Statistics and Data Analysis

Unit 01 – Lecture 04: In-class Activity (Cleaning + Summary + Plots)

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https://github.com/tali7c/Statistics-and-Data-Analysis

Quick Links

Task Deliverables Solution Wrap-up

Agenda

What We Will Do Today

You will complete a small end-to-end preprocessing + EDA task:

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- create summary tables
- create 3 plots and write short insights

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- 5 min: wrap-up + exit question

Dataset

File: `data/campus_cafe_transactions.csv`

Columns:

- `date` (datetime), `category` (Snacks/Drinks/Stationery)
- `payment_mode` (Cash/UPI/Card)
- `units`, `unit_price`, `discount_pct`

Note: It intentionally includes missing values and invalid entries to clean.

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- Compute missingness % per column

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- Handle discount outliers (cap to a reasonable range)
- Handle price outliers (replace with category median or cap; justify)

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- `is_weekend` from `date`

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- total net revenue by `payment_mode`
- top 5 transactions by `net_amount`

Task 5: Plots (10 minutes)

Create and save:

- bar chart: net revenue by category

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Create and save:

- bar chart: net revenue by category
- histogram: net amount per transaction
- line chart: daily net revenue

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- Three plots saved in `images/`
- 3–5 short insights + 2 limitations/caveats

Solution Script (Python)

After attempting yourself, run:

```
python demo/activity_solution.py
```

Outputs:

- `data/campus_cafe_clean.csv`
- summary CSVs in `data/`
- plots in `images/`

Expected Key Results (Example)

Net revenue by category (after cleaning):

Category	Count	Net Revenue (INR)
Snacks	9	1129.25
Drinks	8	368.00
Stationery	7	283.90

Question: Why is Snacks revenue much higher?

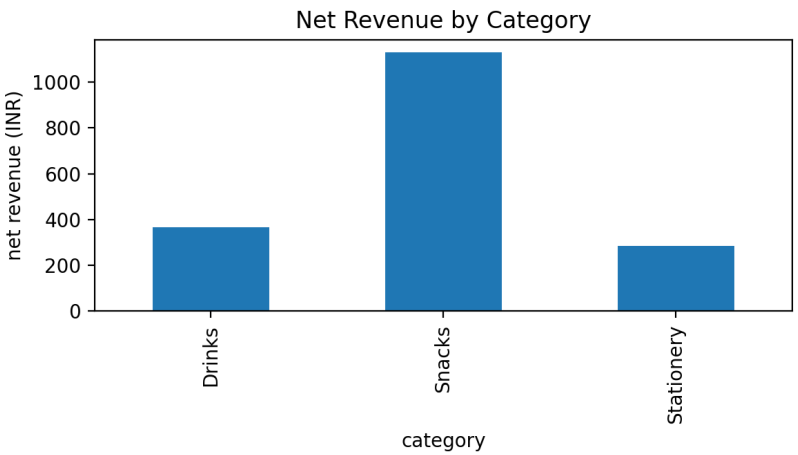
Expected Key Results (Payment Mode)

Net revenue by payment mode (after cleaning):

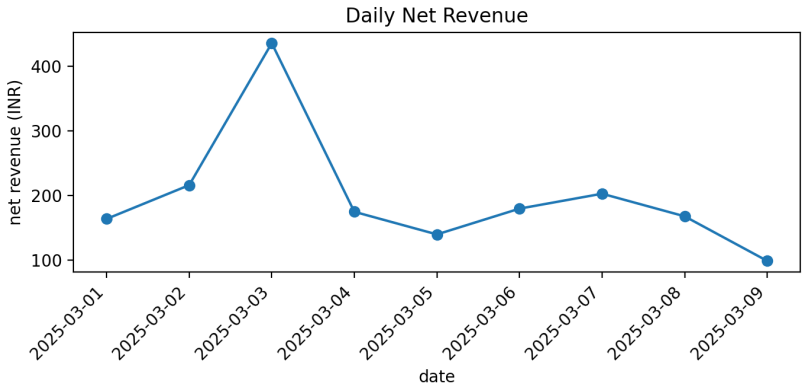
Mode	Count	Net Revenue (INR)
UPI	12	1124.15
Cash	6	304.00
Card	6	353.00

Example Plots

Revenue by Category



Daily Revenue



Write Insights + Caveats

Examples of insights:

- Snacks contribute the largest share of revenue in this sample week.

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- A few large transactions dominate total revenue (check top-5 table).

Examples of caveats:

- Small dataset (only a few days) $\Rightarrow$ not representative.
- Cleaning choices (caps/median replacement) can change results.

Wrap-up

- A good summary combines: cleaning + engineered features + tables + plots

Exit question: What is one cleaning rule you applied and why?

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- Document your rules so results are reproducible
- Always communicate limitations honestly

Exit question: What is one cleaning rule you applied and why?