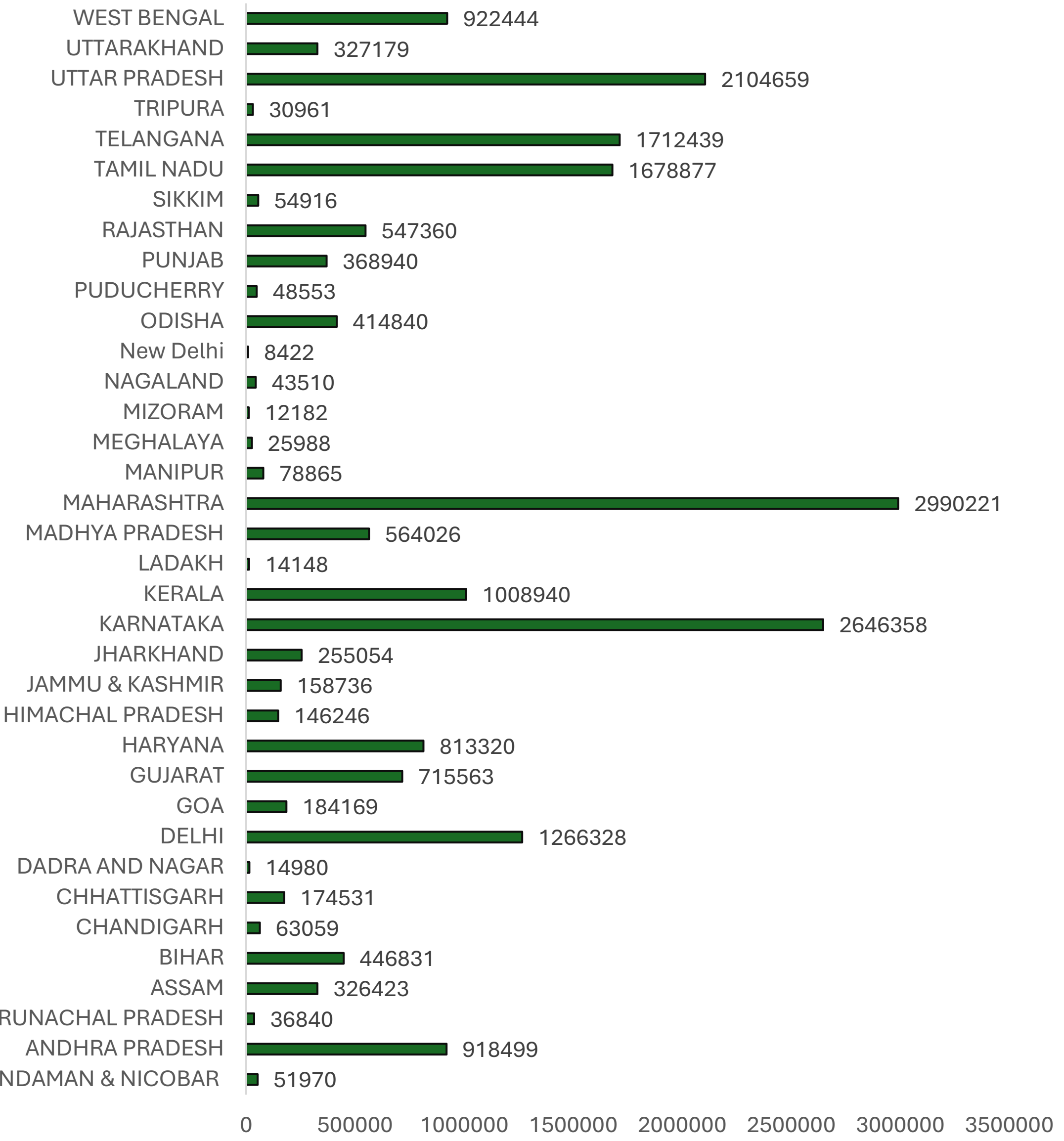

Compare the profit earned by each country in 2019 and 2020


Compare the sales of Fortune and Sugar cookies in each country for 2019 and 2020

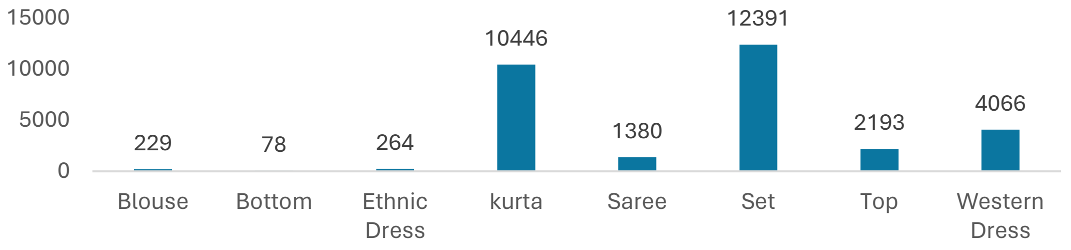

Cookie category sold for the highest price, country-wise, profit earned by that category overall.

DASHBOARD OF STORE DATA

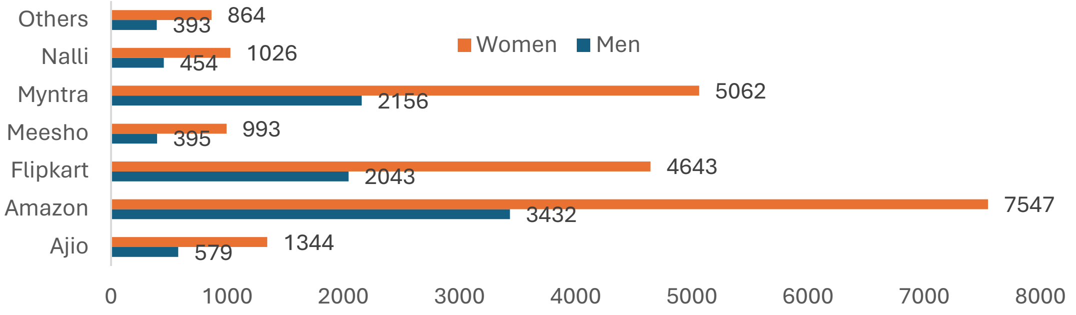
Compare the performance of Delhi, Tamil Nadu, Maharashtra, and Rajasthan from other states.



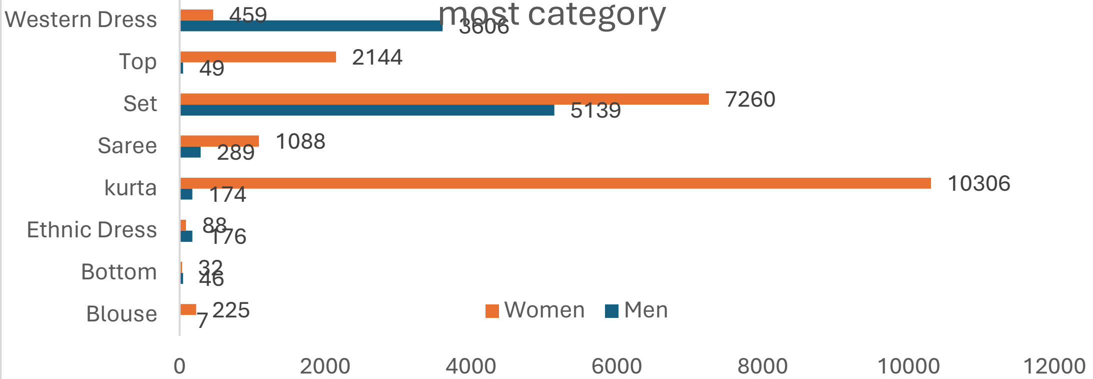
Compare all categories of orders where the amount is less than 1500 and greater than 5000



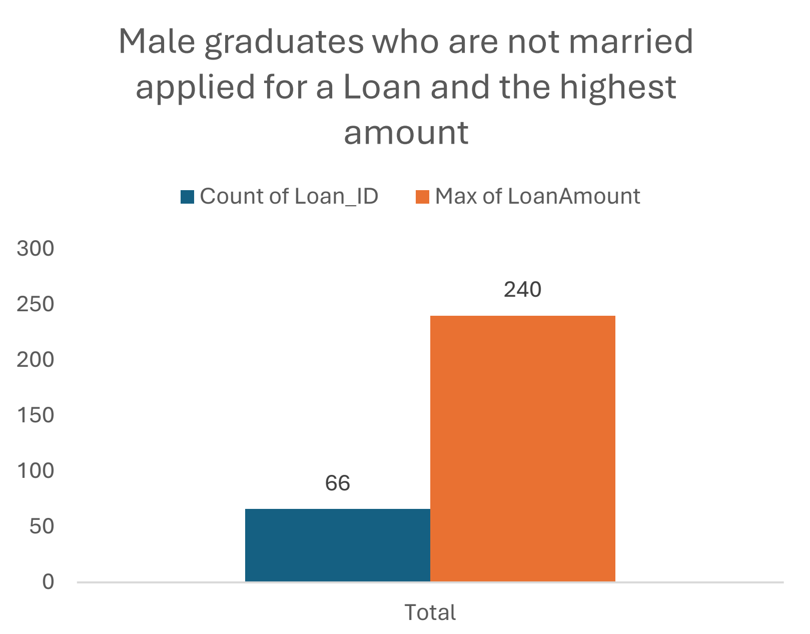
Compare various channels based on the number of male and female customers' orders

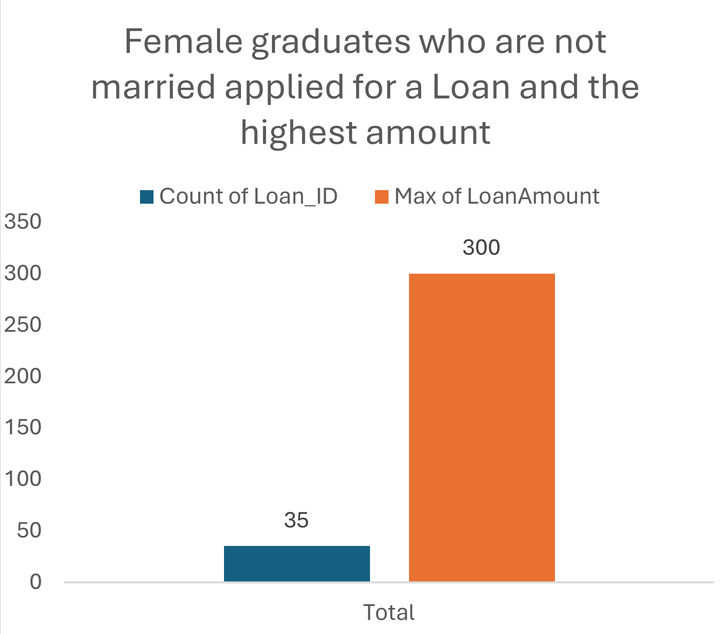


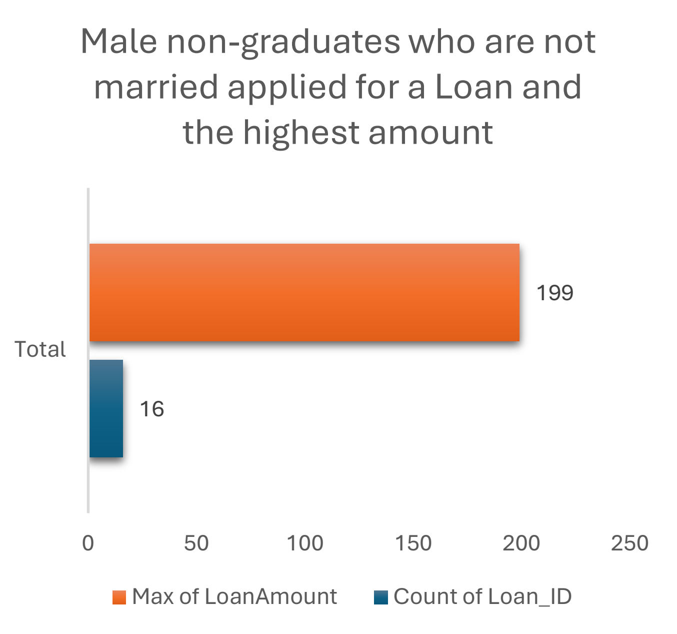
Compare various categories of items based on the most quantity sold and show which gender buys the most category

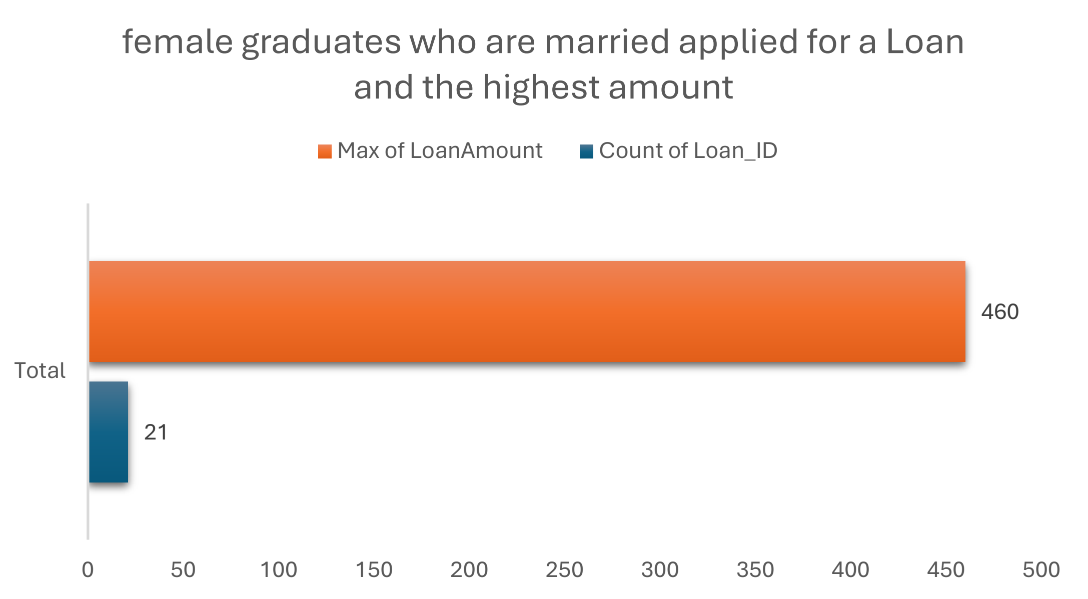


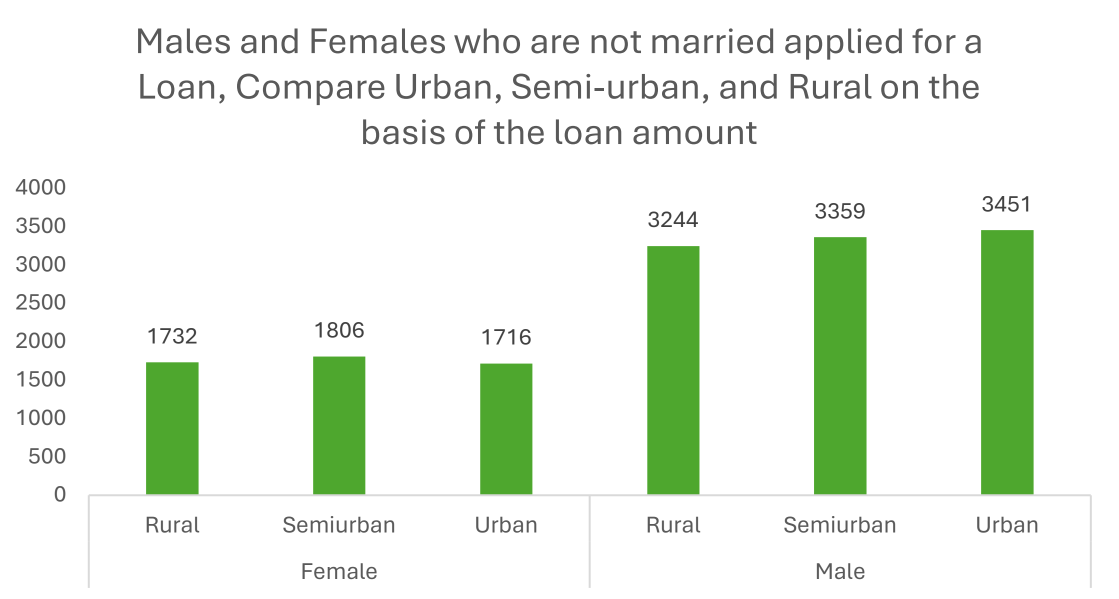
DASHBOARD OF LOAN DATA


Male graduates who are not married applied for a Loan and the highest amount

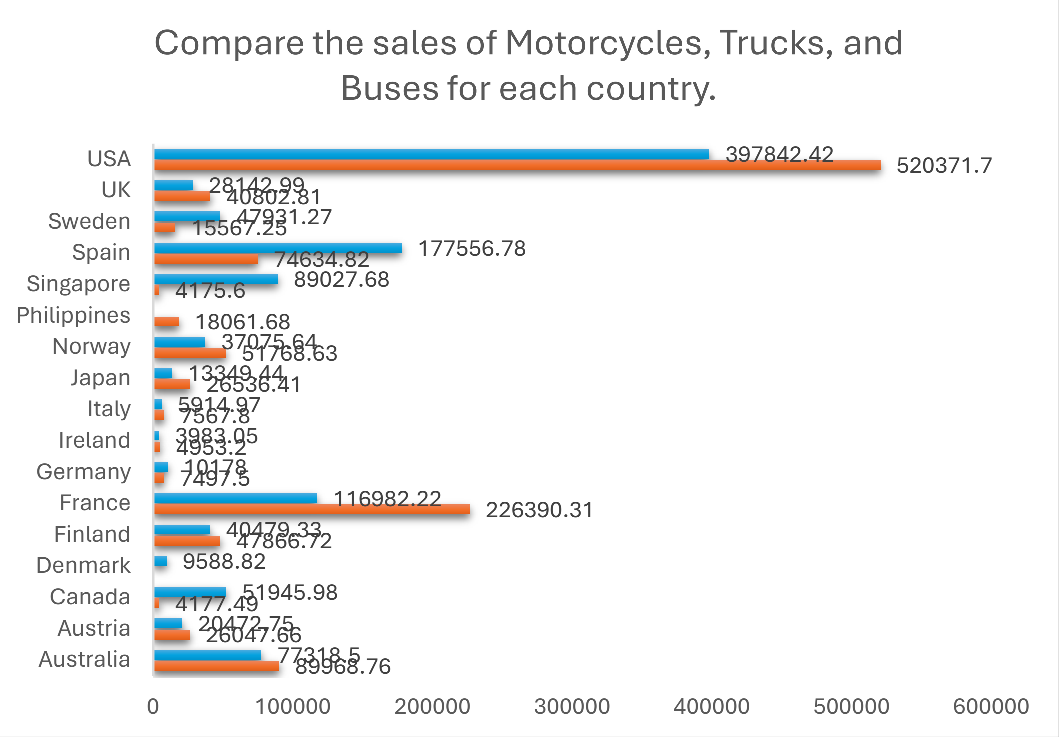

Female graduates who are not married applied for a Loan and the highest amount

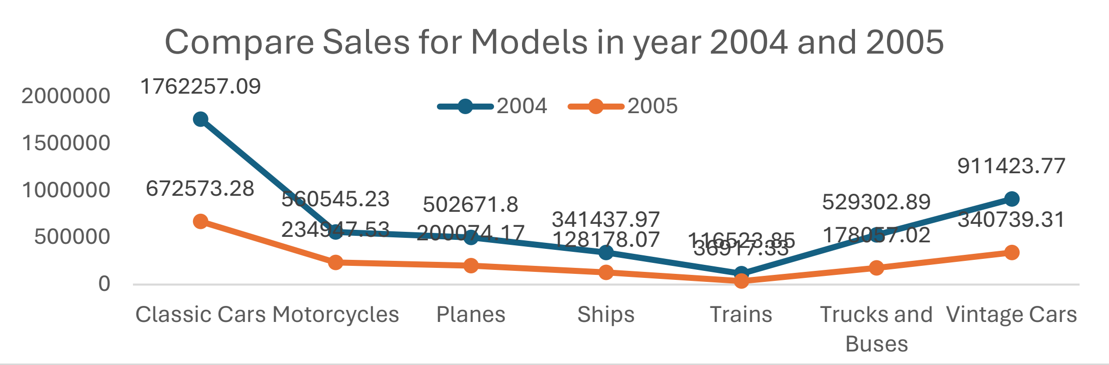

Male non-graduates who are not married applied for a Loan and the highest amount

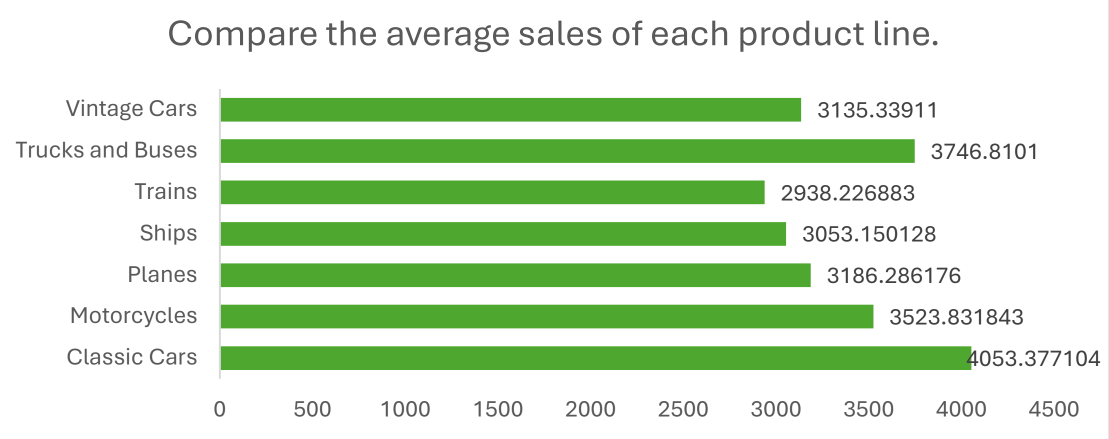

female graduates who are married applied for a Loan and the highest amount

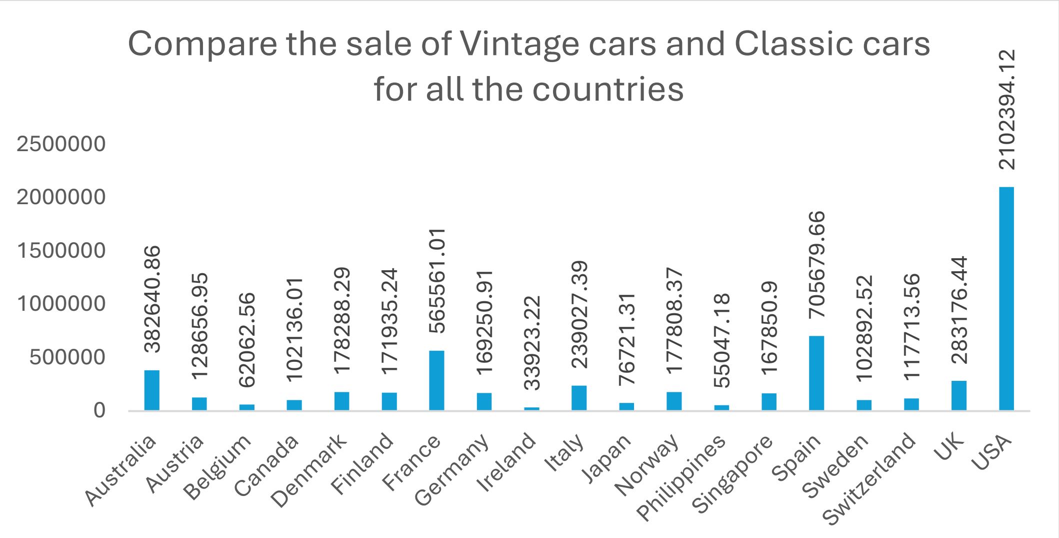

Males and Females who are not married applied for a Loan, Compare Urban, Semi-urban, and Rural on the basis of the loan amount

