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BSAN 360-001 - December 8th 2025
Githib Link: https://github.com/IvanQiu1/BSAN360Project.git

Dataset Description:

Overview of the Dataset:

- Coffee Shop Sales Dataset
  - Contains 3,530 coffee sales transactions recorded in a café
- 3,547 rows, 11 columns, 0 missing data

Dataset Description:

- Data types include Float, Integer Categorical, and Datetime
- Columns: # hours of days | Cash type | # money | Coffee name, Time of Day | Weekday | Month Name | #Weekdaysort | # Monthsort | Date | Time

Source:
https://www.kaggle.com/datasets/anassarfraz13/coffee-sales-dataset

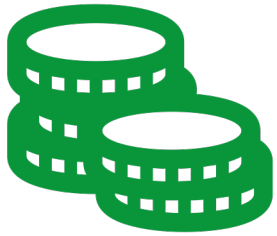
Dataset Description:

Dataset Stats:

- Average Sale: $31.65
- Hour ranges: 6-22 hours
- Common Drink: Americano with Milk (809 orders)
- Payment type: 100% by Card
- Mean sales amount ≈ $31.65; Min $18.12; Max $38.70; Std ≈ $4.88.

Research Question:

Question 1: How do sales trends vary by day of the week or time of day? (ANOVA / Time series)



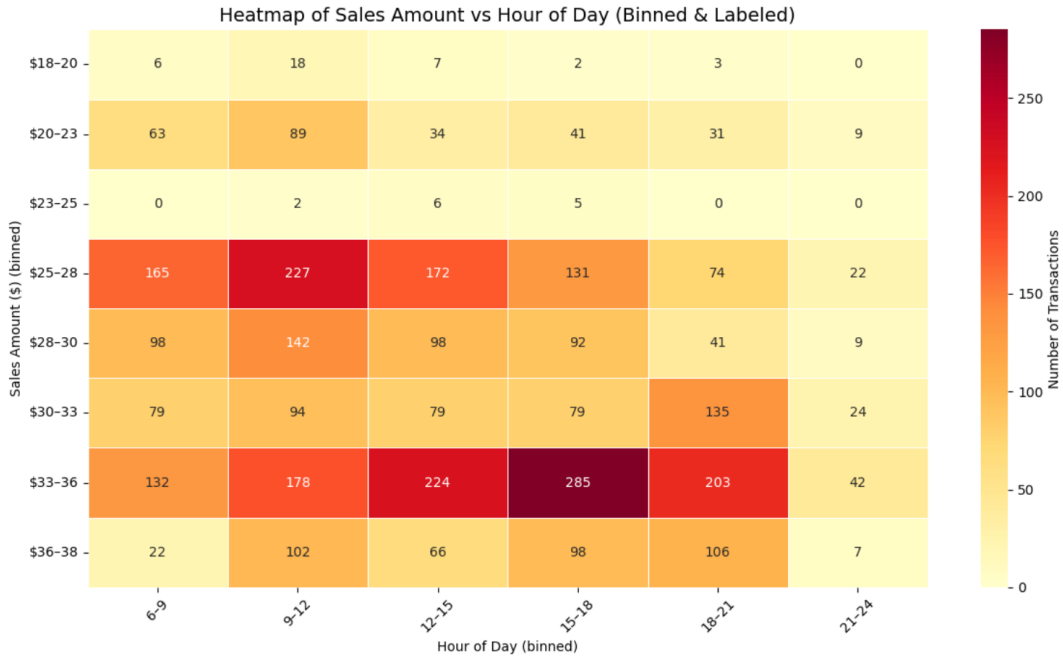
Question 2: What payment methods are most used, and do they correlate with purchase amount or frequency?

Sales Trend:

