Company Background:

Bean & Brew is an independent café located just off a large university campus in a mid-sized urban Canadian city. It's exactly the kind of place where you can find:

- A "Drink of the Week" chalkboard with handwritten doodles!!
- Skilled baristas who know most of their regulars' orders off the top of their heads, and
- Every seat taken before lunchtime during midterm season

The basics:

- Opened: 2019
- Seats: 42 (plus a few window bar stools)
- Hours: 7:00 AM – 4:00 PM, every day
- Core customers: students, staff, and remote workers within a 10–15 minute walk

Their mission:

- Serving great coffee at even greater prices
- Being a place where people actually want to hang out with friends
- Reducing waste without coming off as preachy

Maryam, the owner, summarizes it like this:

"If people leave with a good coffee, a quieter mind, and one fewer cup in the trash, that's a win. But we also, unfortunately, have to still exist as a business next year so there's that."

Recent Changes:

Bean & Brew has done its fair share of experimentation with sustainability before; everything ranging from small discounts to "Plastic-Free July" posters, and even reusable cup stickers. But it's safe to say that, simply put, the results were mixed....

In late 2023 though, they decided to try something way bolder.

Construction period

- From September 4 – December 12, 2022, major roadwork took place right in front of the café.
- The sidewalk was partly blocked, there was constant noise, and the storefront was significantly harder to notice.

November 1, 2023 – Rebrand & Cup Policy
On November 1, 2023, three things happened all at once:

- Cup surcharge introduced:
  - A $0.50 surcharge was added to all takeout drinks served in disposable cups.
  - Dine-in drinks in ceramic cups are not charged the fee.
  - Customers who bring their own reusable cup also avoid the surcharge.   "Takeout" and "False" for own_cup were changed the surcharge

- Sustainability-forward rebrand
  - New branding, signage, and social media emphasizing principles of:
    - "Bring your mug, save a cup"
    - "Stay a while" study/catch-up vibe
  - The interior also changed slightly to feel more like a place to sit than a place to rush through, with tables moved closer together for group study and a couple of comfy chairs added for longer stays.

- Although they'd been selling merch year-round, they significantly ramped up on merch advertising at nearly the same time as the sustainability rebrand

Merch Advertising

- Increased advertising for their merch, which includes:
  - Reusable Coffee Cups
  - Tote Bags, and
  - Coffee Beans
- They truly hoped merch would both:
  - Encourage reusable cup habits
  - Create a small new revenue stream

Maryam is now asking:

Did this actually work? And if not, what should we change?

1. Did the increased advertising for the merch increased reusable cup use?
2. Did the increased advertising for the merch create a small new revenue stream?

The Challenge:

While Bean & Brew wants to contribute towards a more sustainable future (by increasing reusable cup use), they also need to remain financially healthy.

Some tensions they're currently dealing with:

- Reusable cups reduce packaging costs, but discounts and free perks may hurt margins.
- While Surcharges definitely push people toward reusables, they could also annoy price-sensitive customers who buy their coffee in the morning and/or on weekdays.
- Encouraging people to stay and work supports the "third place" vibe, but this could lead to the drink turnover per seat dropping.
- Merch is fun and on-brand, but it takes cash to order and shelf space to store.

They've given you transaction-level and item-level data covering:

- The construction period,
- The months leading up to the surcharge & rebrand,
- The months after.

Your team's job is to use this data to:

Design a sustainability strategy around reusable cups that Bean & Brew can realistically implement, supported by evidence from the data.

Your Role:

You are a small data consulting team brought in to help Bean & Brew's leadership answer three big questions:

1. Behaviour: Who actually brings reusable cups now? How does that differ by drink type, time of day, weekday vs weekend, etc.?
2. Money: What has been the financial impact of the new surcharge and rebrand?
3. Strategy: How should Bean & Brew adjust their pricing, promotions, and operations going forward?

You're not just here to make pretty charts (although pretty charts are always welcome!), but also to provide actionable insights the café can actually use to decide what to do next.

Data Overview:

You are given two files:

1. sales.csv – transaction-level data
2. items.csv – item-level details

Participants will likely want to join these tables on item_name early in their analysis.

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1. Sales.csv — Transaction-level data

Each row represents a single item sold. One customer visit with three items will appear as three rows.

Columns

- date
    Date of the transaction.

- time
    Time of the transaction (between 07:00 and 16:00).

- item_name
    The name of the item purchased (join key to items.csv).

- transaction_type
    "Takeout" or "Dine-in".

- surcharge
    "True" or "False". Indicates whether the $0.50 disposable cup surcharge was applied for this line item.

○ Only applies to certain takeout drinks ordered after November 1, 2023.

- **customer_id**
  An anonymous unique ID for each customer across visits.

- **own_cup**
  Boolean that describes whether a customer brought their own cup. Value is N/A for merchandise.

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2. items.csv — Product-level data

One row per menu item.

Columns

- **item_name**
  Name of the item (join key).

- **price**
  Price charged to customers before any surcharge.