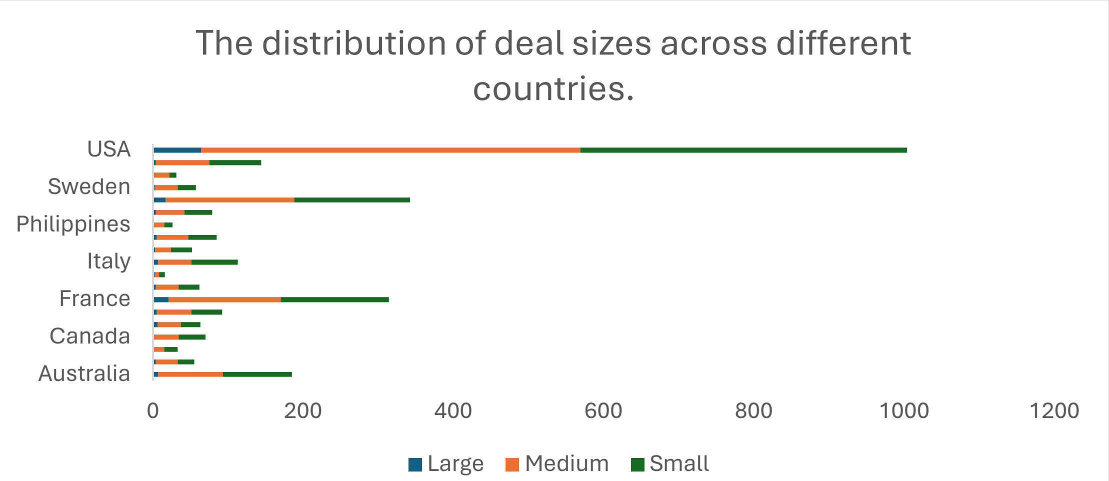
DASHBOARD OF SALES DATA SAMPLE


Compare the sales of Motorcycles, Trucks, and Buses for each country.


Compare Sales for Models in year 2004 and 2005


Compare the average sales of each product line.


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


The distribution of deal sizes across different countries.

Car Collection Data Report

Introduction

The Car Collection dataset offers a comprehensive look into various attributes of different car models, including their make, model, colour, mileage, price, and cost. In this report, we aim to analyse and derive insights from this dataset to aid decision-making processes related to car purchasing and understanding market trends the dataset contains the total of 6 cars with different models namely, Honda, Chevrolet, Nissan, Toyota, Dodge, Ford.

The primary intended audience for this report includes car enthusiasts, automotive industry professionals, analysts, and individuals interested in exploring trends within the car market. The scope of this report encompasses a detailed analysis of the dataset, including statistical analyses, visualizations, and interpretation of findings.

Throughout the analysis, we have posed several key questions and performed corresponding analyses to uncover insights.

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.

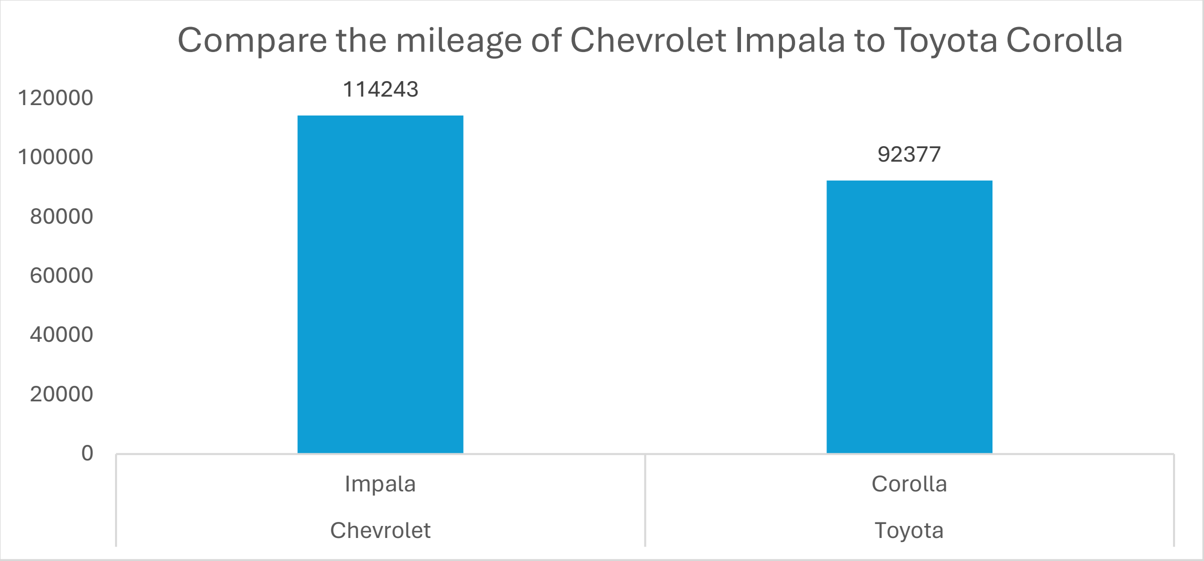
5. Find out all the cars, and their total cost which is more than $2000?

Analytics

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

This analysis compares the fuel efficiency (mileage) of two popular car models, Chevrolet Impala and Toyota Corolla. For performing this the dataset was filtered to isolate data and column chart was created And based on the analysis it was concluded that Chevrolet Impala(114243) provides better mileage compared to Toyota Corolla(92377).

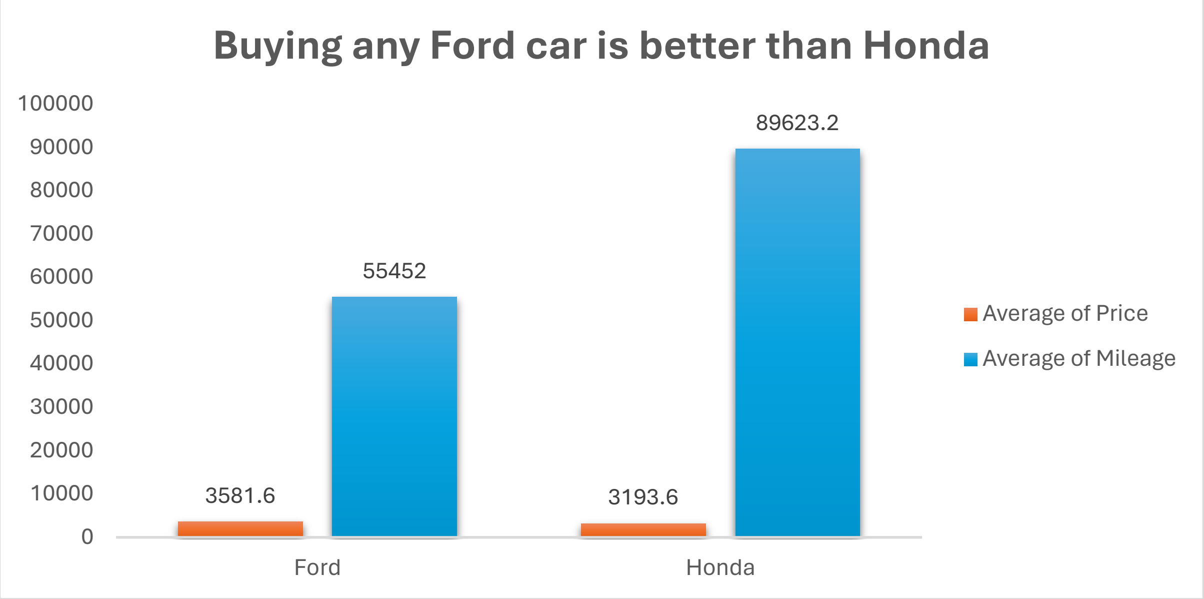
Average of Mileage		
Make	Model	Total
Chevrolet	Impala	114243
Chevrolet Total		114243
Toyota	Corolla	92377
Toyota Total		92377
Grand Total		101123.4



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

This analysis aims to provide justification for purchasing any Ford car over Honda by comparing their respective attributes, specifically focusing on price considerations.

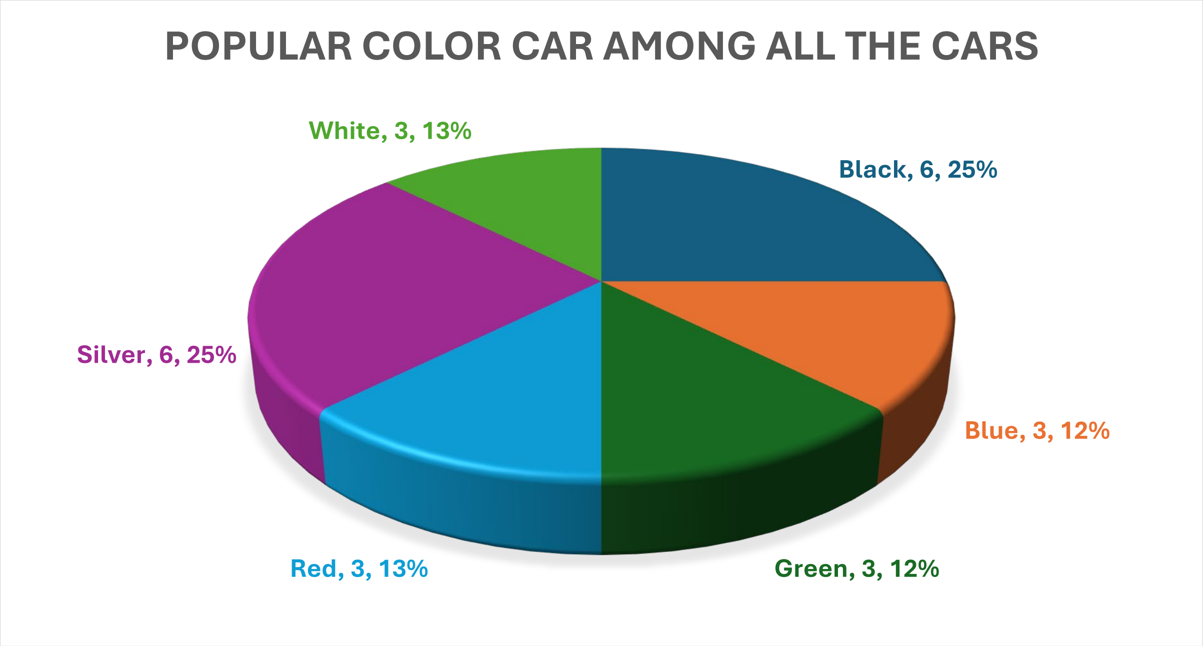
But, after the analysis performed on the dataset it was not justifying the statement rather the Honda cars have better average mileage(89623.3) and average price(3193.6) as compared to Ford cars.



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

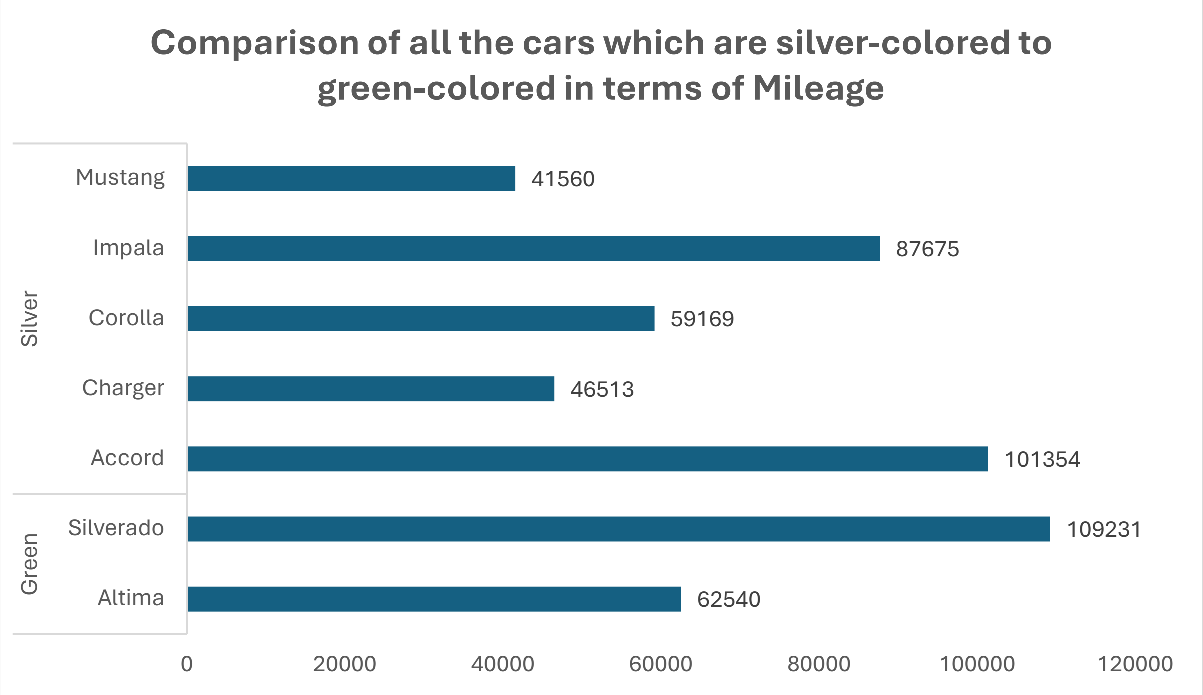
This analysis aims to identify the most popular and least popular car colors among all the cars in the dataset based on the count of the make.

The analysis showed that the most popular color of the cars are Black and White both having the 25% each of the making by company whereas the Green and Blue cars are at the least popular cars with both having the 12% of making.



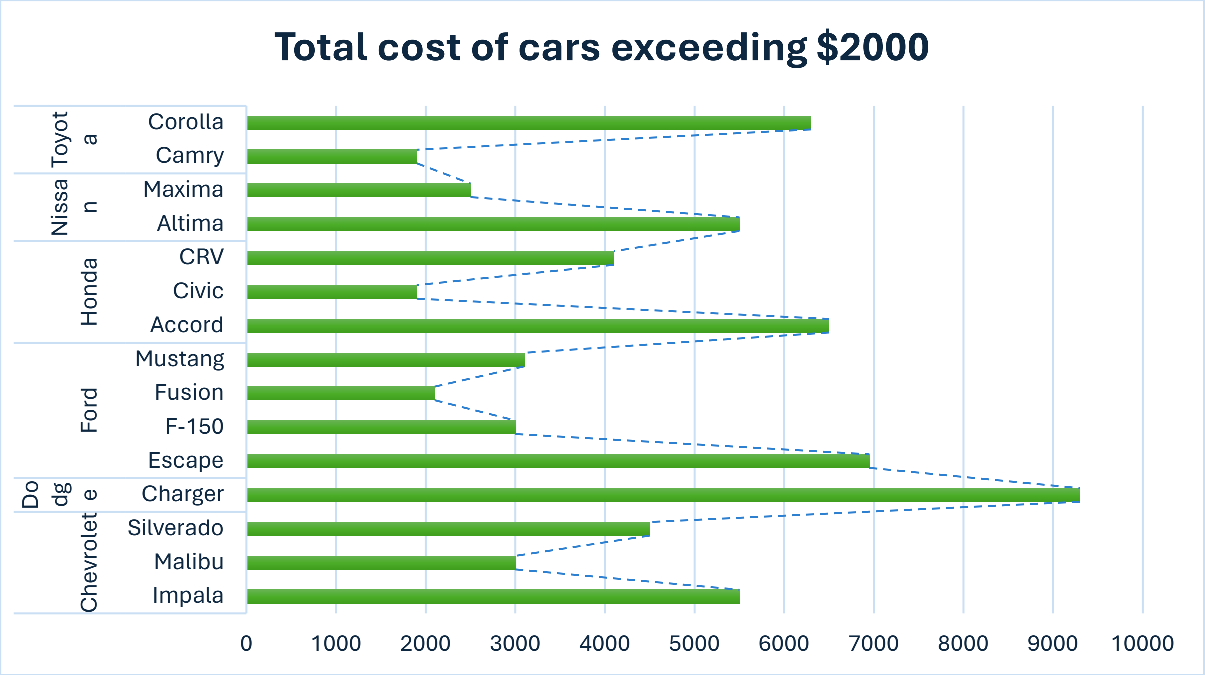
4. Compare all the cars which are of silver color to the green color in terms of Mileage.

This analysis aims to identify the cars which are of silver colour to the green colour in terms of mileage and the insights are there are 5 silver cars namely, Mustang, Impala, Corolla, Charger, Accord where Accord have the highest Average mileage among them which is 101354. And 2 green cars namely, Silverado and Altima where Silverado had the highest mileage of 109231.



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

This analysis aims to find out the car’s costs more than $2000. And by using bar graph and taking value as sum of cost it shows the desired result. The total grand cost of all cars exceeding $2000 is $66150.



Conclusion and Review

Comparison: The analysis comparing the mileage of Chevrolet Impala and Toyota Corolla revealed that Chevrolet Impala provides better fuel efficiency.

Ford vs. Honda Comparison: Contrary to the initial assumption, the analysis did not support the claim that Ford cars are better than Honda cars in terms of mileage and price. Honda cars were found to have better average mileage and price compared to Ford cars.

Popular Car Colors: The analysis identified Black and White as the most popular car colors, each comprising 25% of the car production. Conversely, Green and Blue were found to be the least popular colors, each accounting for only 12% of car production.

Silver vs. Green Cars Comparison: Among silver-colored cars, Accord exhibited the highest average mileage, while Silverado had the highest mileage among green-colored cars.

Cars Costing more than $2000: The analysis determined that the total cost of cars exceeding $2000 amounted to $66150.

The analysis provided valuable insights into various aspects of the dataset, including mileage comparisons, car color popularity, and cost considerations. However, there were discrepancies between the initial assumptions and the findings, particularly in the comparison between Ford and Honda cars. The analysis was thorough and utilized appropriate visualizations, such as column charts and bar graphs, to present the findings effectively. Overall, the report offers valuable information for car buyers, industry professionals, and researchers interested in understanding trends within the car market. However, it's important to note the limitations of the analysis, such as the dataset's completeness and the need for further exploration into other factors influencing car purchasing decisions.

Regression

The Regression Analysis table provides insights into the relationship between the dependent variable (Mileage) and the independent variables (Cost and Price) in the Car Collection Dataset. The analysis indicates a strong positive correlation (Multiple R = 0.962639) between the variables, with approximately 92.67% of the variance in Mileage explained by Cost and Price (R Square = 0.926673). Both Cost and Price have statistically significant effects on Mileage, as evidenced by their coefficients and low p-values. Specifically, Price demonstrates a stronger impact on Mileage compared to Cost. The ANOVA table further confirms the overall significance of the regression model, with a small p-value (1.22E-12) for the F-statistic. Overall, the regression analysis suggests that both Cost and Price play significant roles in determining Mileage in the car collection dataset.