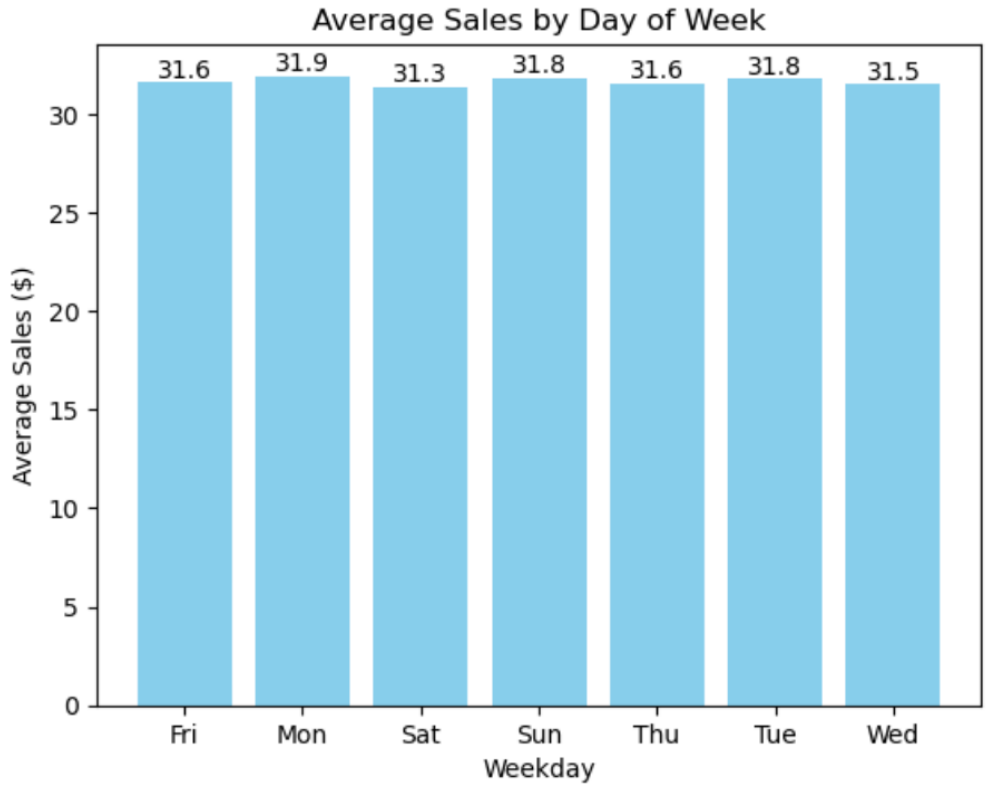
Average Sales highest at night($32.89)

Monday and Fridays shows slightly higher averages

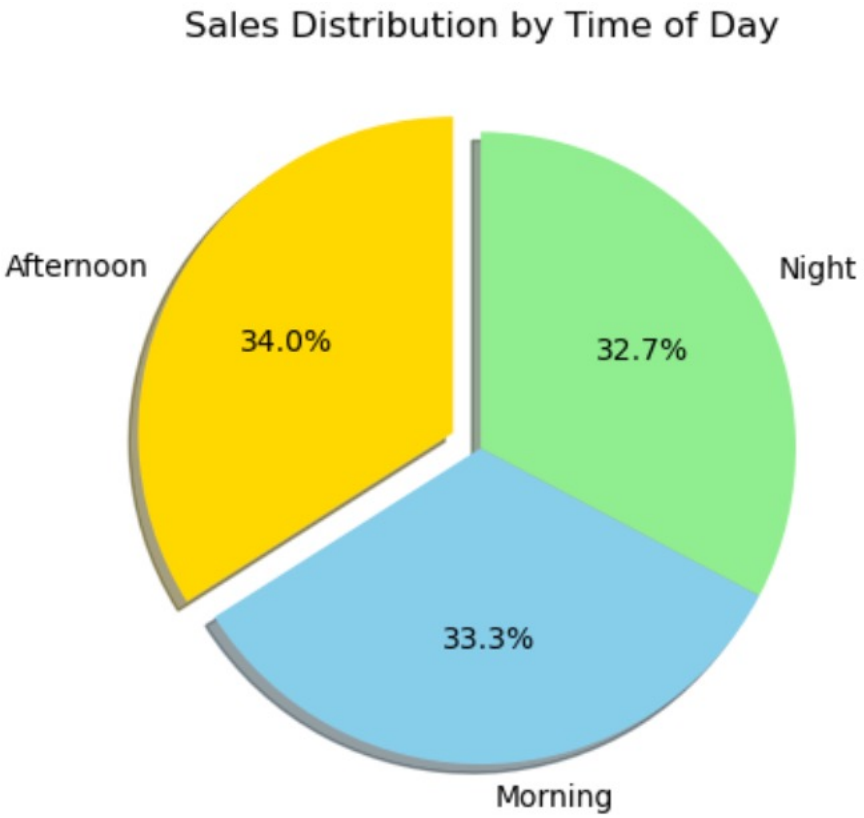
Heatmaps and histograms indicate clustered spending around $28–38



Average Sales by Weekday:



