

Hackathon Assignment Brief: Data-Driven Business Decisions

Objective: Analyze the Toy Store E-Commerce dataset to identify actionable business insights. Each student must formulate a business hypothesis, translate it into a statistical hypothesis, test it using the dataset, and make data-driven recommendations.

Dataset

- Source: [Toy Store E-Commerce Database](#)
 - Contains: sessions, pageviews, orders, returns tables
 - Focus areas: Marketing channels, conversions, customer segments, order amounts, returns
-

Deliverables

Each student must submit:

1. Business Hypothesis
 - Clear, testable, and specific
 - Example: "Paid marketing channels increase conversion rate."
 2. Statistical Hypothesis
 - Null hypothesis (H_0): Assumes no effect
 - Alternative hypothesis (H_1): Assumes there is an effect
 - Include significance level ($\alpha = 0.05$ recommended)
 3. Analysis & Checks
 - Data quality: Missing values, duplicates, outliers
 - Descriptive stats: Means, medians, distributions
 - Visualization: Line charts, histograms, boxplots, conversion funnels
 - Statistical tests: t-test, chi-square, ANOVA, correlation, regression (based on hypothesis)
 - Interpretation: Correct conclusion with respect to H_0/H_1
 4. Business Recommendations
 - Actionable insights grounded in analysis
 - Example: "Invest more in paid marketing channels because they improve conversion rate."
-

Checklist for Students

- ☐ Clearly stated business hypothesis
- ☐ Null and alternative statistical hypotheses

- ☐ Data cleaning and quality checks
 - ☐ Correct test selection & assumptions checked
 - ☐ Visualizations to support findings
 - ☐ Clear, actionable business recommendations
 - ☐ Use promptbi for all the above.
-

Optional Bonus

- Suggest new A/B tests or experiments
 - Build a predictive model for revenue, conversion, or repeat purchase likelihood
-

Possible A/B Tests Using the Dataset

A/B Test Idea	Metric to Compare	Notes
Paid vs organic marketing channels	Conversion rate, revenue per session	Test if paid traffic converts better
Desktop vs mobile users	Conversion rate, average order value	See if device affects behavior
New vs returning customers	Average order value, purchase frequency	Test if repeat customers spend more
Orders with free shipping vs no free shipping	Average purchase amount	Analyze if free shipping boosts order value
Seasonal promotions (holiday vs non-holiday sessions)	Revenue per session, conversion	Test if seasonal campaigns increase revenue
Email campaign recipients vs non-recipients	Conversion rate, average order value	Test effectiveness of

A/B Test Idea	Metric to Compare	Notes
		email marketing
Users who view product video vs those who don't	Conversion rate	Product content effectiveness
Cart abandonment reminder sent vs not sent	Cart completion rate	Test impact of reminders
Users who use search bar vs those who browse	Conversion rate, session length	Test impact of search functionality
Customers exposed to product recommendations vs not	Upsell/cross-sell revenue	Test recommendation engine effectiveness
Return policy visible vs hidden	Repeat purchase rate	Test impact of return policy transparency
Coupon/discount applied vs no discount	Average order value	Measure promotional incentive effectiveness
Different product images/layouts (if available)	Click-through & conversion	Test UX/design changes
Browsers (Chrome vs others)	Conversion rate	Check if experience varies by browser

A/B Test Idea	Metric to Compare	Notes
Users who interact with reviews vs not	Conversion rate, average order value	Test influence of social proof

Students can choose one or two A/B tests to complement their main hypothesis analysis.

Submission Format: - Short report or slide deck including: 1. Business Hypothesis 2. Statistical Hypothesis 3. Analysis & Checks (with visuals and code if applicable) 4. Business Recommendations