Regression Statistics	
Multiple R	0.962639
R Square	0.926673
Adjusted R Square	0.91969
Standard Error	259.2716
Observations	24

ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	2	17839897	8919948	132.6943	1.22E-12			
Residual	21	1411657	67221.78					
Total	23	19251554						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	441.3528	288.7848	1.52831	0.141359	-159.208	1041.914	-159.208	1041.914
X Variable 1	-0.00058	0.001699	-0.34395	0.734304	-0.00412	0.002949	-0.00412	0.002949
X Variable 2	1.038413	0.070492	14.73084	1.52E-12	0.891816	1.18501	0.891816	1.18501

Anova: one factor

In the Single Factor ANOVA table, there are three groups: Mileage, Cost, and Price. For the Mileage group, there are 24 observations, with a sum of 2011267, an average of 83802.79, and a variance of 1.21E+09. Similarly, for the Cost group, there are 24 observations, with a sum of 66150, an average of 2756.25, and a variance of 705502.7. For the Price group, there are also 24 observations, with a sum of 78108, an average of 3254.5, and a variance of 837024.1.

The ANOVA section assesses the differences in means among the levels of the single factor variable (Mileage, Cost, and Price). The Between Groups SS (Sum of Squares) is 1.04E+11 with 2 degrees of freedom (df) and a Mean Squares (MS) of 5.22E+10. This indicates significant variation among the group means. The F-statistic is 128.8822, with a p-value of 5E-24, which is much lower than the typical significance level of 0.05, suggesting a highly significant difference in means among the groups. The Within Groups SS is 2.8E+10 with 69 df. The Total SS is 1.32E+11.

Anova: Single Factor						
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Mileage	24	2011267	83802.79	1.21E+09		
Cost	24	66150	2756.25	705502.7		
Price	24	78108	3254.5	837024.1		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	1.04E+11	2	5.22E+10	128.8822	5E-24	3.129644
Within Groups	2.8E+10	69	4.05E+08			
Total	1.32E+11	71				

Anova: two factor

In the Two Factor ANOVA table, there are two factors: Rows and Columns, with respective levels of Mileage, Cost, and Price. The summary section provides the count, sum, average, and variance for each row and column combination. For example, Row 1 represents Mileage with a count of 3, a sum of 70512, an average of 23504, and a variance of 1.2E+09. Similarly, Row 2 represents Cost with a count of 3, a sum of 99635, an average of 33211.67, and a variance of 2.88E+09.

The ANOVA section assesses the sources of variation in the data. The Rows SS (Sum of Squares) is 8.95E+09 with 23 degrees of freedom (df) and a Mean Squares (MS) of 3.89E+08. The Columns SS is 1.04E+11 with 2 df and an MS of 5.22E+10. Both Rows and Columns have p-values greater than 0.05, indicating that neither Rows nor Columns have a significant effect on the observed variances. The Error SS is 1.9E+10 with 46 df. The Total SS is 1.32E+11.

SUMMARY	*Count*	*Sum*	*Average*	*Variance*		
Row 1	3	70512	23504	1.2E+09		
Row 2	3	99635	33211.67	2.88E+09		
Row 3	3	104854	34951.33	3.31E+09		
Row 4	3	79104	26368	1.77E+09		
Row 5	3	76673	25557.67	1.47E+09		
Row 21	3	47301	15767	5.38E+08		
Row 22	3	42702	14234	3.19E+08		
Row 23	3	66425	22141.67	9.74E+08		
Row 24	3	140665	46888.33	6.06E+09		
Mileage	24	2011267	83802.79	1.21E+09		
Cost	24	66150	2756.25	705502.7		
Price	24	78108	3254.5	837024.1		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Rows	8.95E+09	23	3.89E+08	0.941208	0.549982	1.766805
Columns	1.04E+11	2	5.22E+10	126.3564	2.05E-19	3.199582
Error	1.9E+10	46	4.13E+08			
Total	1.32E+11	71				

Descriptive Statistics

The descriptive statistics provide key metrics for the variables Mileage, Cost, and Price. For Mileage, the mean is 83802.79 with a standard error of 7112.652. The median is 81142, and the standard deviation is 34844.74, indicating a moderate spread of data around the mean. The range is 105958, with the minimum mileage recorded at 34853 and the maximum at 140811. The skewness is positive (0.386522), indicating a slight right skew in the distribution, while the kurtosis (-1.09718) suggests a relatively flat distribution.

For Cost, the mean is 2756.25 with a standard error of 171.4525. The median is 2750, and the standard deviation is 839.9421. The range is 3000, with the minimum cost at 1500 and the maximum at 4500. The skewness is positive (0.473392), indicating a slight right skew, and the kurtosis (-0.81266) suggests a relatively flat distribution.

For Price, the mean is 3254.5 with a standard error of 186.7512. The median is 3083, and the standard deviation is 914.8902. The range is 2959, with the minimum price at 2000 and the maximum at 4959. The skewness is positive (0.272019), indicating a slight right skew, and the kurtosis (-1.20291) suggests a relatively flat distribution. Overall, these statistics provide insights into the central tendency, variability, and distribution shape of the data for each variable.

Mileage		*Cost*		*Price*	
Mean	83802.79	Mean	2756.25	Mean	3254.5
Standard Error	7112.652	Standard Error	171.4525	Standard Error	186.7512
Median	81142	Median	2750	Median	3083
Mode	#N/A	Mode	3000	Mode	#N/A
Standard Deviation	34844.74	Standard Deviation	839.9421	Standard Deviation	914.8902
Sample Variance	1.21E+09	Sample Variance	705502.7	Sample Variance	837024.1
Kurtosis	-1.09718	Kurtosis	-0.81266	Kurtosis	-1.20291
Skewness	0.386522	Skewness	0.473392	Skewness	0.272019
Range	105958	Range	3000	Range	2959
Minimum	34853	Minimum	1500	Minimum	2000
Maximum	140811	Maximum	4500	Maximum	4959
Sum	2011267	Sum	66150	Sum	78108
Count	24	Count	24	Count	24

Correlation

The correlation coefficient between Cost and Price is -0.41106, indicating a moderate negative linear relationship between the two variables. This suggests that as the cost increases, the price tends to decrease, and vice versa. However, the strength of this correlation is moderate, meaning that the relationship is not extremely strong.

	Cost	*Price*
Cost	1	
Price	-0.41106	1

Order Data Report

Introduction

This report delves into a comprehensive dataset capturing sales transactions within the automotive industry, encompassing various attributes such as Order ID, Order Date, Ship Date, Customer Details, Product Information, and Sales Figures. The primary objective of this analysis is to glean actionable insights to inform decision-making processes and drive business growth within the automotive sector. By examining sales data across different US states, segments, categories, and sub-categories, this report aims to identify key trends, top-performing segments, and areas of potential growth. Insights derived from this analysis will be invaluable for automotive industry stakeholders, including sales managers, marketers, and executives, seeking to optimize sales strategies, enhance customer satisfaction, and maximize revenue.

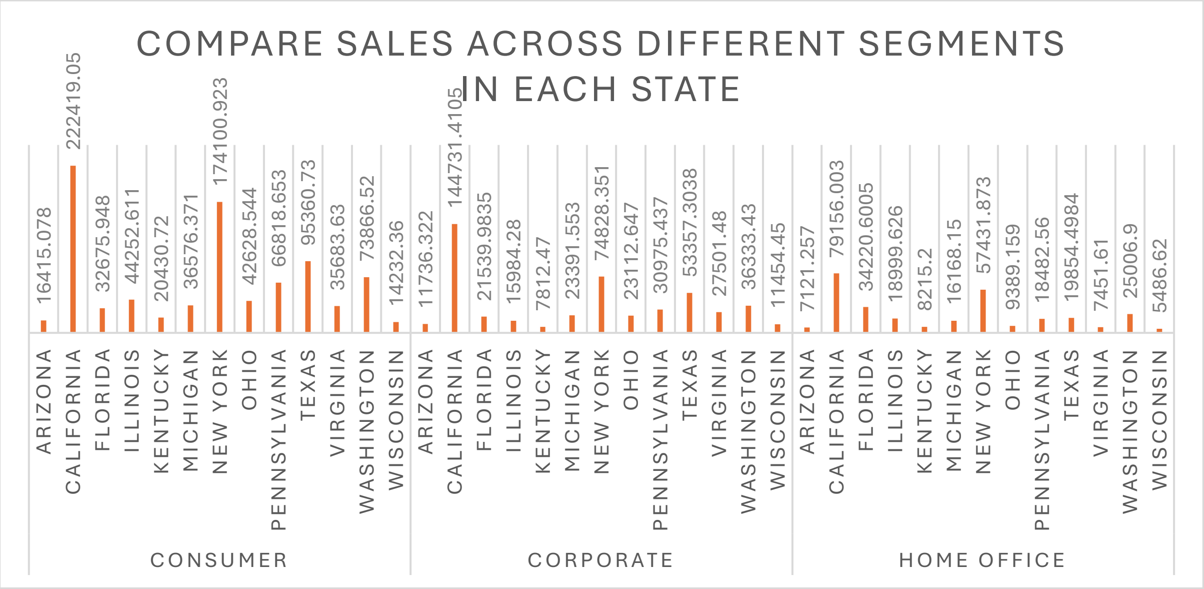
Questionnaire

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 the most sales in the US, California, Texas, and Washington?
4. Compare total and average sales for all different segments?
5. Compare the average sales of different categories and subcategory of all the states.

Analytics

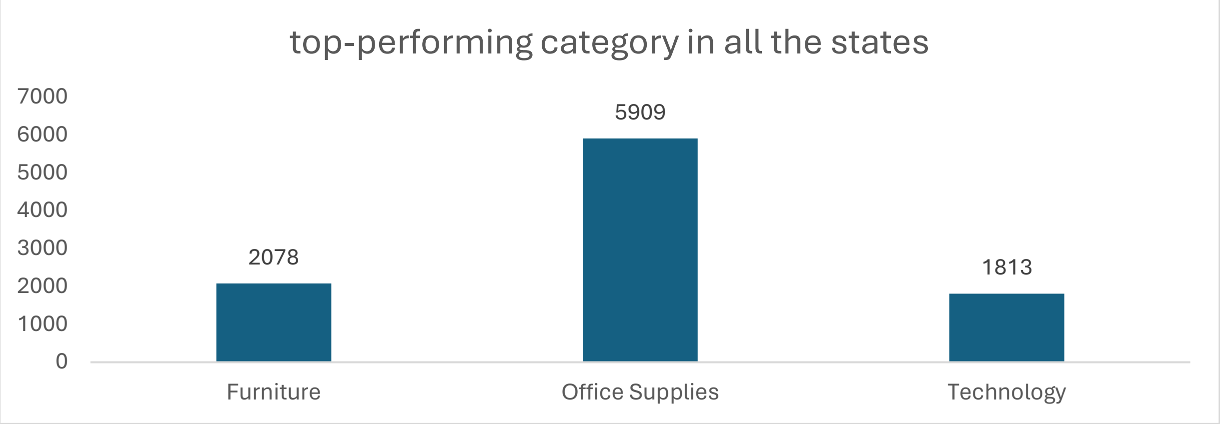
1.Compare all the US states in terms of Segment and Sales. Which Segment performed well in all the states?

After comparing all the states in terms of segment and sales , California(222419.05) emerged as the state with the highest number of sales. Consumer(1148060.531) segment performed well in all the states.



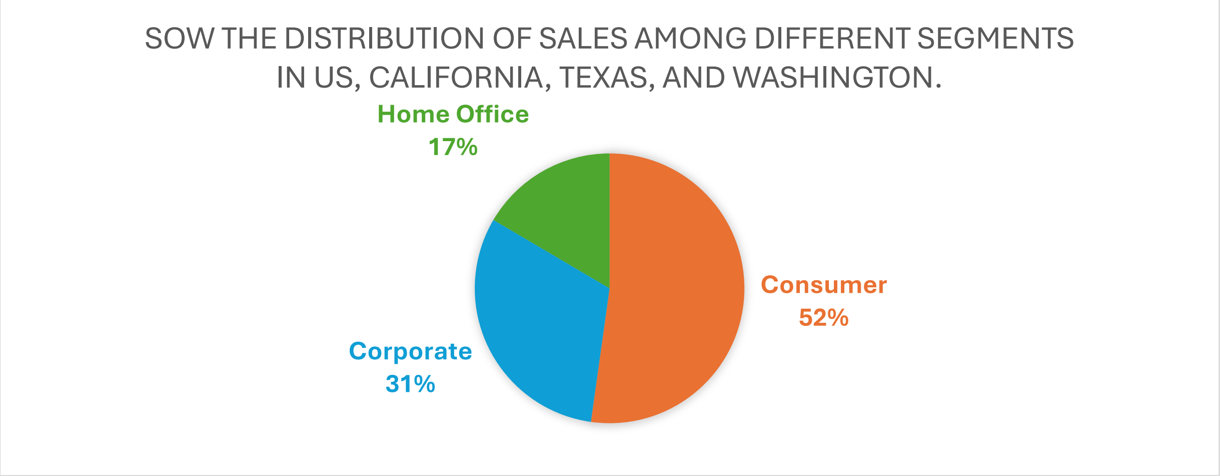
2. Find out top performing category in all the states?

Office Supplies is the top performing category in all the states with total count of sales of 5909 followed by furniture(2078) and technology(1813).



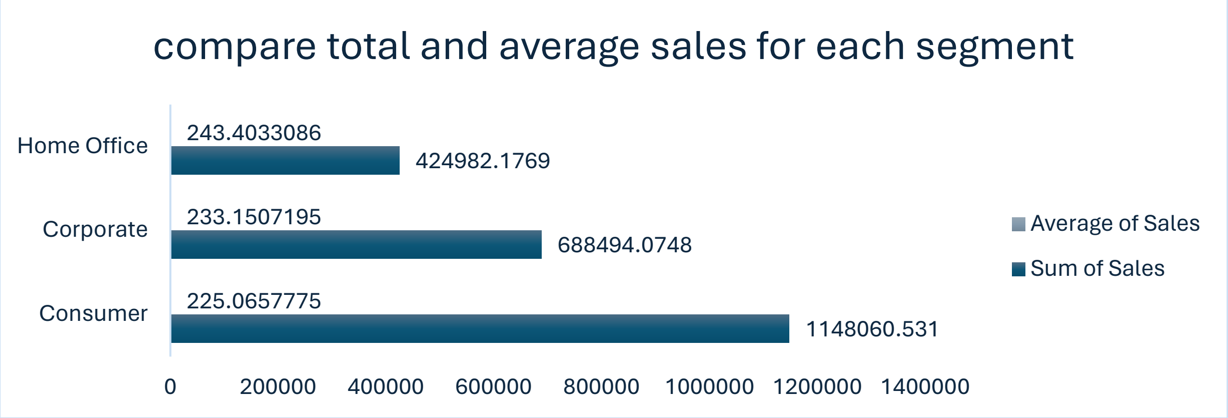
3. Which segment has most sales in US, California, Texas, and Washington?

Filtering the states for the total sales count and showing the percentage of distribution through pie chart. The consumer segment has the most sales in US, California, Texas, and Washington**.**



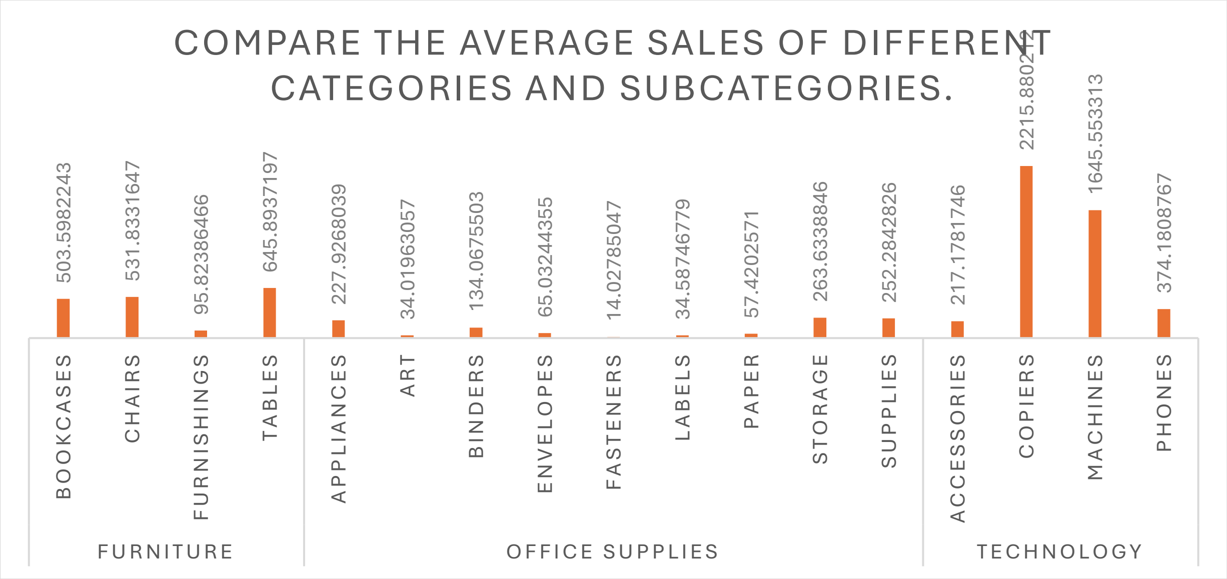
4. Compare total and average sales for all different segments?

It is clearly visible that the consumer segment has higher average sales with 1148060.531 and home office segment has higher total sales of 243.40 followed by Corporate(233.1507195).



5. Compare average sales of different categories and subcategory of all the states.

The analysis shows the average sales for the 3 categories having multiple subcategories, the categories are Furniture, Office Supplies, Technology.



Conclusion and Review

The analysis of sales data within the automotive industry reveals several key findings. California emerges as the top-performing state in terms of sales volume, with the Consumer segment demonstrating strong performance across all states. Office Supplies emerges as the top-performing category, followed by Furniture and Technology, indicating consumer preferences. The Consumer segment consistently dominates sales across the US, particularly in California, Texas, and Washington.

Additionally, the analysis highlights the higher average sales of the Consumer segment compared to the Home Office segment. Overall, these insights provide valuable guidance for optimizing sales strategies, improving customer engagement, and driving business success within the automotive industry.

Regression

In this regression analysis for the Order dataset, there is almost no relationship between Order ID and Sales, as indicated by the very low multiple R and R-squared values (0.000434 and 1.88E-07, respectively). The coefficient for Order ID is not statistically significant, with a p-value of 0.965747. This suggests that Order ID does not predict Sales. Similarly, the ANOVA test confirms the lack of significance, with an F-statistic p-value of 0.965747.

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.000434
R Square	1.88E-07

Adjusted R Square	-0.0001
Standard Error	625.334
Observations	9789

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	721.1637	721.1637	0.001844	0.965747
Residual	9787	3.83E+09	391042.6		
Total	9788	3.83E+09			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	230.5863	12.63999	18.24261	3.83E-73	205.8093	255.3633	205.8093	255.3633
X Variable 1	-9.6E-05	0.002235	-0.04294	0.965747	-0.00448	0.004286	-0.00448	0.004286

Descriptive Statistics

In the Sales dataset, the mean sales amount is 230.1162, with a standard error of 6.320053. The median sales value is 54.384, while the mode is 12.96. The standard deviation is 625.3021, indicating considerable variability in sales amounts. The data is highly positively skewed, with a skewness value of 13.05363, and exhibits high kurtosis at 307.3056, indicating heavy-tailed distribution. The range of sales values spans from 0.444 to 22638.48, with a total sum of 2252607 across 9789 observations.

Sales	
Mean	230.1162
Standard Error	6.320053
Median	54.384
Mode	12.96
Standard Deviation	625.3021
Sample Variance	391002.7
Kurtosis	307.3056
Skewness	13.05363
Range	22638.04
Minimum	0.444
Maximum	22638.48
Sum	2252607
Count	9789

Cookie Data Report

Introduction

In our cookie data set cookies—specifically six types: Chocolate Chip, Fortune Cookie, Sugar, oatmeal Raisin, Snickerdoodle, and White chocolate macadamia Nut. We've got a treasure trove of data on these cookies, covering how many units were sold, their costs, the money they brought in (revenue), and the profits they made. And we're not just looking at one place or time; we're exploring different countries and dates to see how things vary. This report isn't just about cookies; it's about understanding what people like, how much they're willing to pay, and where these treats are most popular. So, get ready to uncover some fascinating insights into the cookie world and what it means for businesses like yours.

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?