Total Sales by Time of Day

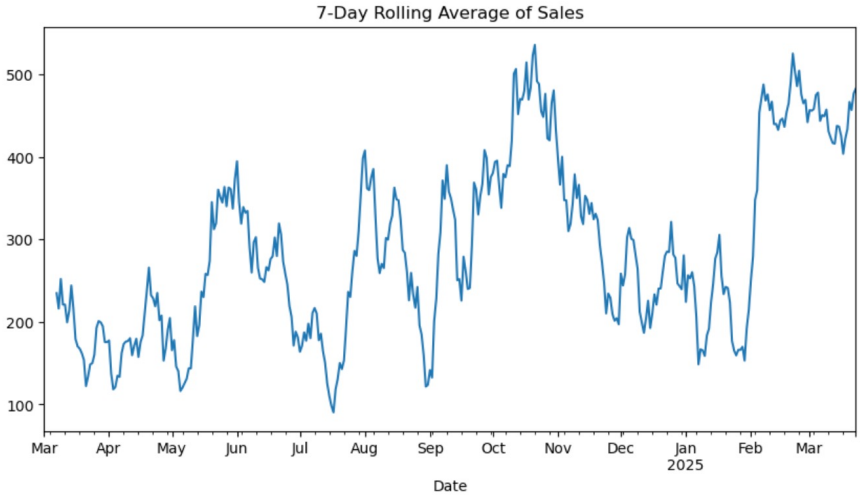


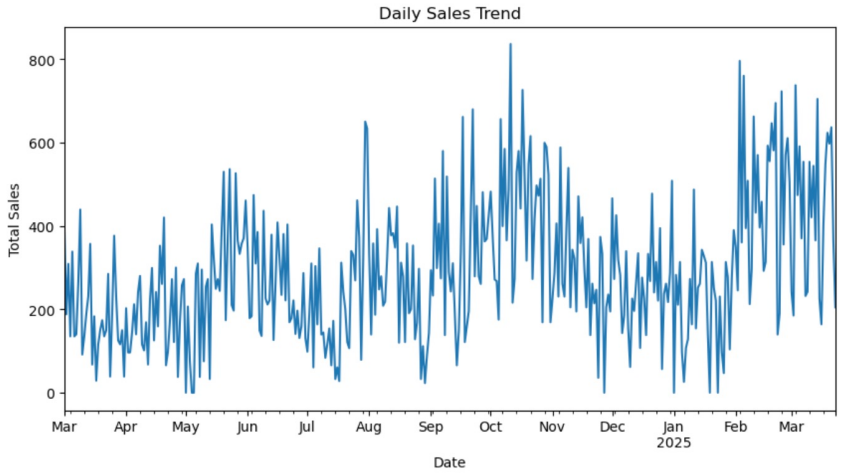
ANOVA Test for Time of Day

AMOVA compares Sales Amount across Morning/Afternoon/Night

- F-Statistic = 78.218
  - This shows the differences between time-of-day, groups are **much bigger** than random variation within the groups.
- P=value = 5.74e-34
  - The p-value shows extremely strong evidence that sales amounts differ across time-of-day groups. The probability that these differences occurred by chance is nearly zero.
  - This is far below 0.05, so we reject the null hypothesis.

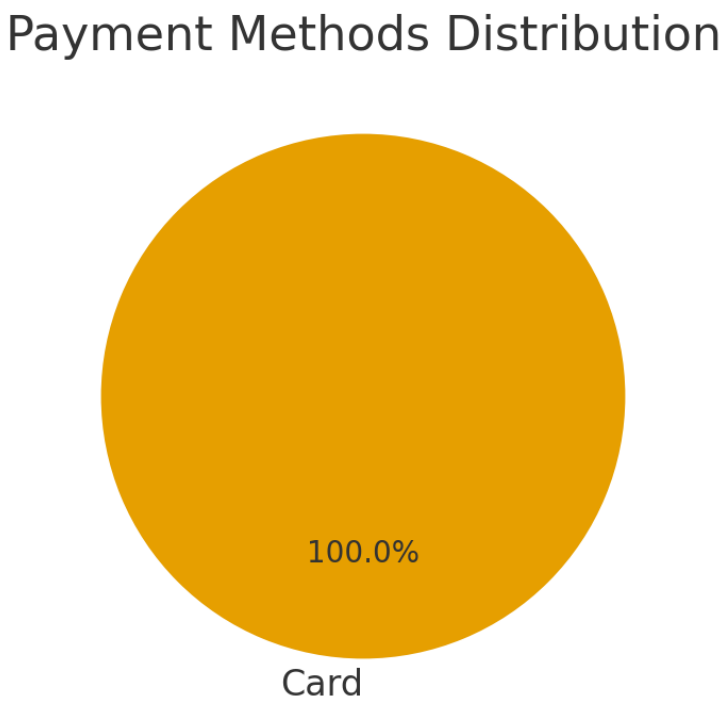
Time series Plot





Payment Method:

100 % Pay by Card



Conclusion/Recommendations

Sales are consistent across the weekdays: mean of $31.3-$31.9

Sales tend to be higher in the afternoon

Based on the Time Series Plot, Mid October have the best sales

Payment method is 100% card

Recommendation:

- Expand payment-type recording
- Experiment with promotions in slower periods time of day and month.