- **production_cost**
  Estimated cost to the café of producing one unit (beans, milk, cup, etc., but not rent or labour).

- **item_type**
  "Drink", "Food", or "Merchandise" (T-shirts, reusable cups).

- **drink_temperature**
  "Hot", "Cold", or "N/A" for merchandise.

- drink_type
   "Coffee", "Tea", "Other" or "N/A" for merchandise.

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3. Data simplifications (for this case)

To keep the focus on behaviour and profitability, please assume:

- Prices and production costs for each item stay constant over the dataset period.
- The café is open 7:00 AM – 4:00 PM every day, including weekends and holidays.
- There are no other discounts, promotions, or loyalty programs beyond what's implied in the data.
- All monetary values are in the same currency.

Guiding Questions:

You don't have to answer all of these, but they're meant to spark ideas.

Behaviour

1. How did drink sales change after the surcharge and rebrand, compared to merch?
2. Are customers less likely to bring their own cups for cold drinks vs hot? Why might that be?
3. Did weekday morning customers react differently to the surcharge than customers who come on weekends or afternoons?
4. Has the mix of dine-in vs takeout, the mix of customers coming in on weekdays vs weekends, and/or the mix of customers coming in on mornings vs the afternoons changed since Bean & Brew started pushing a "stay and study" vibe?
5. Did the construction period (Fall 2022) have longer-term effects on customer patterns?

Financials

1. How did the surcharge affect revenue from drinks served in disposable cups?
2. When you factor in production costs, did total profit improve, worsen, or stay similar?
3. Are there specific drink or food categories where encouraging reusables has the biggest upside?

Customer Segments

1. Are customers who bring their own cups more likely to: look at customer ID
   a. Come back more often?
   b. Buy higher-margin items?
   c. Purchase merchandise?
2. Who buys merch, especially reusable cups? Are they mostly existing regulars or more occasional visitors?

Strategy & Operations

1. If Bean & Brew removed the surcharge tomorrow, what would you expect to happen to:
    a. Reusable cup usage?
    b. Revenue and profit?
2. If they increased the surcharge or added a discount for reusables, which segment would react the most?
3. What metrics (KPIs) should the café track going forward to know if their sustainability strategy is working?

Deliverables:

Each team must submit a slide deck that tells the story of your analysis and recommendations, as well as the Jupyter notebook with all your code. Please note that since you'll mostly be judged on your slide deck, your Jupyter notebook doesn't have to be pretty. However, we may refer to it for cross-checking some analyses.

Required:

1. **Slide deck (PDF or PPTX)**
   a. Max 10 content slides (not counting title, thank you slide or appendix).
   b. Must include:
      i. Problem framing – How you understand Bean & Brew's challenge.
      ii. Data & methodology – Briefly, how you cleaned / joined / explored the data.
      iii. Key insights – The 3–5 most important findings, supported by charts/tables.
      iv. Customer/behaviour story – Who is most affected and how.
      v. Financial impact – High-level revenue/profit view for your recommended strategy.
      vi. Recommendations – Clear, actionable steps Bean & Brew should take.
      vii. Risks & trade-offs – What could go wrong, what to monitor.

2. **Code/notebook**
   Submit a single Jupyter notebook with your main analysis.

Optional:

1. Appendix (optional but encouraged)
   a. Extra charts, checks, or sensitivity analyses you couldn't include in the main presentation
   b. Technical details of any modelling or segmentation

Presentation:

- Selected TOP 5 teams will have 5 minutes to present + 2 minutes Q&A on presentation day.
- At least half the team members must present.

Judging Criteria:

Total: 110 points

1. **Data Analysis – 40 pts**
   a. Data understanding & cleaning (10 pts)
      i. Joined tables correctly, handled obvious issues sensibly.
      ii. Shows awareness of limitations (e.g., construction period, no price changes).
   b. Exploratory analysis & insight (30 pts)
      i. Clear, well-labelled visuals and tables.
      ii. Goes beyond counts to look at patterns (e.g., before/after changes, segments).
      iii. Insights are grounded in the data, not just speculation.

2. **Bonus for Advanced / Creative Analysis – 10 pts**

   Extra points can be awarded for including:

   a. Simple modelling (e.g., logistic regression/classification, clustering).
   b. Scenario testing: "What if we change the surcharge by X?"
   c. Smart segmentation (e.g., morning customers vs non-morning customers using time/day).

You will not be penalized for skipping this. Strong EDA alone can still score well.

3. **Business Recommendations – 30 pts**
   a. Recommendations directly connect to the data and financial logic.

b. Clear explanation of trade-offs between sustainability & profit.
c. Concrete, implementable actions (not just "do more marketing").
d. Includes high-level estimates of financial impact and key KPIs.

4. **Presentation & Storytelling – 30 pts**
   a. Slides are clean, readable, and not text-dumped.
   b. The story flows: problem → analysis → insights → recommendations.
   c. Team explains charts clearly and answers questions thoughtfully.
   d. Finishes within the time limit.