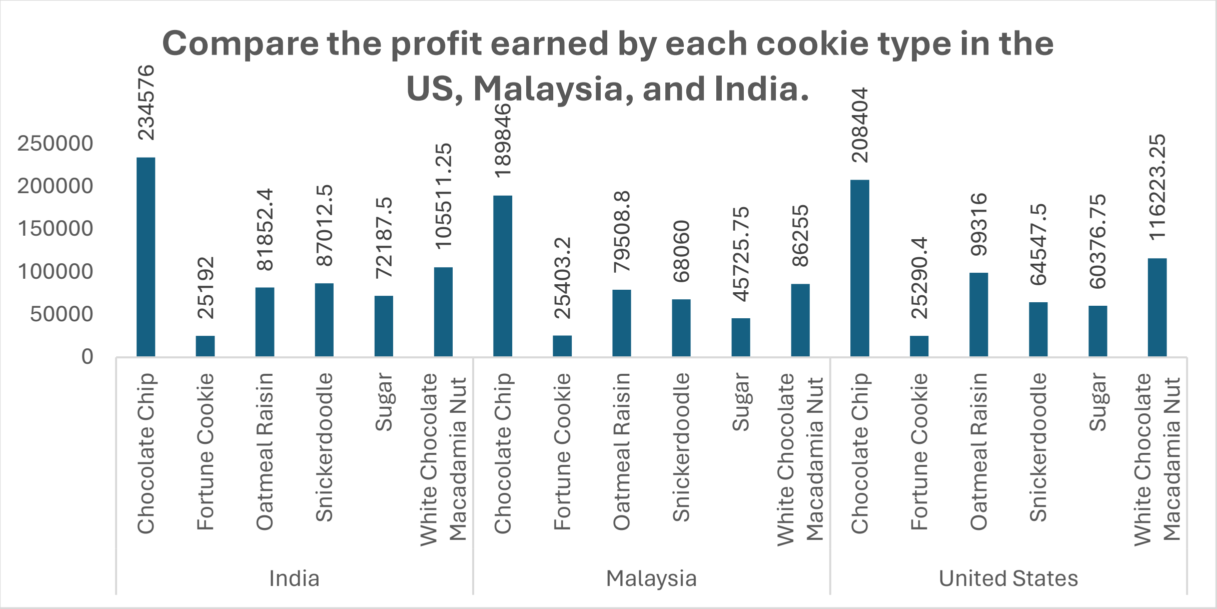
4. Compare the performance of all the countries for the year 2019 to 2020. Which country perform in each of these years?

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

Analytics

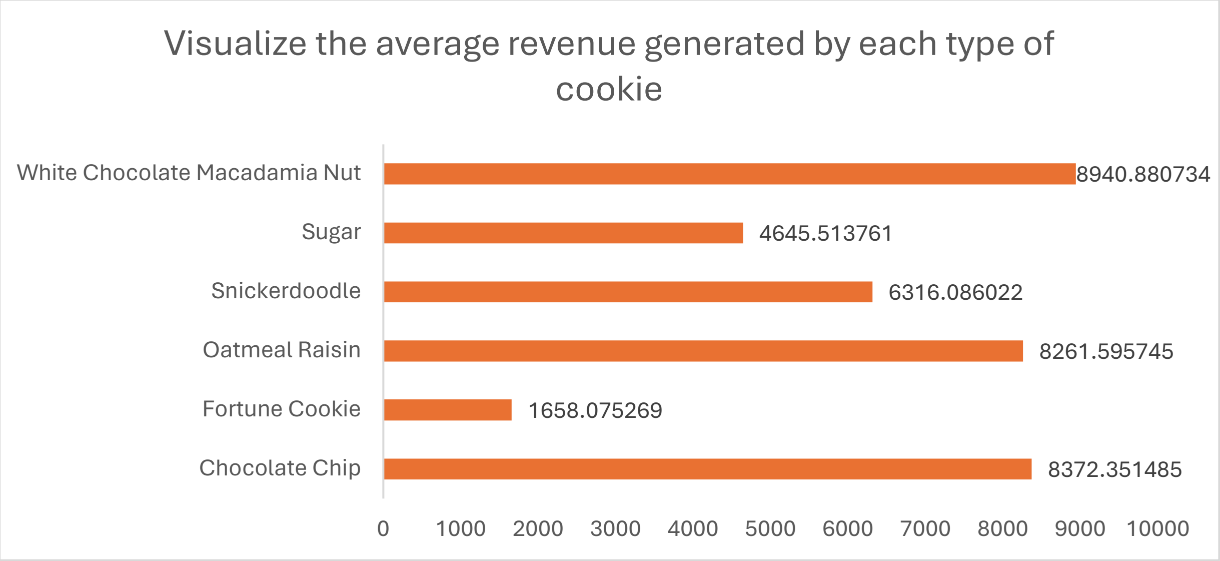
1. Compare the profit earn by all cookie types in US, Malaysia, and India.

This analysis compares the profit earned by all cookie types in US, Malaysia, and India. Max profit earned by India for chocolate chip followed by Malaysia and United States for the same.



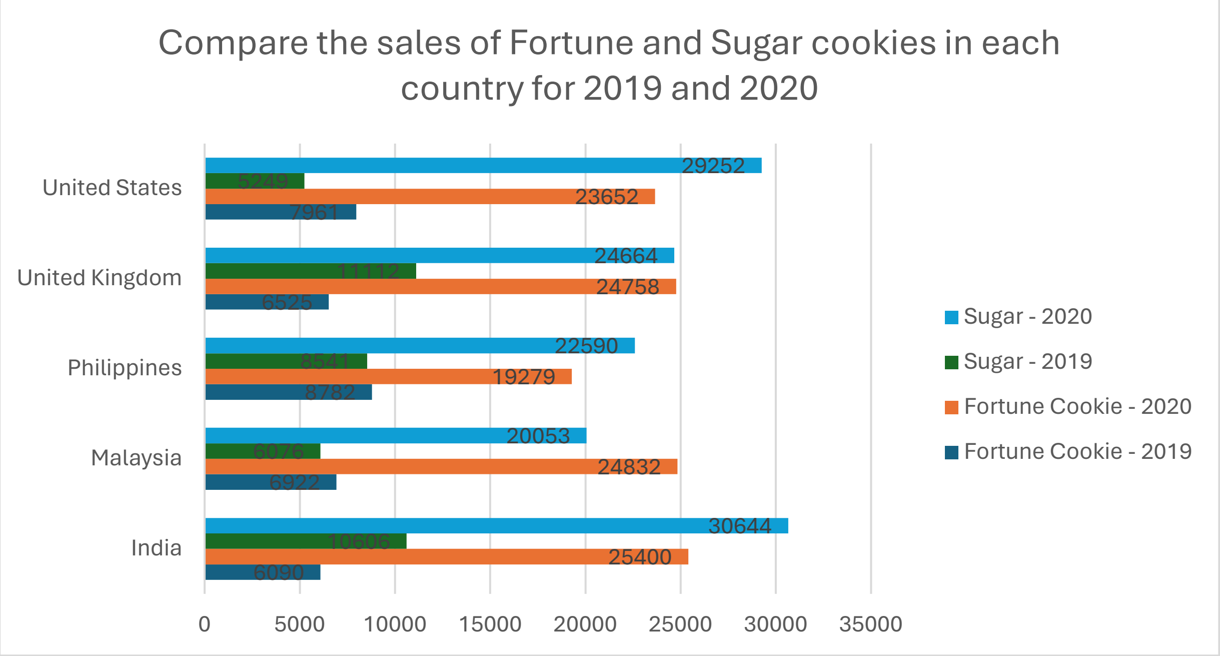
2. What is the average revenue generated by different types of cookies?

This analysis aims to provide average revenue generated and it’s visible that white chocolate macadamia nut with average revenue generate is 8940.88 followed by chocolate chip.



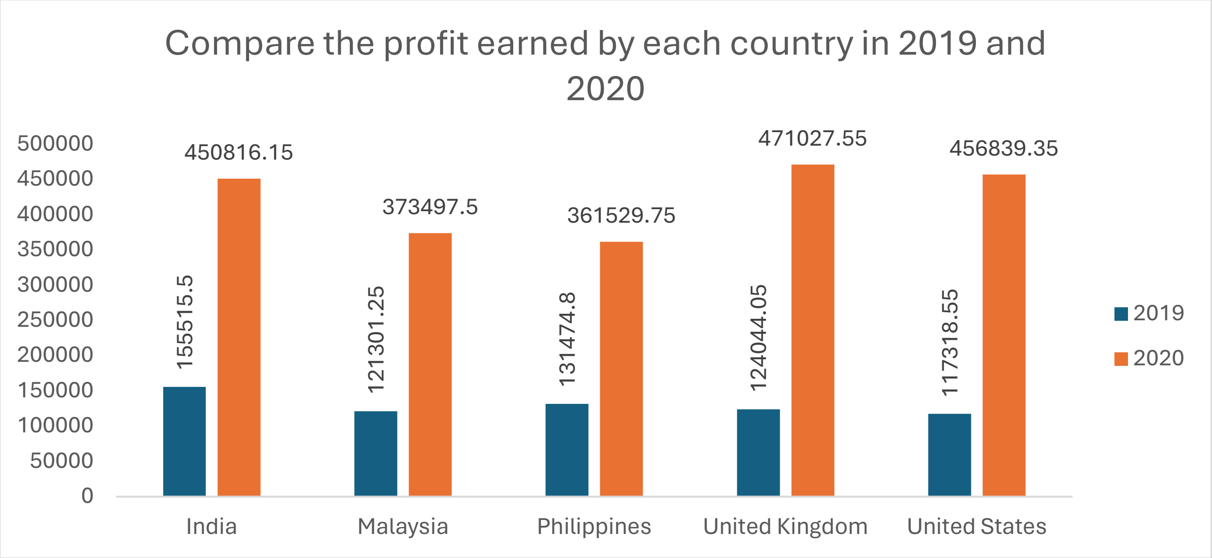
3. Which country sold most Fortune and sugar cookies in 2019 and in 2020?

This analysis aims to compare the sales of fortune and sugar cookies in countries for 2019 and 2020, where India shows the significant sale in sugar cookies for the year 2020 having 30644 sales count, and the most sale sugar cookies in 2019 was from united kingdom followed by India then for the fortune cookie India again shows the higher sales of 25400 followed by Malaysia and for the fortune cookie Philippines shows the higher sales of 8782 followed by united states.



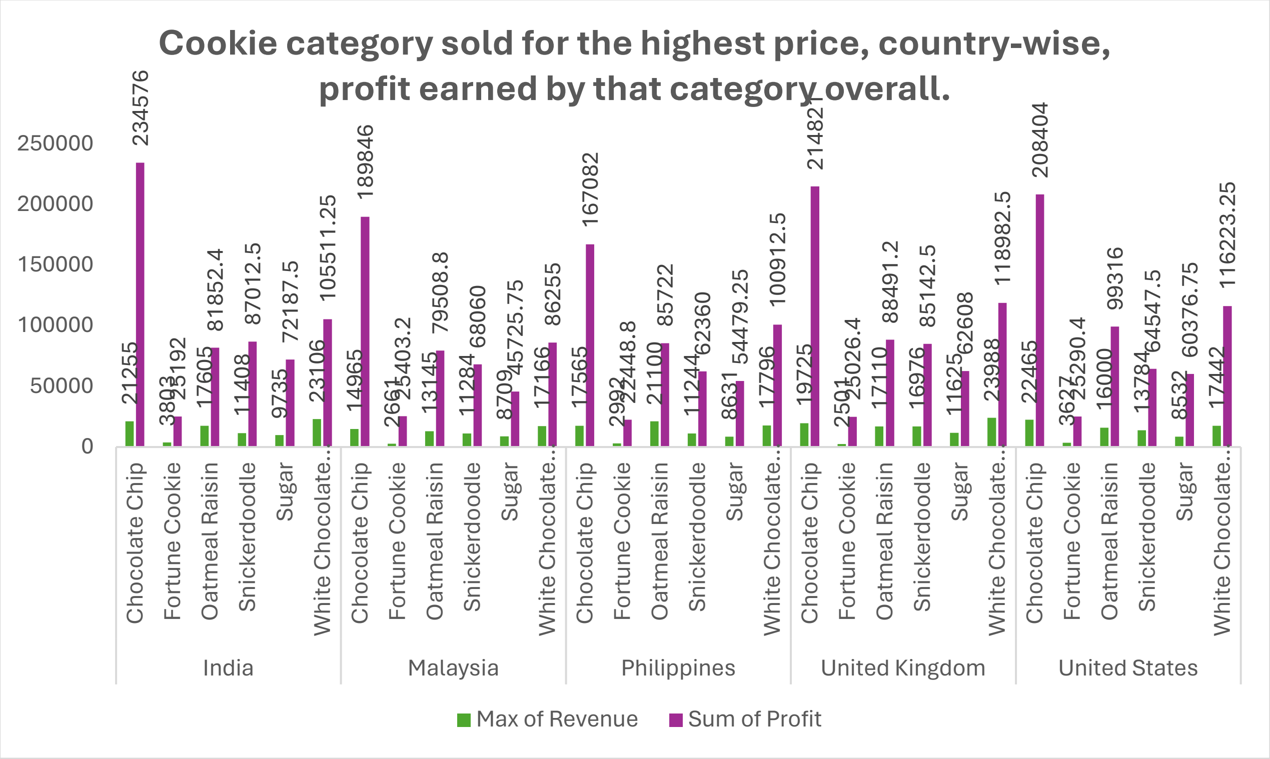
4. Compare the performance of all the countries for the year 2019 to 2020. Which country perform in each of these years?

This analysis aims to compare the profit earned by countries in the financial year 2019 and 2020, according to the graph United kingdom shows the highest profit earned in 2020 with 471027.55 sales followed by United states with 456839.35 and the highest profit in 2019 was recorded by India with 155515.5 sales followed by Philippines with 131474.8.



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

This analysis aims to find the cookie category sold for the highest price, country-wise, profit earned by that category, max of revenue is recorded by chocolate chip(23988) and sum of profit is recorded by sugar(2763364.45) for the country India followed by United Kingdom.



Conclusion and Review

The analysis provided insights into the profit earned by different cookie types in the US, Malaysia, and India. India emerged with the highest profit for chocolate chip cookies, followed by Malaysia and the United States.

White chocolate macadamia nut cookies generated the highest average revenue, followed closely by chocolate chip cookies.

In terms of sales, India showed significant sales of sugar cookies in 2020, while the United Kingdom had the highest sales of sugar cookies in 2019. For fortune cookies, India and Malaysia exhibited higher sales in both years, with the Philippines and the United States also contributing notable sales.

Regarding profit comparison by country for 2019 and 2020, the United Kingdom recorded the highest profit in 2020, followed by the United States. In 2019, India had the highest profit, followed by the Philippines.

Chocolate chip cookies were sold for the highest price in terms of revenue, while sugar cookies generated the highest profit overall.

The analysis presented valuable insights into the cookie industry, aiding stakeholders in understanding market dynamics and making informed decisions. The findings were effectively communicated through clear and appropriate visualizations. However, it's important to acknowledge the need for further exploration into additional factors influencing sales and profitability. Ensuring data accuracy and completeness is paramount for obtaining reliable insights.

Regression

In the regression analysis for the Cookie dataset, the model's multiple R is 1, indicating a perfect linear relationship between the independent and dependent variables. The R-squared and adjusted R-squared values are both 1, indicating that the independent variables explain all the variability in the dependent variable. The standard error is very small (9.16E-12), suggesting precise estimates. The ANOVA results show that the regression model is highly significant ($p < 0.05$), with an F-statistic of 1.9E+31. The coefficients for the independent variables (X Variable 1, X Variable 2, X Variable 3) are all very close to 0, indicating no meaningful effect on the dependent variable. The p-values for these coefficients are all greater than 0.05, further supporting the lack of significance.

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	1
R Square	1
Adjusted R Square	1

Standard Error	9.16E-12
Observations	700

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	4.78E+09	1.59E+09	1.9E+31	0
Residual	696	5.84E-20	8.39E-23		
Total	699	4.78E+09			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-1.3E-11	7.3E-13	-18.0657	4.09E-60	-1.5E-11	-1.2E-11	-1.5E-11	-1.2E-11
X Variable 1	6.56E-17	8.42E-16	0.077892	0.937936	-1.6E-15	1.72E-15	-1.6E-15	1.72E-15
X Variable 2	1	8.38E-16	1.19E+15	0	1	1	1	1
X Variable 3	-1	1.72E-15	-5.8E+14	0	-1	-1	-1	-1

Anova: one factor

The single-factor ANOVA analysis compares the variance between two groups: Cost and Profit. The Cost group comprises 700 observations, with a total sum of 1,926,955 and an average of 2,752.79. The Profit group also consists of 700 observations, with a total sum of 2,763,364 and an average of 3,947.66. The ANOVA results indicate that there is a significant difference between the means of the Cost and Profit groups (F = 90.92153, $p < 0.05$). This suggests that there is a statistically significant variation in the average values of Cost and Profit. The p-value (6.36E-21) is much smaller than the significance level ($\alpha = 0.05$), indicating strong evidence against the null hypothesis. Therefore, we reject the null hypothesis and conclude that there is a significant difference in the mean values of Cost and Profit.

Anova: Single Factor						
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Cost	700	1926955	2752.792	4149401		
Profit	700	2763364	3947.664	6842519		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	5E+08	1	5E+08	90.92153	6.36E-21	3.848119
Within Groups	7.68E+09	1398	5495960			
Total	8.18E+09	1399				

Anova: two factor

The two-factor ANOVA without replication assesses the effects of two categorical independent variables, Revenue and Cost, on the dependent variable, Profit. The table provides a summary of the data for Revenue, Cost, and Profit, indicating the count, sum, average, and variance for each factor level. The ANOVA results reveal significant main effects for both Revenue (F = 14.75112, $p < 0.05$) and Cost (F = 1484.458, $p < 0.05$), as well as a significant interaction effect between Revenue and Cost (MS = 28507277, $p < 0.05$). The p-values for all factors are less than the significance level ($\alpha = 0.05$), indicating strong evidence against the null hypothesis. Therefore, we reject the null hypothesis and conclude that both Revenue and Cost have a significant impact on Profit, and there is also a significant interaction effect between Revenue and Cost.

Anova: Two-Factor Without Replication				
SUMMARY	*Count*	*Sum*	*Average*	*Variance*
Row 1	3	17250	5750	6943125
Row 2	3	21520	7173.333	10805909
Row 3	3	23490	7830	12874869
Row 4	3	12280	4093.333	3518629
Row 5	3	13890	4630	4501749
Revenue	700	4690319	6700.456	21380458
Cost	700	1926955	2752.792	4149401
Profit	700	2763364	3947.664	6842519

ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Rows	1.99E+10	699	28507277	14.75112	0	1.112595
Columns	5.74E+09	2	2.87E+09	1484.458	0	3.002161
Error	2.7E+09	1398	1932550			
Total	2.84E+10	2099				

Descriptive Statistics

The descriptive statistics provide insights into the distribution and characteristics of the variables Unit Sold, Revenue, Cost, and Profit. For Unit Sold, the mean value is 1608.32 units, with a standard error of 32.79 units. The median value is 1542.5 units, indicating the central tendency of the data, and the mode is 727 units, representing the most frequently occurring value. The standard deviation, skewness, and kurtosis values indicate the dispersion, symmetry, and shape of the distribution, respectively. Similarly, for Revenue, Cost, and Profit, the descriptive statistics provide measures of central tendency, variability, and distributional characteristics. These statistics offer valuable insights into the distribution and variability of the variables, aiding in better understanding their underlying characteristics and informing further analysis.

Unit Sold		*Revenue*		*Cost*		*Profit*	
Mean	1608.32	Mean	6700.456	Mean	2752.792	Mean	3947.664

Standard Error	32.78652	Standard Error	174.767	Standard Error	76.99166	Standard Error	98.86874
Median	1542.5	Median	5871.5	Median	2423.6	Median	3424.5
Mode	727	Mode	8715	Mode	3450	Mode	5229
Standard Deviation	867.4498	Standard Deviation	4623.901	Standard Deviation	2037.008	Standard Deviation	2615.821
Sample Variance	752469.1	Sample Variance	21380458	Sample Variance	4149401	Sample Variance	6842519
Kurtosis	-0.31491	Kurtosis	0.464596	Kurtosis	0.810043	Kurtosis	0.338621
Skewness	0.43627	Skewness	0.867861	Skewness	0.930442	Skewness	0.840484
Range	4293	Range	23788	Range	10954.5	Range	13319
Minimum	200	Minimum	200	Minimum	40	Minimum	160
Maximum	4493	Maximum	23988	Maximum	10994.5	Maximum	13479
Sum	1125824	Sum	4690319	Sum	1926955	Sum	2763364
Count	700	Count	700	Count	700	Count	700

Correlation

The correlation matrix reveals the relationships between the variables Unit Sold, Revenue, Cost, and Profit. A correlation coefficient close to 1 indicates a strong positive correlation, while a value near -1 signifies a strong negative correlation. For Unit Sold and Revenue, the correlation coefficient is approximately 0.796, indicating a moderately strong positive correlation. Similarly, Unit Sold and Profit exhibit a correlation coefficient of approximately 0.829, indicating a moderately strong positive relationship. Revenue and Cost demonstrate a correlation coefficient of around 0.992, signifying a strong positive correlation. Additionally, Revenue and Profit show a correlation coefficient of approximately 0.995, indicating a very strong positive relationship. Cost and Profit display a correlation coefficient of about 0.975, suggesting a strong positive correlation between these variables. These correlation values provide insights into the degree and direction of the relationships between the variables, aiding in understanding their associations and potential impacts on each other.

	Unit Sold	*Revenue*	*Cost*	*Profit*
Unit Sold	1			
Revenue	0.796298	1		
Cost	0.742604	0.992011	1	
Profit	0.829304	0.995163	0.974818	1

Loan Data Report

Introduction

The loan dataset provides comprehensive information about loan applicants, encompassing attributes such as gender, marital status, education level, income details, loan amount, and property area. this dataset offers a rich source of insights into the dynamics of loan applications.

In this analysis, we aim to delve into the characteristics of loan applicants and explore patterns within the data. By leveraging pivot tables and charts, we seek to address specific queries regarding loan applicants' demographics, educational backgrounds, and loan amounts.

Understanding the nuances of loan applications is crucial for financial institutions to make informed decisions, optimize lending processes, and tailor services to meet the diverse needs of customers. Through this analysis, we endeavour to uncover actionable insights that can drive strategic decision-making and enhance the efficiency of loan management systems.

Questionnaire

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

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

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

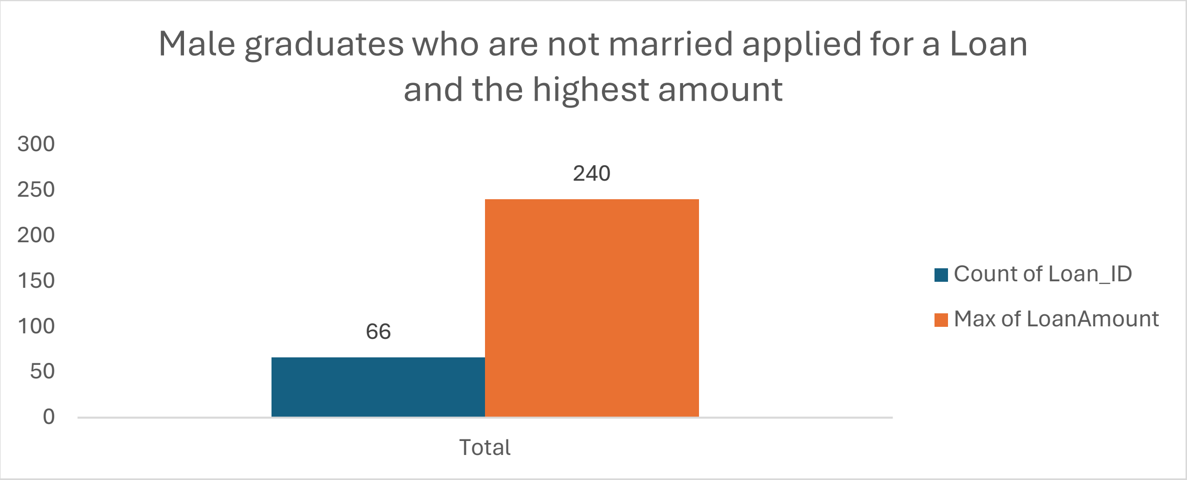
4. How many female graduates who are married applied for Loan? What was the highest amount?

5. How many male and female who are not married applied for Loan? Compare Urban, Semi-urban and rural based on amount.

Analytics

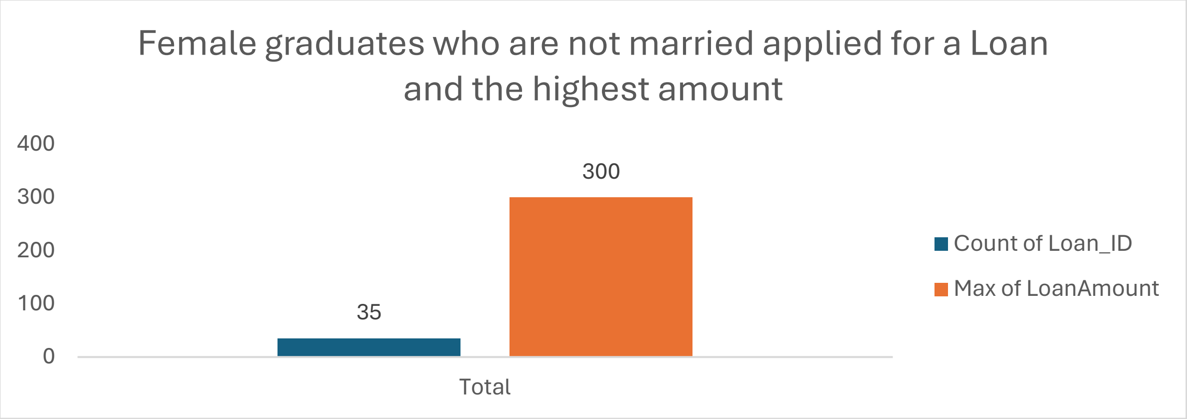
1. How many male graduates who are not married applied for Loan? What was the highest amount?

This analysis shows the no. of male graduates applied for the loan and are not married with the highest amount. As of analysed the total no. of loan applied is 66 and max loan amount is 240.



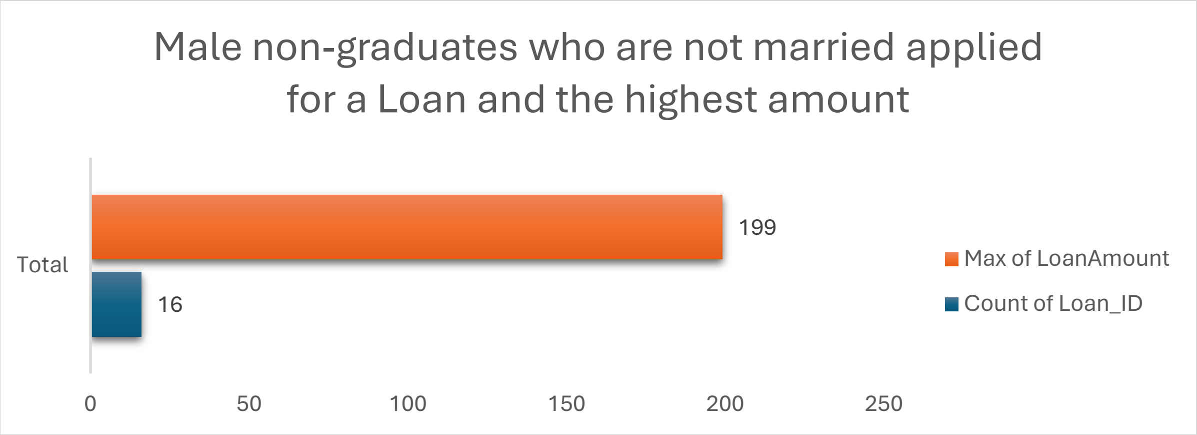
2. How many female graduates who are not married applied for Loan? What was the highest amount?

This analysis shows the no. of female graduates applied for the loan and are not married with the highest amount. As of analysed the total no. of loan applied is 35 and max loan amount is 300.



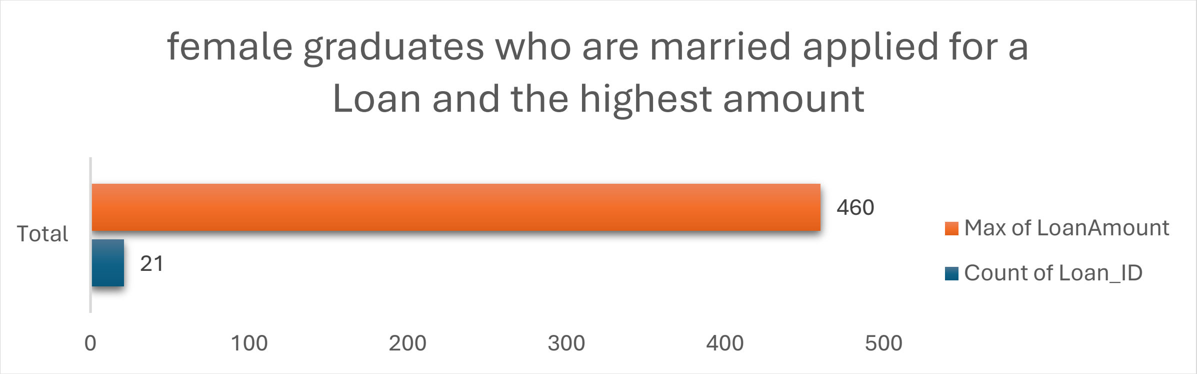
3. How many male non-graduates who are not married applied for Loan? What was the highest amount?

This analysis shows the no. of male non-graduates applied for the loan and are not married with the highest amount. As the total no. of loan applied is 16 and max loan amount is 199.



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

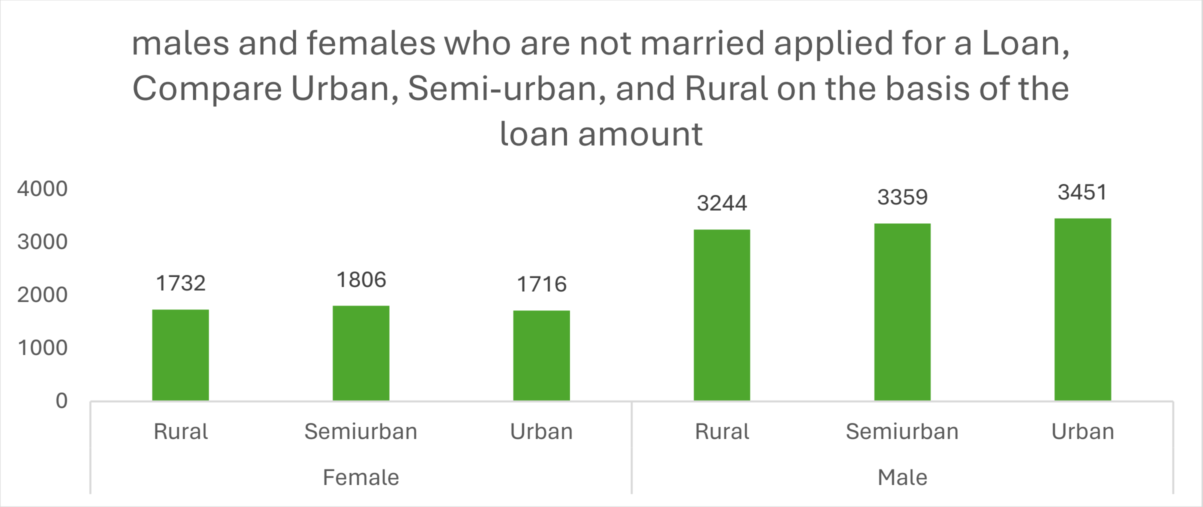
This analysis shows the no. of female graduates applied for the loan and are not married with the highest amount. As of analysed the total no. of loan applied is 21 and max loan amount is 460.



5. How many male and female who are not married applied for Loan? Compare Urban, Semi-urban and rural based on amount.

This analysis aims to compare the rural, semi urban, urban female and male who are not married and applied for the loan, where the no. is less in females but much higher in males

Females loan count in rural(1732),semiurban(1806), urban(1716) and males loan count in rural(3244),semiurban(3359),urban(3451).



Conclusion and Review

The analysis indicates clear gender disparities in loan applications. Male graduates not married dominated the applicant pool, followed by female graduates not married. Both male non-graduates not married and married female graduates also applied for loans, albeit in smaller numbers. Notably, males significantly outnumbered females across rural, semi-urban, and urban areas.

The analysis effectively illustrates gender-based trends in loan applications and provides valuable insights into borrower demographics. Further exploration into factors influencing loan decisions is recommended, along with visual enhancements to improve data presentation. Overall, the report lays a foundation for understanding loan dynamics, with potential for deeper insights.

Regression

The regression analysis for the loan dataset reveals a multiple R coefficient of approximately 0.531, indicating a moderate positive relationship between the predictors and the loan amount. The R-squared value of around 0.282 suggests that about 28.2% of the variability in the loan amount can be explained by the independent variables. The coefficient for Applicant Income is approximately 0.096, and for Co-applicant Income, it's about 0.0068. These coefficients signify the impact of each predictor on the loan amount. Additionally, the ANOVA table displays a significant F-value of 37.32 ($p < 0.05$), affirming the statistical significance of the regression model. The ANOVA table indicates that the regression model is statistically significant, as evidenced by the low p-value (<0.05). This analysis provides insights into how applicant and co-applicant incomes influence the loan amount, aiding in better understanding the loan approval process.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.531078663
R Square	0.282044546
Adjusted R Square	0.274487121
Standard Error	50.85033905
Observations	289

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	289502.8035	96500.93	37.32019	2.25609E-20
Residual	285	736940.7397	2585.757		
Total	288	1026443.543			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	66.690952	16.26833015	4.099434	5.41E-05	34.66963005	98.71227396	34.66963	98.71227
X Variable 1	0.095771273	0.045649816	2.097955	0.03679	0.005917708	0.185624838	0.005918	0.185625
X Variable 2	0.005807787	0.000627861	9.250122	5.49E-18	0.004571955	0.007043619	0.004572	0.007044
X Variable 3	0.006772797	0.001264765	5.354983	1.76E-07	0.004283331	0.009262263	0.004283	0.009262

Anova: one factor

In the ANOVA table for the single-factor analysis, the loan dataset is divided into two groups based on the factors Loan Amount and Loan Amount Term. The total sum of squares (SS) is approximately 8392703, with 2267909 within-group SS and 6124794 between-group SS. This results in a mean square (MS) of 3937.343 within groups and 6124794 between groups. The F-value of 1555.565 and the associated p-value of approximately 8.4E-166 indicate that there is a significant difference between the means of the two groups. Therefore, the factor being considered (Loan Amount vs. Loan Amount Term) has a significant impact on the loan dataset.

Anova: Single Factor
SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*		
Loan Amount	289	39533	136.7924	3564.04		
Loan Amount Term	289	99032	342.6713	4310.645		

ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	6124794	1	6124794	1555.565	8.4E-166	3.857654
Within Groups	2267909	576	3937.343			
Total	8392703	577				

Anova: two factor

In the two-factor ANOVA without replication, the loan dataset is analyzed based on two factors: Loan Amount and Loan Amount Term. The dataset is arranged in rows and columns, with Loan Amount Term as the row factor and Loan Amount as the column factor. The total sum of squares (SS) is approximately 8392703, with 1264619 SS for rows, 6124794 SS for columns, and 1003290 SS for error. The mean square (MS) for rows is 4391.038, and for columns is 6124794. The F-value for rows is 1.260472, and for columns is 1758.156, with associated p-values indicating significance (p < 0.05). This suggests that both factors, Loan Amount and Loan Amount Term, have a significant impact on the loan dataset.

Anova: Two-Factor Without Replication				
SUMMARY	*Count*	*Sum*	*Average*	*Variance*
Row 1	2	470	235	31250
Row 2	2	486	243	27378
Row 3	2	568	284	11552
Row 4	2	438	219	39762
Row 5	2	512	256	21632
Row 286	2	473	236.5	30504.5
Row 287	2	475	237.5	30012.5
Row 288	2	518	259	20402
Row 289	2	278	139	3362
Loan Amount	289	39533	136.7924	3564.04
Loan Amount Term	289	99032	342.6713	4310.645

ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Rows	1264619	288	4391.038	1.260472	0.024978	1.214301
Columns	6124794	1	6124794	1758.156	1.2E-124	3.87395
Error	1003290	288	3483.647			
Total	8392703	577				

Descriptive Statistics

Descriptive statistics were computed for four variables in the loan dataset: Loan Amount Term, Applicant Income, Co-Applicant Income, and Loan Amount. For Loan Amount Term, the mean is approximately 342.67 months, with a standard error of 3.86 months. The median Loan Amount Term is 360 months, with a mode of 360 months as well. The standard deviation is

65.66 months, indicating variability in loan term lengths. Applicant Income has a mean of approximately 4637.35, with a standard error of 281.80. The median and mode are 3833 and 5000, respectively. The standard deviation is high at 4790.68, suggesting significant variability in applicant incomes. Co-Applicant Income has a mean of about 1528.26, with a standard error of 139.86. The median is 879, with a mode of 0, indicating a right-skewed distribution. The standard deviation is 2377.60, highlighting variability in co-applicant incomes. Lastly, Loan Amount has a mean of 136.79, with a standard error of 3.51. The median is 126, with a mode of 150. The standard deviation is 59.70, suggesting variability in loan amounts. These statistics provide insights into the central tendency, variability, and distribution of the loan dataset variables.

Loan Amount Term		*Applicant Income*		*Co-Applicant Income*		*Loan Amount*	
Mean	342.6713	Mean	4637.353	Mean	1528.263	Mean	136.7924
Standard Error	3.862088	Standard Error	281.8049	Standard Error	139.8588	Standard Error	3.51174
Median	360	Median	3833	Median	879	Median	126
Mode	360	Mode	5000	Mode	0	Mode	150
Standard Deviation	65.6555	Standard Deviation	4790.684	Standard Deviation	2377.599	Standard Deviation	59.69958
Sample Variance	4310.645	Sample Variance	22950653	Sample Variance	5652978	Sample Variance	3564.04
Kurtosis	8.62994	Kurtosis	141.612	Kurtosis	32.96701	Kurtosis	5.739804
Skewness	-2.64147	Skewness	10.41123	Skewness	4.510775	Skewness	1.780616
Range	474	Range	72529	Range	24000	Range	432
Minimum	6	Minimum	0	Minimum	0	Minimum	28
Maximum	480	Maximum	72529	Maximum	24000	Maximum	460
Sum	99032	Sum	1340195	Sum	441668	Sum	39533
Count	289	Count	289	Count	289	Count	289

Correlation

The correlation matrix for the loan dataset variables shows the correlation coefficients between Applicant Income, Co-Applicant Income, and Loan Amount. The correlation between Applicant Income and Co-Applicant Income is approximately -0.084, indicating a weak negative correlation between these two variables. The correlation between Applicant Income and Loan Amount is approximately 0.446, suggesting a moderate positive correlation. Similarly, the correlation between Co-Applicant Income and Loan Amount is approximately 0.230, indicating a weak positive correlation.

	Applicant Income	*Co-Applicant income*	*Loan Amount*
Column 1	1		
Column 2	-0.08435	1	
Column 3	0.445695	0.230355	1

Shop Sales Data Report

Introduction

This report delves into a comprehensive sales dataset, focusing on analysing sales performance and product trends among salesmen. The dataset comprises attributes such as salesmen details, product information, sales quantities, and profits earned. The primary objective of this analysis is to uncover insights that can inform sales strategy formulation and enhance business performance. By examining sales data over a specified period and comparing product performance, the report aims to identify top-performing salesmen, analyse product popularity, and understand sales trends. The insights derived from this analysis will be invaluable for sales managers, marketing professionals, and executives seeking to optimize sales strategies, maximize revenue, and drive business growth. Through this analysis, we aim to provide actionable insights that can guide decision-making and contribute to overall business success.

Questionaries

1. Compare all the salesmen based on 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?

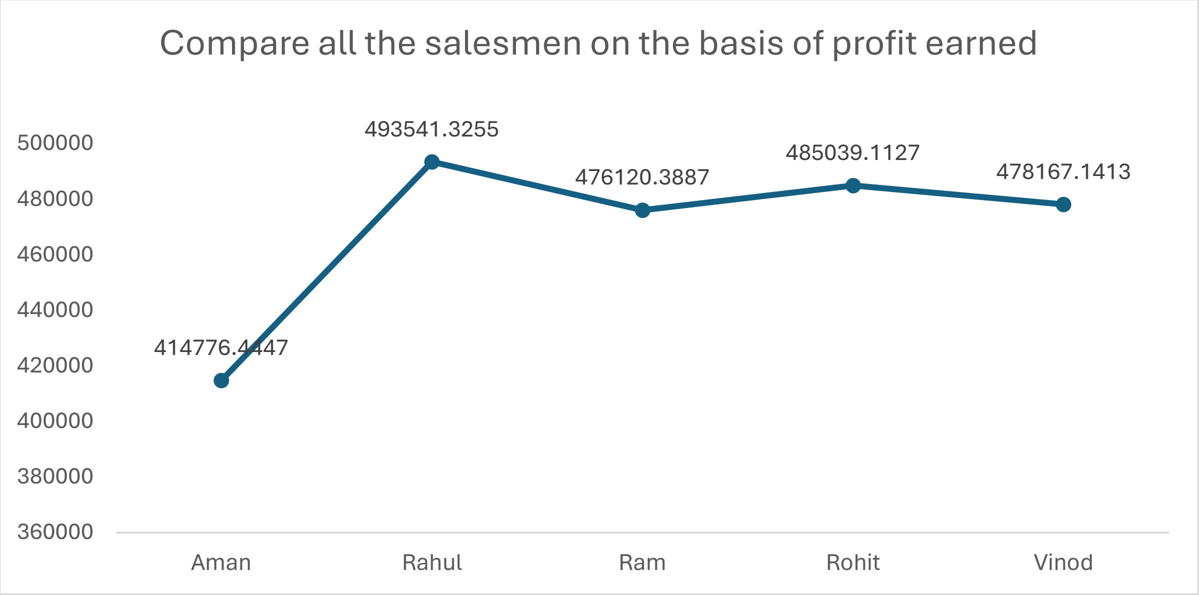
4. Which item yield most average profit?

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

Analytics

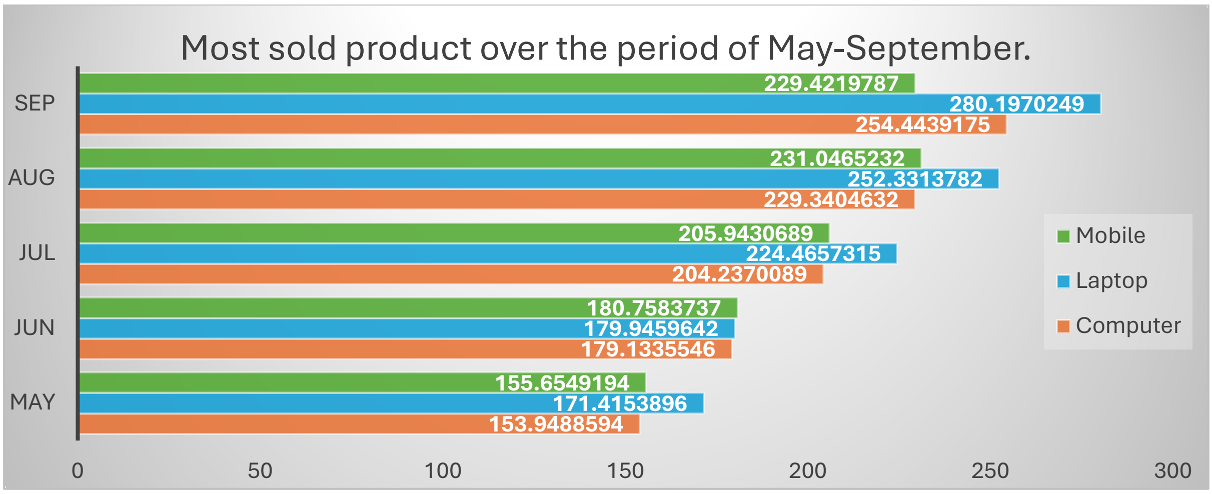
1. Compare all the salesmen on the basis of profit earn.

The comparison of all the salesmen on the basis of profit earned and the line chart shows that the rahul has the highest profit earned with value 493541.3255, compared to all the salesmen.



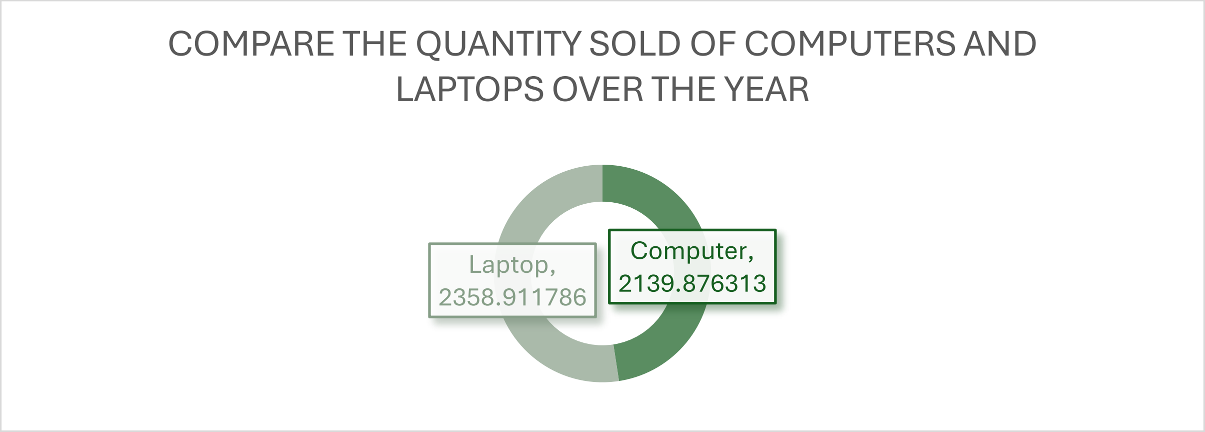
2. Find out most sold product over the period of May-September.

To identify the most sold product over the period of May-September, we would need to analyze the sales data within the timeframe. By aggregating the quantity sold for each product across all transactions during this period, and the most sold product over the period of May-September is Laptop with most sales in the September month with the value of 280.1970249.



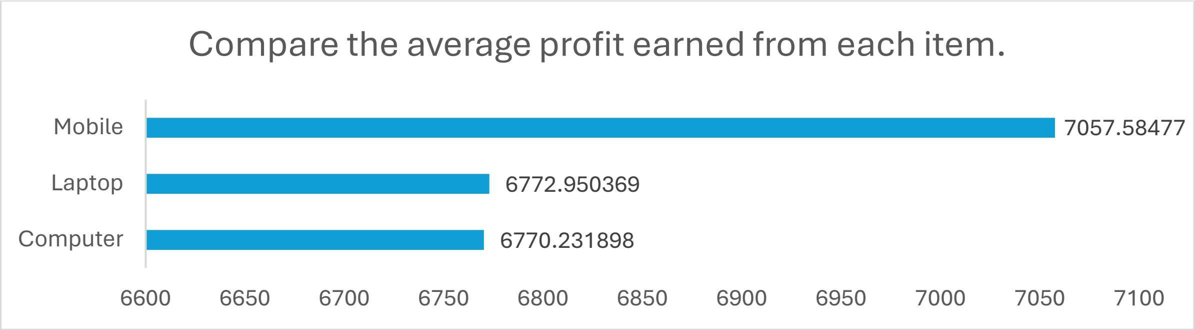
3. Find out which of the two product sold the most over the year Computer or Laptop?

The two product sold the most over the year between computer or laptop where Computer has the sold quantity of 2139.876313 and laptop has 2358.911786 units sold quantity.



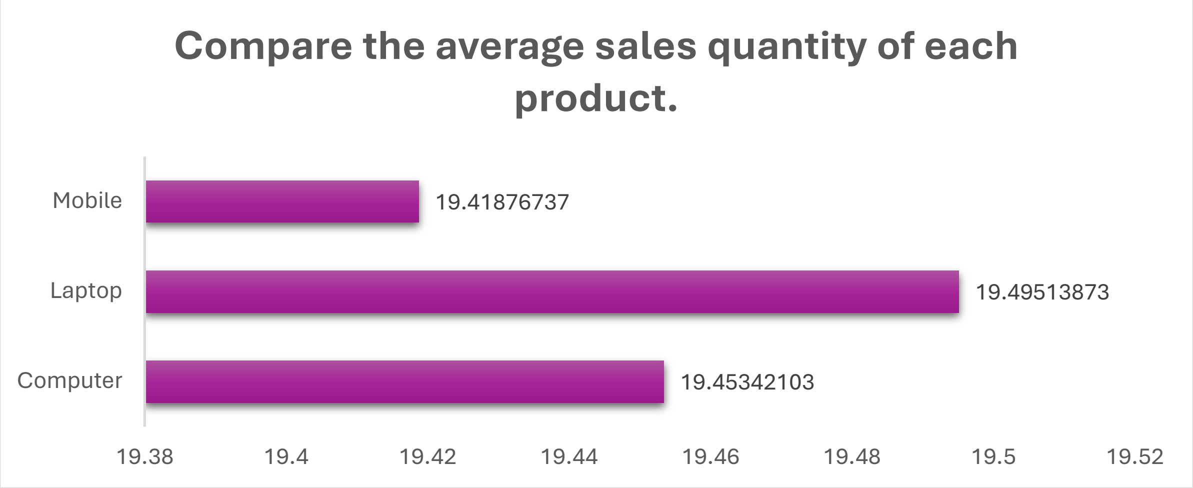
4 . Which item yield most average profit?

This analysis shows that the Mobile has the most Average profit earned among Mobile, Laptop, and Computer where Mobile has the average profit earned of 7057.58477.



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

The analysis shows that the average sales quantity of Laptop(19.49513873) is higher than the other products e.g. Mobile(19.41876737) and Computer(19.45342103).



Conclusion and Review:

The analysis reveals significant insights into sales performance and product trends among salesmen. Rahul emerges as the top performer, earning the highest profit compared to all other salesmen. Moreover, the most sold product over the period of May-September is identified as the Laptop, with the highest sales recorded in September. Between computers and laptops, laptops outperform computers in terms of units sold throughout the year. Additionally, mobile phones exhibit the highest average profit among mobiles, laptops, and computers. Lastly, laptops demonstrate the highest average sales quantity compared to mobiles and computers.

The analysis effectively highlights sales performance and product trends, providing valuable insights for sales strategy optimization. Visualizations aid in understanding trends over time and product popularity. However, deeper insights into factors influencing sales fluctuations and product preferences could enhance the analysis. Overall, the report offers actionable insights for improving sales strategies and maximizing revenue.

Regression

This regression analysis demonstrates a robust relationship between the quantity of items sold (X Variable 1) and the corresponding sales amount (Y). With a high R Square value of approximately 0.91, it indicates that about 91% of the variability in sales amount can be accounted for by changes in the quantity of items sold. For each additional unit increase in the quantity sold, there's an average increase of approximately $246.47 in sales amount. Both the intercept and the coefficient of the X Variable 1 are statistically significant, with t-stats of 23.38 and 58.73, respectively, and very low p-values (nearly zero), affirming the reliability of these coefficients. Thus, we conclude that the quantity of items sold serves as a strong predictor of sales amount in this dataset.

SUMMARY OUTPUT
Regression Statistics

Multiple R	0.954076972							
R Square	0.910262868							
Adjusted R Square	0.909998936							
Standard Error	630.0595983							
Observations	342							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	1.37E+09	1.37E+09	3448.844	4.6E-180			
Residual	340	1.35E+08	396975.1					
Total	341	1.5E+09						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	2068.993161	88.47952	23.38387	9.14E-73	1894.957	2243.029	1894.957	2243.029
X Variable 1	246.4655683	4.196812	58.72686	4.6E-180	238.2106	254.7206	238.2106	254.7206

Anova : Single Factor

The single-factor ANOVA conducted on the quantity (Qty) and sales amount (Amount) reveals a significant difference between the groups. The analysis indicates that there's a substantial variance between the groups (SS = $8.01E+09) compared to within the groups (SS = $1.5E+09), resulting in a high F-statistic of 3632.879 with a very low p-value (nearly zero). This implies that the difference in means between the quantity and sales amount is unlikely to have occurred by chance. Therefore, we reject the null hypothesis and conclude that there's a significant difference in sales amounts attributed to different quantities sold.

Anova: Single Factor						
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Qty	342	6654.271	19.45693	66.0952		
Amount	342	2347644	6864.457	4410782		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	8.01E+09	1	8.01E+09	3632.879	2.1E-275	3.85513
Within Groups	1.5E+09	682	2205424			
Total	9.52E+09	683				

Anova two factor

In the two-factor ANOVA analysis without replication, we observe both rows and columns contribute significantly to the variance. The sums of squares (SS) for rows and columns are $7.58E+08 and $8.01E+09, respectively. The high F-statistics for both rows (1.014883) and columns (3659.913) with low p-values (nearly zero) indicate that the differences observed in both factors are statistically significant. Therefore, we reject the null hypothesis and conclude that both the quantity sold (Qty) and sales amount (Amount) significantly affect the variance in the dataset.

Anova: Two-Factor Without Replication				
SUMMARY	*Count*	*Sum*	*Average*	*Variance*
Row 1	2	1003	501.5	497004.5
Row 2	2	7804	3902	30388808
Row 3	2	3005	1502.5	4485013
Row 4	2	2304	1152	2635808
Row 5	2	7003	3501.5	24479005
Row 339	2	10252.82	5126.411	51884342
Row 340	2	10272.93	5136.467	52087770
Row 341	2	10293.05	5146.523	52291595
Row 342	2	10313.16	5156.58	52495819
Qty	342	6654.271	19.45693	66.0952
Amount	342	2347644	6864.457	4410782

ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Rows	7.58E+08	341	2221714	1.014883	0.445792	1.195299
Columns	8.01E+09	1	8.01E+09	3659.913	2.1E-184	3.868873
Error	7.46E+08	341	2189134			
Total	9.52E+09	683				

Descriptive Statistics:

For the quantity sold (Qty), the mean is approximately 19.46 with a standard error of 0.44. The data is moderately positively skewed (skewness = -0.10) and shows a slight negative kurtosis (-0.999), indicating a slightly flatter distribution compared to a normal distribution. The range of quantity sold spans from 3 to 33.31.

For the sales amount (Amount), the mean is approximately 6864.46 with a larger standard error of 113.57. The data is also moderately positively skewed (skewness = -0.36) and has a slightly negative kurtosis (-0.508). The range of sales amount is much larger, ranging from 1000 to 10279.85.

Qty		*Amount*	

Mean	19.45693	Mean	6864.457
Standard Error	0.439614	Standard Error	113.5651
Median	19.45693	Median	6984.647
Mode	3	Mode	1000
Standard Deviation	8.129896	Standard Deviation	2100.186
Sample Variance	66.0952	Sample Variance	4410782
Kurtosis	-0.99883	Kurtosis	-0.5078
Skewness	-0.09948	Skewness	-0.36449
Range	30.30852	Range	9279.851
Minimum	3	Minimum	1000
Maximum	33.30852	Maximum	10279.85
Sum	6654.271	Sum	2347644
Count	342	Count	342

Correlation

The correlation coefficient between quantity sold (Qty) and sales amount (Amount) is approximately 0.954. This strong positive correlation suggests that there is a significant relationship between the quantity of items sold and the corresponding sales amount, indicating that as the quantity sold increases, the sales amount also tends to increase.

	Qty	*Amount*
Qty	1	
Amount	0.954077	1

Sales Data Sample Report

Introduction

This report analyses a comprehensive sales dataset, featuring attributes such as ORDERNUMBER, QUANTITYORDERED, PRICEEACH, and SALES. It aims to extract insights to guide sales strategies and enhance business performance. The intended audience includes sales managers, marketers, and executives seeking to optimize sales operations and maximize revenue. Key analyses include comparing sales of Vintage cars and Classic cars, determining average sales, identifying top-selling products, assessing profit by country for specific product lines, comparing sales across different years, and evaluating countries based on deal size. Through these analyses, the report aims to provide actionable insights for driving sales growth and improving overall business outcomes.

The scope of the project encompasses analysing a comprehensive sales dataset to extract valuable insights that can inform sales strategies, optimize product offerings, and enhance overall business performance. analysts and researchers seeking insights into sales dynamics and market trends will find value in the project.

Questionnaire

1. Comparison of sales between Vintage cars and Classic cars across all countries.

2. Determination of the average sales of all products and identification of the highest-selling product.

3. Assessment of the country yielding the most profit for Motorcycles, Trucks, and Buses.

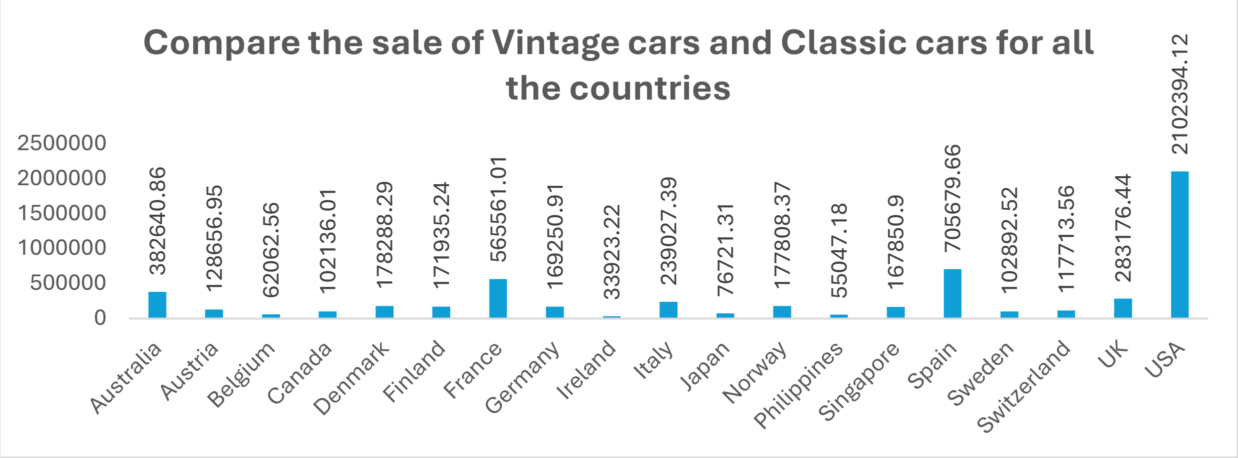
4. Comparison of sales for all items across the years 2004 and 2005.

5. Comparative analysis of all countries based on deal size.

Analytics

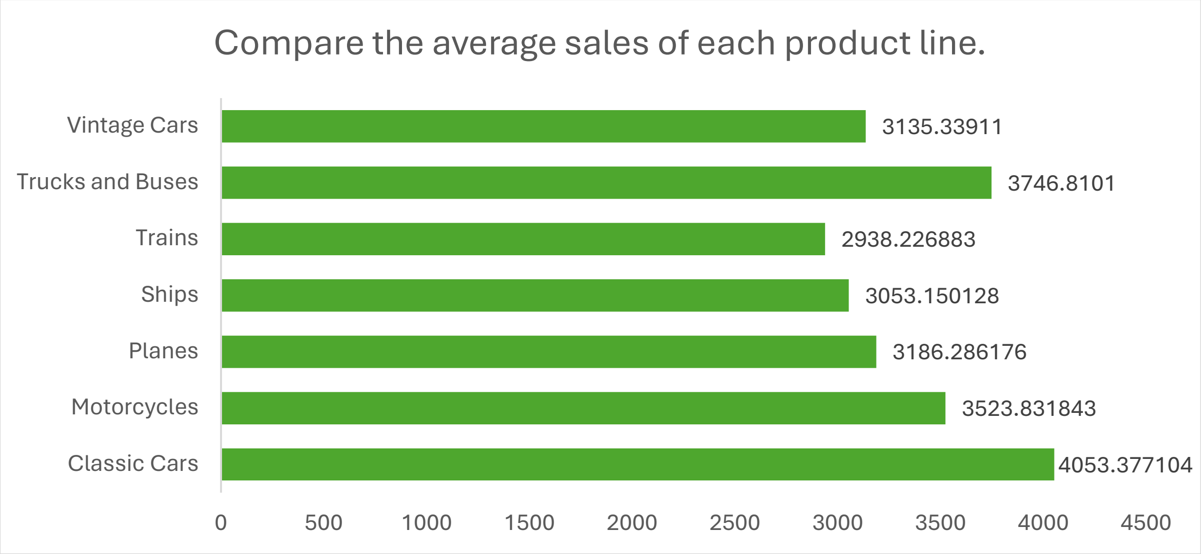
1. Comparison of sales between Vintage cars and Classic cars across all countries.

This analysis Compare the sale of Vintage cars and Classic cars for all the countries. Where USA(2102394.02) has the highest sales followed by Spain, France, and Australia.



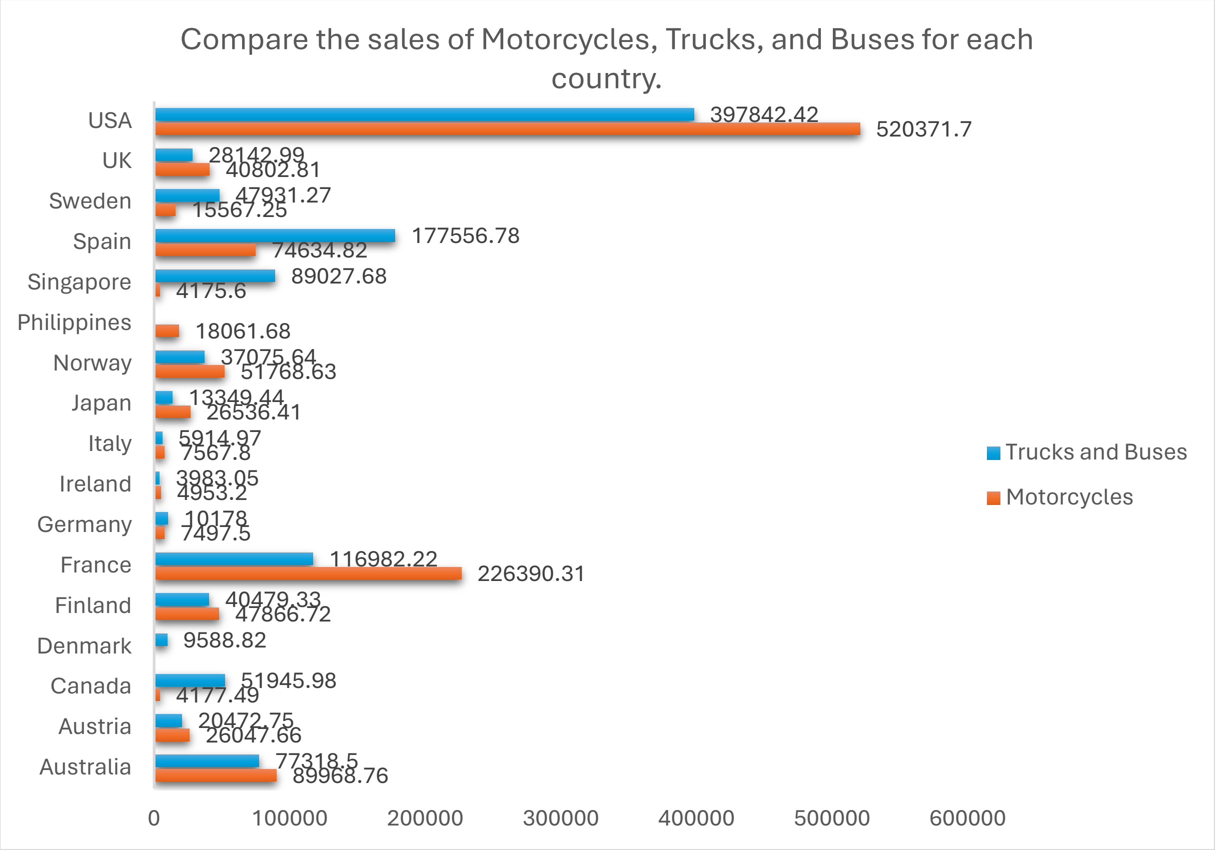
2. Determination of the average sales of all products and identification of the highest-selling product.

This analysis aims to provide average sales of all products and identification of the highest-selling product. And through the graph we can see that Classic Cars have the highest sales with 4053.377104 average sales followed by Trucks and Buses and Motorcycles.



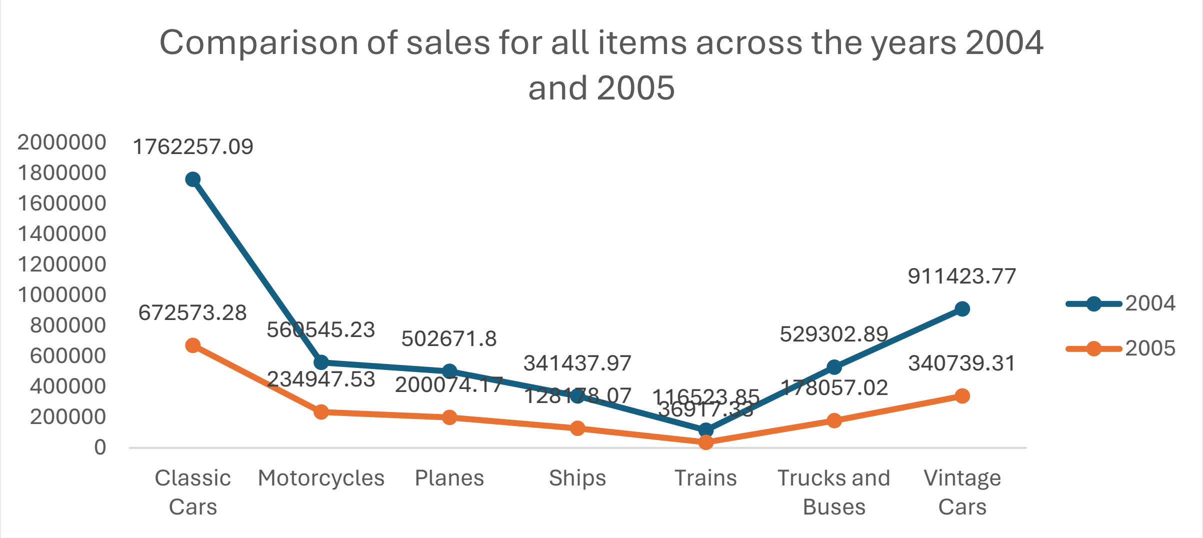
3. Assessment of the country yielding the most profit for Motorcycles, Trucks, and Buses.

This analysis aims to identify the country yielding the most profit for Motorcycles, Trucks, and Buses. And bar chart shows that the USA has the highest sales with 397842.42 sum of sales for Trucks and Buses while 520371.7 sum of sales for Motorcycles followed by France and Spain.



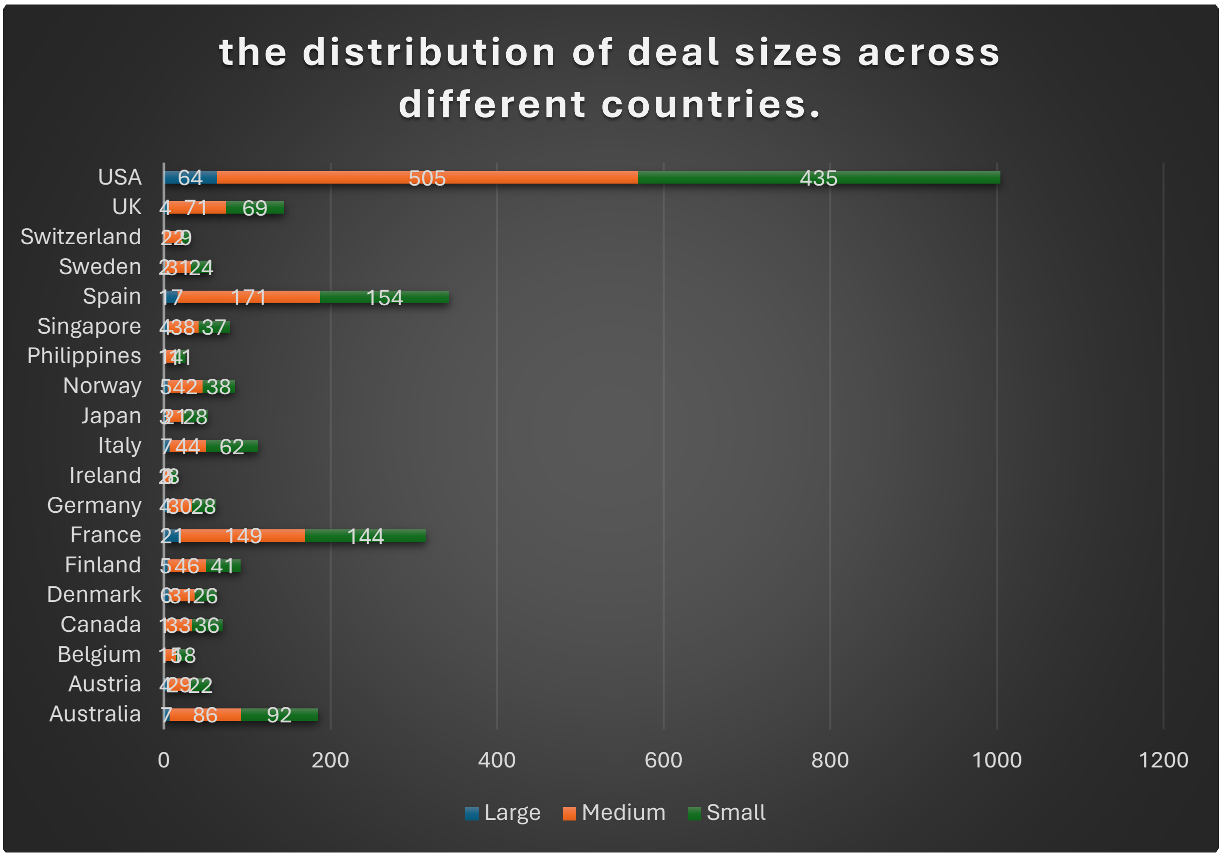
4. Comparison of sales for all items across the years 2004 and 2005.

This analysis aims to compare the sales for all the items across the years 2004 and 2005, with the line chart we can see that the sales for all the items across the years are shifting at very rate where the sales for Classic cars are highest among all the categories in both the years with 1762257.09 sales in 2004 and 672573.28 sales in 2005.



5. Comparative analysis of all countries based on deal size.

This analysis aims to find out the distribution of deal sizes across the different countries. And the bar chart shows that the deal size in the USA with large deal size of 64, medium deal size of 505, and small deal size of 435 is way higher than all the other countries.



Conclusion and Review

The analysis uncovers significant insights into sales dynamics and profitability across categories and countries. Notably, the USA emerges as a key market leader, exhibiting strong sales performance in Vintage and Classic cars, Trucks, Buses, and Motorcycles. Classic Cars stand out as the highest-selling product, contributing significantly to overall sales revenue. Moreover, the USA demonstrates exceptional profitability, particularly in the Trucks, Buses, and Motorcycles categories. Sales for Classic cars remain consistently robust throughout the years 2004 and 2005, indicating sustained demand for this category. Additionally, the USA showcases markedly larger deal sizes compared to other countries, underscoring its dominance in sales volume.

While the analysis effectively presents key findings through visualizations, further exploration into factors influencing sales fluctuations and deal size disparities could provide deeper insights. Overall, the report offers valuable insights for optimizing sales strategies and driving business growth.

Regression

This regression analysis for the sales dataset reveals that the model is statistically significant, as indicated by a very low p-value (4.62E-78). The multiple R value of 0.877 suggests a strong positive linear relationship between the independent variables (MSRP, Quantity Ordered) and the dependent variable (Sales). The coefficient values indicate that for every unit increase in MSRP, there's an increase of approximately $103.08 in sales. Similarly, for every unit increase in Quantity Ordered, sales increase by about $12.82, and for every unit increase in the third independent variable, sales increase by approximately $47.43. The adjusted R-squared value of 0.766 indicates that the model explains about 76.6% of the variance in the sales data.

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.877178
R Square	0.769441
Adjusted R Square	0.766629
Standard Error	896.6688
Observations	250

ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	3	6.6E+08	2.2E+08	273.6567	4.62E-78			
Residual	246	1.98E+08	804014.9					
Total	249	8.58E+08						

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-5271.93	322.9166	-16.326	4.32E-41	-5907.96	-4635.9	-5907.96	-4635.9
X Variable 1	103.0809	6.001152	17.17685	5.42E-44	91.26071	114.9011	91.26071	114.9011
X Variable 2	12.81807	1.661734	7.713668	3.04E-13	9.545024	16.09111	9.545024	16.09111
X Variable 3	47.42944	3.350938	14.15408	1.13E-33	40.82925	54.02963	40.82925	54.02963

Anova: one factor

In this single-factor ANOVA analysis, we're comparing the impact of different levels of the factor (Sales and MSRP) on the variance in the data. The ANOVA results indicate that there is a significant difference between the groups, as the p-value is very low (3.1E-113). This suggests that there's strong evidence to reject the null hypothesis, indicating that at least one of the means of the groups (Sales and MSRP) is significantly different from the others. The F-value of 894.0704 further supports this, as it is much greater than 1, indicating that there is a significant difference between the groups. Therefore, there is evidence to suggest that Sales and MSRP have a significant impact on the variance in the dataset.

Anova: Single Factor						
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Sales	250	903280.9	3613.123	3445221		
MSRP	250	25534	102.136	1664.552		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	1.54E+09	1	1.54E+09	894.0704	3.1E-113	3.860199
Within Groups	8.58E+08	498	1723443			
Total	2.4E+09	499				

Anova: two factor

This two-factor ANOVA without replication analyzes the impact of Sales, MSRP, and Quantity Ordered on the variance in the dataset. The ANOVA results show that there is no significant difference between the rows (Sales, MSRP, and Quantity Ordered) as the p-value (0.33951) is greater than the significance level (0.05). However, there is a significant difference between the columns (Sales and MSRP) with a very low p-value (1.9E-168), indicating that at least one of the means of the groups is significantly different from the others. The F-value of 925.2361 further supports this conclusion. Therefore, we can infer that Sales and MSRP have a significant impact on the variance in the dataset.

Anova: Two-Factor Without Replication				
SUMMARY	*Count*	*Sum*	*Average*	*Variance*
Row 1	3	4097.66	1365.887	5069957
Row 2	3	2451.12	817.04	1725170

Row 3	3	1566	522	648687
Row 4	3	5095.24	1698.413	7507173
Row 5	3	5140.39	1713.463	7650609
Row 248	3	4386.35	1462.117	5944534
Row 249	3	2261.6	753.8667	1546167
Row 250	3	4176.72	1392.24	5420980
Sales	250	903280.9	3613.123	3445221
MSRP	250	25534	102.136	1664.552
QuantityOrdered	250	8659	34.636	89.69428

ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Rows	2.95E+08	249	1182944	1.044989	0.33951	1.194432
Columns	2.09E+09	2	1.05E+09	925.2361	1.9E-168	3.013826
Error	5.64E+08	498	1132016			
Total	2.95E+09	749				

Descriptive Statistics

The descriptive statistics for Quantity Ordered, Sales, MSRP, and Price Each reveal valuable insights into the dataset. Quantity Ordered has a mean of 34.636 units, with a standard deviation of 9.470706, indicating moderate variability in the quantity ordered. Sales, on the other hand, show a much higher variability, with a mean of 3613.123 and a standard deviation of 1856.131. The MSRP (Manufacturer's Suggested Retail Price) has a mean of 102.136, with a standard deviation of 40.79892, suggesting moderate variability in the price. In contrast, Price Each, with a mean of 84.45296 and a standard deviation of 20.22993, exhibits less variability compared to MSRP. The skewness and kurtosis values provide insights into the distribution shape and tail behaviour of the variables. Overall, these descriptive statistics offer a comprehensive understanding of the dataset's central tendency, variability, and distribution characteristics for each variable.

Quantity Ordered		*Sales*		*MSRP*		*Price Each*	
Mean	34.636	Mean	3613.123	Mean	102.136	Mean	84.45296
Standard Error	0.59898	Standard Error	117.392	Standard Error	2.58035	Standard Error	1.279453
Median	34	Median	3263.96	Median	99	Median	100
Mode	29	Mode	#N/A	Mode	118	Mode	100
Standard Deviation	9.470706	Standard Deviation	1856.131	Standard Deviation	40.79892	Standard Deviation	20.22993
Sample Variance	89.69428	Sample Variance	3445221	Sample Variance	1664.552	Sample Variance	409.2499
Kurtosis	-0.64676	Kurtosis	1.127057	Kurtosis	-0.19836	Kurtosis	-0.40344
Skewness	0.256745	Skewness	1.013489	Skewness	0.517104	Skewness	-0.9678

Range	51	Range	10626.85	Range	181	Range	73.12
Minimum	15	Minimum	652.35	Minimum	33	Minimum	26.88
Maximum	66	Maximum	11279.2	Maximum	214	Maximum	100
Sum	8659	Sum	903280.9	Sum	25534	Sum	21113.24
Count	250	Count	250	Count	250	Count	250

Correlation

The correlation matrix indicates the relationships between Quantity Ordered, Sales, and Price Each. There's a moderate positive correlation of approximately 0.514 between Quantity Ordered and Sales, suggesting that as the quantity ordered increases, sales tend to increase as well. Similarly, there's a weak positive correlation of about 0.664 between Sales and Price Each, indicating that higher-priced items may contribute to higher sales, albeit to a lesser extent. However, there seems to be a negligible correlation of approximately -0.013 between Quantity Ordered and Price Each, implying that changes in the quantity ordered don't significantly impact the individual item price.

	Quantity Ordered	*Sales*	*Price Each*
Quantity Ordered	1		
Sales	0.513951	1	
Price Each	-0.01254	0.663973	1

Store Dataset Report

Introduction

This dataset comprises sales data from a retail store, encompassing various attributes such as customer demographics (Gender, Age Group), transaction details (Order ID, Status), product specifics (Category, SKU), and shipping information. Our analysis is geared towards elucidating customer behavior and product trends, with the goal of uncovering patterns, preferences, and correlations within the data. By harnessing these insights, businesses can refine marketing strategies, streamline inventory management, and elevate overall customer satisfaction.

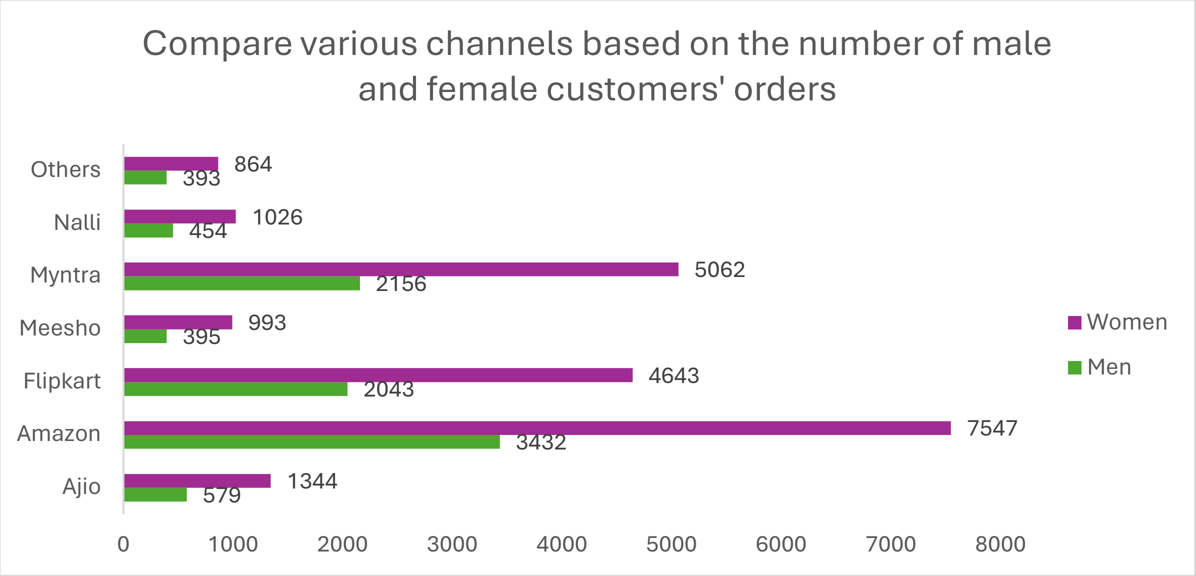
Questionnaire

1. Compare various channels based on how many male customers order and female customer order.
2. Compare all the categories of order where amount is less than 1500 and greater than 5000.
3. How many Customers are there whose age is 30 and above and state is Delhi.
4. Which of the following state perform better than other, Delhi, Tamil Nadu, Maharashtra, Rajasthan.
5. Which city performed better than all other cities based on highest order placed.
6. Compare various categories of items based on most quantity sold and show which gender buys the most category.

Analytics

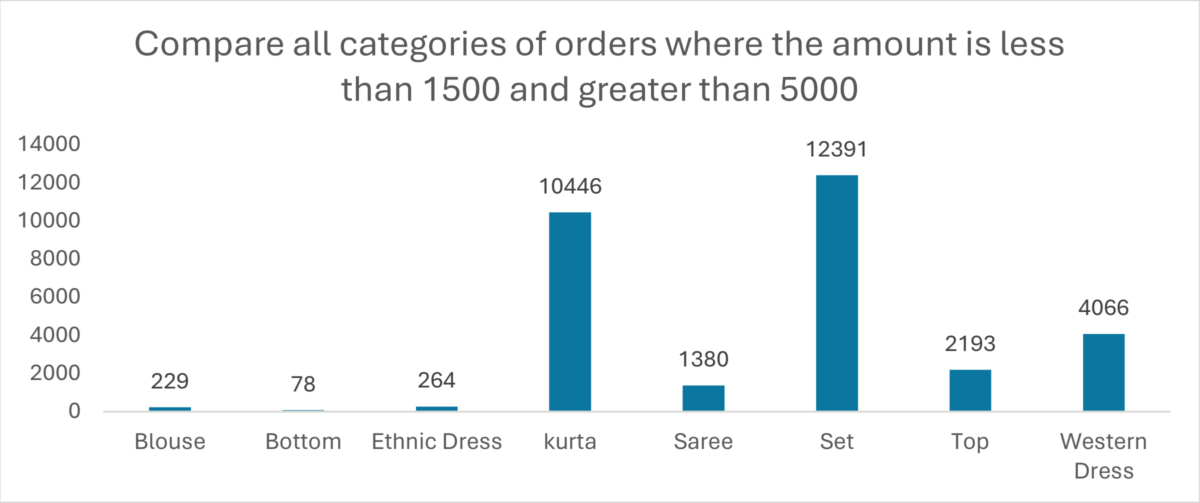
1. Compare various channels based on how many male customers order and female customer order?

Amazon leads in the sales in both men and women category followed by Myntra and Flipkart. Amazon sold almost 3432 units in men category and almost 7547 units in women category. Myntra sold 2156 units in men section and 5062 units in women section.



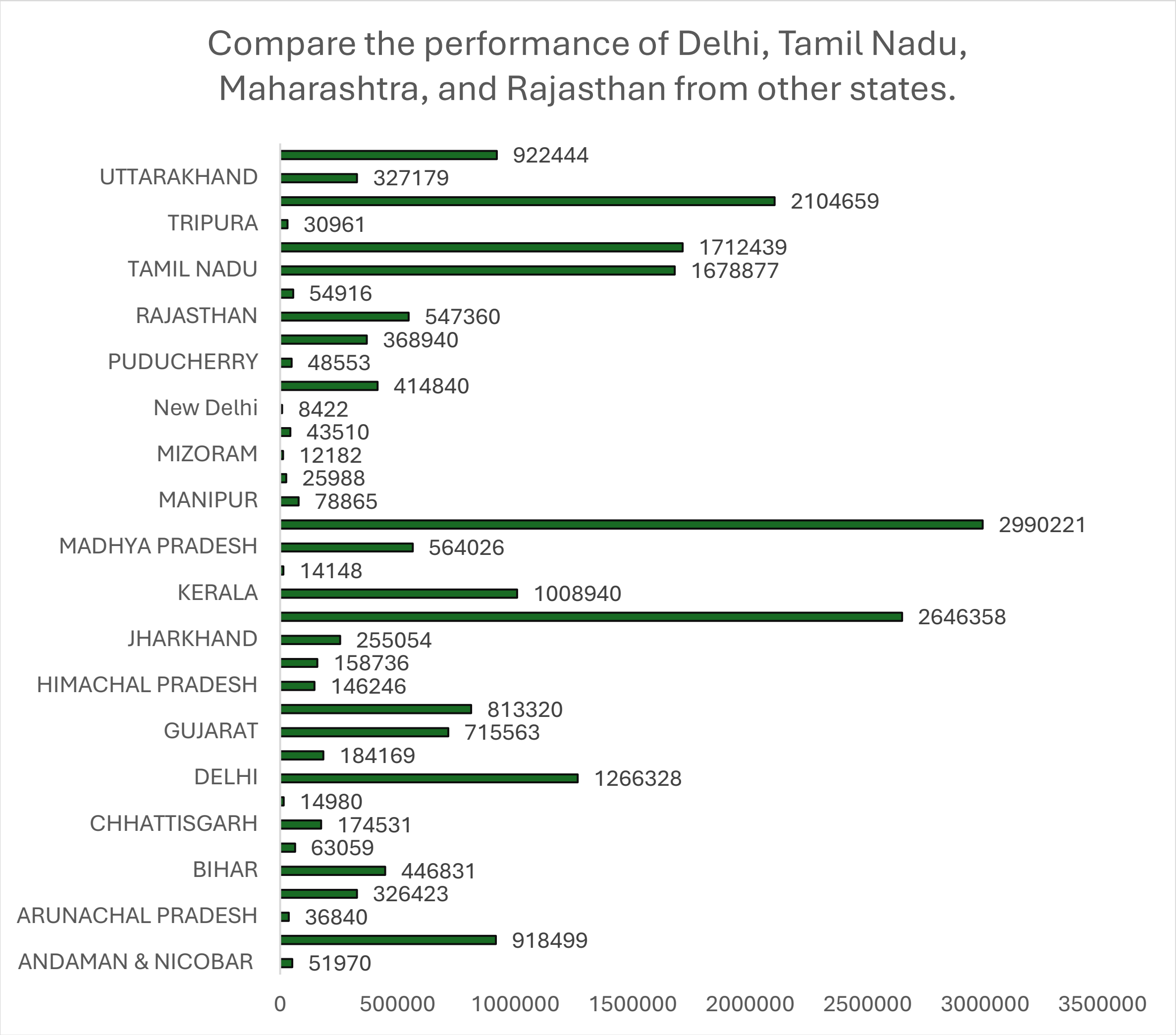
2. Compare all the categories of order where amount is less than 1500 and greater than 5000.

This analysis helps in comparing the categories of order where amount is less than 1500 and greater than 5000. Showing the kurta(12391) and set(10446) with highest count of the orders followed by western dress, top and saree.



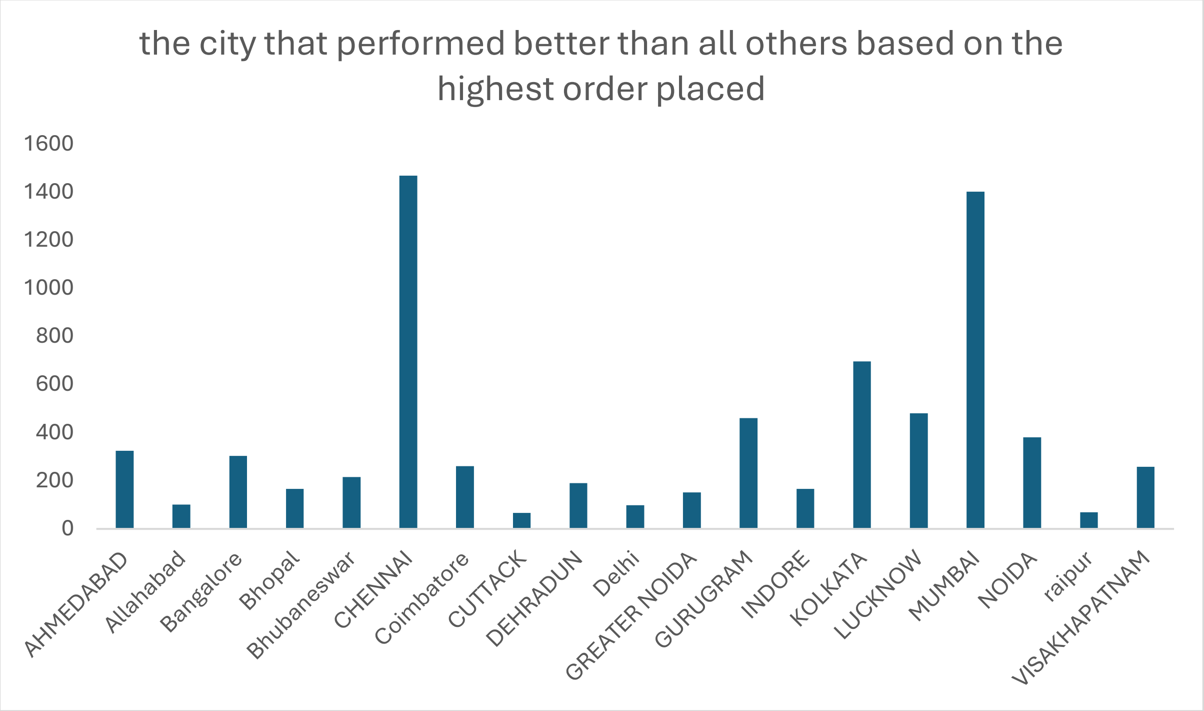
4. Which of the following state perform better than other, Delhi, Tamil Nadu, Maharashtra, Rajasthan.

This analysis shows which states performed better than the states mentioned above and Karnataka (2646358) has the highest performance than the other states followed by Uttar Pradesh(2104659) and Telangana(1712439).



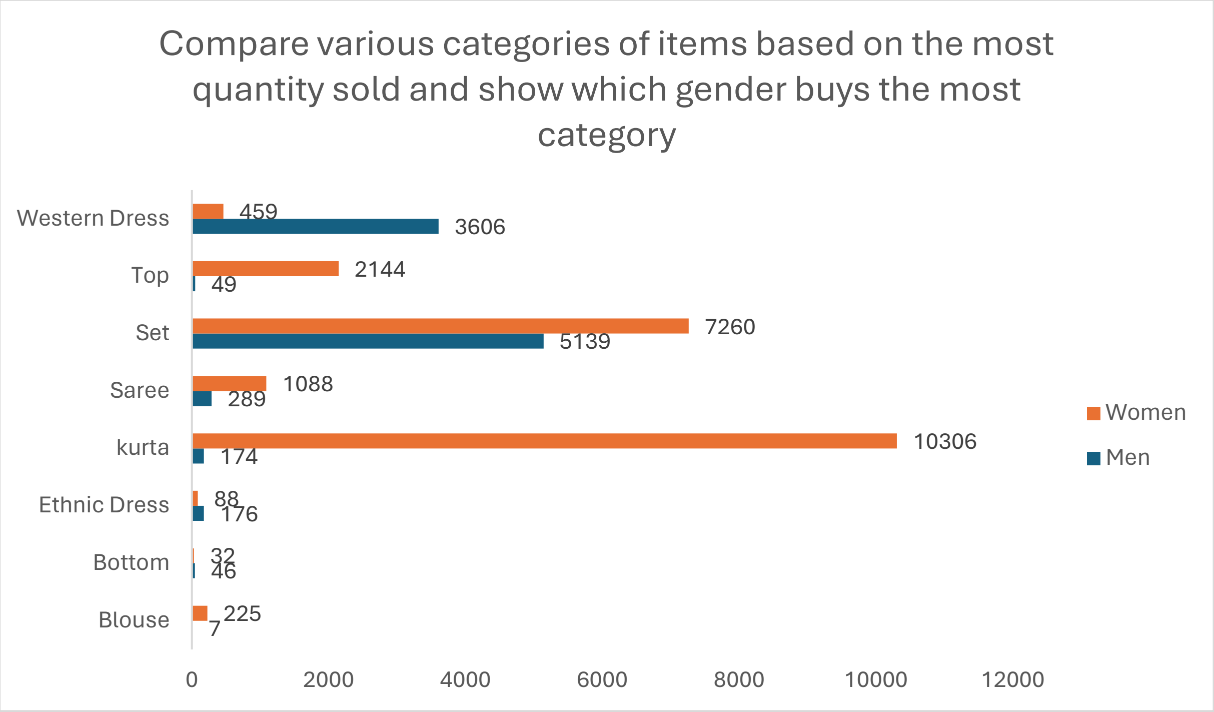
5. Which city performed better than all other cities based on highest order placed.

Based on the graph recorded we can actually see which city performed better than all other cities based on highest order placed, so according to graph Bangluru has the highest order placed with 2673 orders followed by Hyderabad(1998).



6. Compare various categories of items based on most quantity sold and also show which gender buys the most category.

This analysis shows the comparison of various categories of items based on most quantity sold which is kurta bought by women set bought by women followed by men and western dress followed by top for both men and women.



Conclusion And Review

The analysis highlights Amazon's dominance in sales across both men's and women's categories, with Myntra and Flipkart following closely behind. Amazon leads in sales for both men's and women's categories, followed by Myntra and Flipkart. Top-selling items include kurta and set, with Karnataka and Bangalore showing the highest sales performance.

The analysis provides valuable insights into sales trends and regional performance, aiding decision-making for retailers. However, further exploration into additional factors influencing sales could enhance the analysis. Overall, the findings offer valuable information for optimizing sales strategies in competitive markets.

Regression

The regression analysis for the store dataset indicates that the model has a multiple (R) value of approximately 0.172, suggesting a weak positive correlation between the independent variables (quantity and size) and the dependent variable (amount). The (R^2) value, which measures the proportion of the variance in the dependent variable explained by the independent variables, is approximately 0.030. This suggests that only about 3% of the variability in the amount can be explained by the quantity and size.

In terms of significance, the ANOVA results show that the regression model is statistically significant, as indicated by the very low p-value of 0 for the regression. However, when looking at the coefficients, it's observed that the coefficient for X Variable 1 (quantity) is not statistically significant, with a p-value of 0.632. On the other hand, the coefficient for X Variable 2 (size) is highly significant, with a very low p-value (approximately 1.3 * 10^{-205}), indicating that size has a substantial impact on the amount.

The intercept term is also statistically significant, indicating that even when quantity and size are zero, there is still a significant amount expected, as evidenced by the low p-value and the confidence intervals for the intercept coefficient.

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.172398
R Square	0.029721
Adjusted R Square	0.029659
Standard Error	264.5693
Observations	31047

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	66561870	33280935	475.4629	0
Residual	31044	2.17E+09	69996.92		
Total	31046	2.24E+09			
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*

Intercept	185.155	16.57854	11.16836	6.61E-29	152.6604
X Variable 1	0.047626	0.099327	0.479489	0.631594	-0.14706
X Variable 2	492.0276	15.95904	30.83065	1.3E-205	460.7472

Anova-1 factor

The single-factor ANOVA test conducted on the Qty and Amount groups reveals a highly significant result. The between-groups variance, which measures the variability between the Qty and Amount groups, is extremely large (SS = 7.2 * 10^9), resulting in a very high F-statistic (F = 199639.8) and an associated p-value close to zero (p < 0.001). This indicates that there is a significant difference between the Qty and Amount groups concerning their means. The within-groups varian.ce, representing the variability within each group, is also considerable (SS =2.24 * 10^9), reflecting the dispersion of data points around their respective group means. Overall, the ANOVA test suggests a strong statistical significance in the difference between Qty and Amount groups.

Anova: Single Factor						
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Qty	31047	31237	1.00612	0.008853		
Amount	31047	21176377	682.0748	72136.38		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	7.2E+09	1	7.2E+09	199639.8	0	3.841609
Within Groups	2.24E+09	62092	36068.2			
Total	9.44E+09	62093				

Anova- 2 factor

The two-factor ANOVA conducted on Age, Qty, and Amount reveals interesting insights. Regarding rows, the variability in the data across different groups (SS = 7.49 * 10^8) doesn't show a significant difference between them (p = 0.468). However, the variability between columns is substantial (SS =9.09*10^9), indicating a significant difference among the factors Age, Qty, and Amount (p < 0.001). The error term, representing variability within groups, is also noteworthy (SS = 1.5*10^9), showing dispersion within each combination of factors. Overall, the ANOVA results suggest a statistically significant difference between the factors Qty and Amount concerning their means, but no significant difference across age groups.

Anova: Two-Factor Without Replication				
SUMMARY	*Count*	*Sum*	*Average*	*Variance*
Row 1	3	421	140.3333	42116.33
Row 2	3	1479	493	685648
Row 3	3	521	173.6667	59609.33
Row 4	3	750	250	172171
Row 5	3	607	202.3333	88482.33

Row 31044	3	974	324.6667	283326.3
Row 31045	3	1145	381.6667	403529.3
Row 31046	3	446	148.6667	47506.33
Row 31047	3	828	276	199225
Age	31047	1226250	39.49657	228.5307
Qty	31047	31237	1.00612	0.008853
Amount	31047	21176377	682.0748	72136.38

ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Rows	7.49E+08	31046	24134.08	1.000774	0.468198	1.016275
Columns	9.09E+09	2	4.54E+09	188446.6	0	2.995877
Error	1.5E+09	62092	24115.42			
Total	1.13E+10	93140				

Descriptive Statistics

The mean age is approximately 39.50 years, with a standard deviation of 15.12. The data's distribution is slightly skewed to the right (skewness = 0.73), and its kurtosis indicates a relatively normal distribution (kurtosis = -0.16). On average, the quantity ordered is about 1.01, with a small standard deviation of 0.09. The mode is 1, indicating that this value appears most frequently in the dataset. However, the data is heavily right-skewed (skewness = 19.45) and exhibits high kurtosis (kurtosis = 475.36), suggesting a heavily tailed distribution. The average amount is approximately 682.07, with a considerable standard deviation of 268.58. The data is moderately skewed to the right (skewness = 1.05) and has a slightly heavier tail (kurtosis = 1.77). The range of values spans from 229 to 3036.

Age		*Qty*		*Amount*	
Mean	39.49657	Mean	1.00612	Mean	682.0748
Standard Error	0.085795	Standard Error	0.000534	Standard Error	1.524289
Median	37	Median	1	Median	646
Mode	28	Mode	1	Mode	399
Standard Deviation	15.11723	Standard Deviation	0.094088	Standard Deviation	268.5822
Sample Variance	228.5307	Sample Variance	0.008853	Sample Variance	72136.38
Kurtosis	-0.1587	Kurtosis	475.3566	Kurtosis	1.768676
Skewness	0.72916	Skewness	19.4509	Skewness	1.052904
Range	60	Range	4	Range	2807
Minimum	18	Minimum	1	Minimum	229
Maximum	78	Maximum	5	Maximum	3036
Sum	1226250	Sum	31237	Sum	21176377
Count	31047	Count	31047	Count	31047

Correlation

The correlation matrix reveals the relationships between Age, Qty (quantity), and Amount variables. Firstly, Age shows an almost negligible positive correlation with Qty, with a correlation coefficient of around 0.0049, indicating an extremely weak association. Similarly, the correlation between Age and Amount is also very weak, standing at approximately 0.0035. Conversely, there appears to be a slightly stronger positive correlation, though still weak, between Qty and Amount, with a correlation coefficient of about 0.1724. This suggests that as the quantity ordered increases, there's a modest increase in the total amount. Overall, these correlation values signify subtle connections between the variables, with the quantity ordered having the most notable influence on the total amount compared to Age.

	Age	*Qty*	*Amount*
Age	1		
Qty	0.004884	1	
Amount	0.003522	0.172377	1

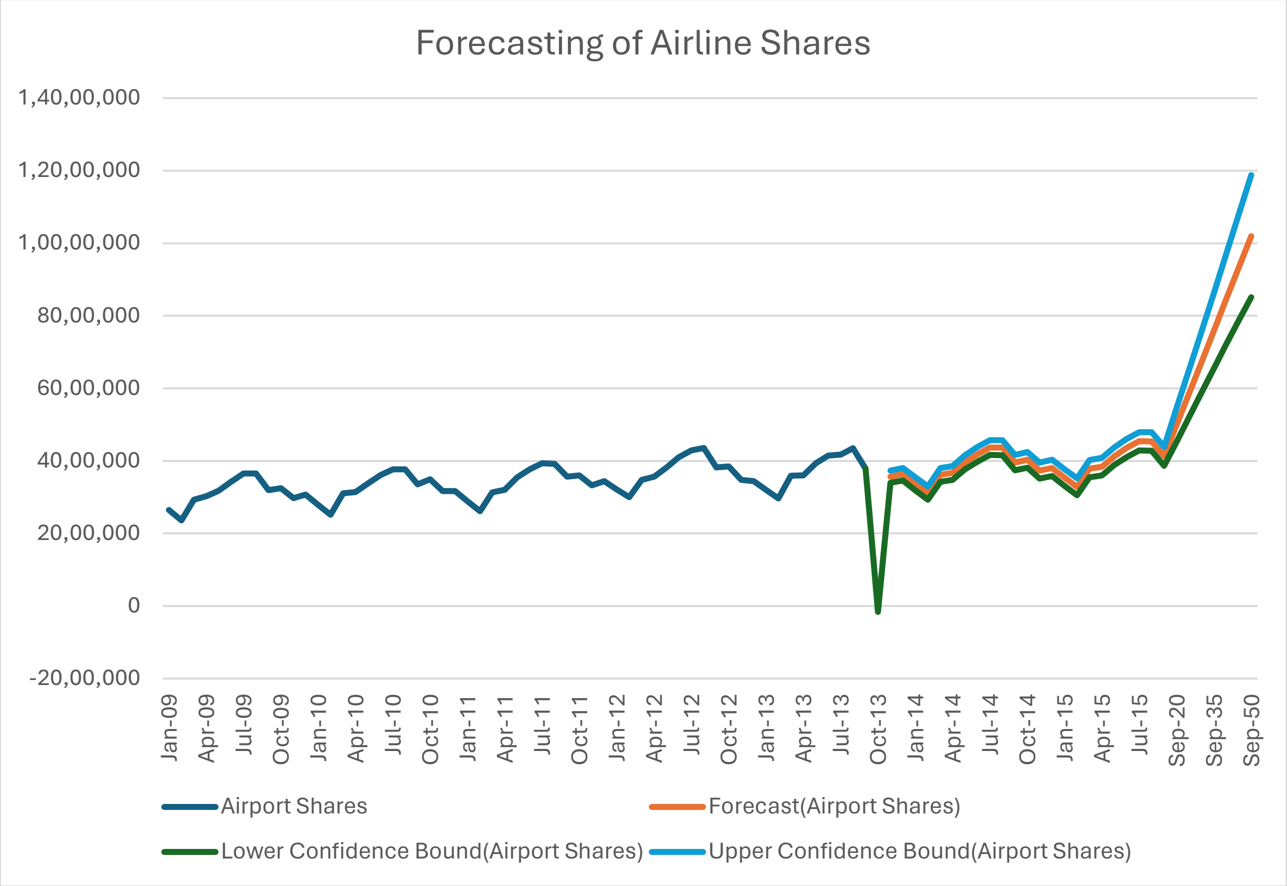
Airline Shares Forecast Analysis

The Shares dataset of Airline(Emirates) showing the time series forecasting of shares from year 2016 to 2050 having the known shares of date series from 2009 to 2015.

Date	Airline Shares	Forecast(Airline Shares)	Lower Confidence Bound(Airline Shares)	Upper Confidence Bound(Airline Shares)
Jan-09	26,44,539			
Feb-09	23,59,800			
Mar-09	29,25,918			
Apr-09	30,24,973			
Nov-09	29,71,484			
Jan-10	27,85,466			
Feb-10	25,15,361			
Mar-10	31,05,958			
Nov-10	31,63,659			
Jan-11	28,83,810			
Feb-11	26,10,667			
Mar-11	31,29,205			
Apr-11	32,00,527			
Apr-12	35,63,007			
May-12	38,20,570			
Oct-12	38,44,987			
Nov-12	34,78,890			
Dec-12	34,43,039			
Jan-13	32,04,637			
Feb-13	29,66,477			
Jul-13	41,76,486			
Aug-13	43,47,059			
Sep-13	37,81,168	37,81,168	37,81,168	37,81,168
Oct-13			-1,62,369	
Nov-13		35,62,680	33,95,234	37,30,125
Dec-13		36,33,798	34,61,388	38,06,209
Jan-14		33,66,457	31,89,182	35,43,732
Feb-14		31,10,903	29,28,857	32,92,949
Apr-15		38,39,280	35,97,219	40,81,340
Sep-15		41,26,863	38,65,432	43,88,294
Sep-20		49,93,668	45,29,269	54,58,066
Sep-25		58,60,472	52,07,346	65,13,598
Sep-30		67,27,277	58,83,194	75,71,361
Sep-35		75,94,082	65,52,552	86,35,611
Sep-40		84,60,887	72,13,929	97,07,844
Sep-45		93,27,691	78,66,787	1,07,88,596
Sep-50		1,01,94,496	85,10,985	1,18,78,007

The forecast sheet provides predicted values for Airline Shares from January 2009 to September 2015, with additional projections for September 2020, 2025, 2030, 2035, 2040, 2045 and 2050. These forecasts are complemented by Lower and Upper Confidence Bounds, indicating the range of expected values with a certain level of confidence. The data allows for insight into expected trends and potential variability in Airline Shares over the specified time period.

The forecasted Airline Shares span a wide range of values across various years, providing insight into the expected trends in Airline traffic. For instance, the predicted shares for September 2020, 2025, 2030, 2035, 2040, and 2045 are 49,93,668; 58,60,472; 67,27,277; 75,94,082; 84,60,887; and 93,27,691, respectively and for the 2050 it's 1,01,94,496. These values indicate a steady increase in Airline shares over the years, suggesting a sustained growth trajectory in air travel demand. Additionally, the Lower and Upper Confidence Bounds offer a range of potential values around these predictions, highlighting the uncertainty inherent in forecasting future trends in Airline shares.



The Graph shows the Airline shares, forecast, lower bound, upper bound. The line graph visually represents the variation in Airline Shares over time. The graph illustrates a clear upward trend in Airline shares from 2009 to 2050, with occasional fluctuations reflecting changes in air travel demand. Particularly notable is the significant increase in shares projected for the coming decades, indicating a robust growth trajectory in Airline traffic. This visual representation effectively communicates the expected trends in Airline shares, showcasing the anticipated expansion in air travel activities over the forecasted period.

A compelling narrative of the evolution of Airline shares over the specified timeline, offering insights into the dynamic nature of the aviation industry. As depicted, the consistent upward trajectory in Airline shares underscores the sector's resilience and enduring appeal, despite occasional fluctuations attributed to various factors such as economic conditions, technological advancements, and geopolitical events. This graphical representation serves as a valuable tool for stakeholders and decision-makers, enabling them to glean actionable insights into the future trajectory of air travel and make informed strategic decisions to capitalize on emerging opportunities and potential challenges.