



## 1 Mandala Data Test

This test evaluates your technical skills, critical thinking, and problem-solving abilities in the context of a real-world business scenario. You have **1 hour and 15 minutes** to complete all parts. Use any resources at your disposal, as this is an open-book test. We're interested in your approach, reasoning, and thought process.

Your responses will be a mix of code (**R or Python**) and written explanations.

## 2 Instructions

- Choose one format to submit your response:
  1. Preferably, use Quarto (.qmd) or Jupyter Notebook (.ipynb)
  2. Alternatively, submit your responses as follows:
    - a. A document (e.g., Word or PDF) containing your written responses and any visualisations or tables
    - b. A separate, runnable script file (R or Python) that contains all your analysis
- Make sure all code works when run and includes helpful comments explaining what it does. Clearly document any external data requirements, including file names and structures, so others can understand how to use the code with their own data
- Send your completed test to [recruitment@mandala.com](mailto:recruitment@mandala.com)

### 3 Test

Bikes-R-Us, a US-based bike taxi company, is considering launching its services in New York City. This expansion would put them in competition with traditional yellow taxis for short-distance urban transport. However, they want to avoid directly competing with app-based ride-sharing services like Uber, which often focus on longer trips and a different customer base.

The NYC transport market includes various modes of getting around the city, from public transit to private vehicles. Bikes-R-Us aims to carve out a niche within this ecosystem, specifically targeting short trips that might otherwise be served by taxis.

They've hired Mandala to analyse the existing taxi data and provide strategic insights to guide their entry into this complex and competitive urban transport landscape. Our goal is to help Bikes-R-Us understand the current market dynamics, identify potential opportunities, and develop a targeted strategy for successfully establishing their bike taxi service in New York City.

#### 3.1 Part 1

1. Load and clean the NYC Yellow Taxi Trip ONLY for January 2024 (data can be found [HERE](#)).
2. Conduct exploratory data analysis, focusing on summarising daily trip volume trends
3. Create visualisations for:
  - a. Daily trip distance distribution
  - b. Average fare amount by day of the week
  - c. Top 5 pickup locations and how they change across days of the week
4. Compute average trip speed for:
  - a. Each day of the week
  - b. Each day of the week and trip distance (e.g., short, medium, long)

### 3.2 Part 2

1. Analyse the relationship between trip fare and other factors that may explain the trip fare variability
2. Based on your findings from Part 1 and the above analysis, list the key takeaways for Bikes-R-Us
3. Discuss how external factors (weather, events) might impact taxi demand:
  - a. List potential effects on trip volume and characteristics
  - b. Outline a method to incorporate such data into your analysis

### 3.3 Part 3

As previously mentioned, Bikes-R-Us has hired Mandala to help them enter the New York City market. They want to compete with taxis but not with Uber. To help your team to develop a data-driven strategy for Bikes-R-Us, you have been tasked to:

1. Formulate a problem statement - what is the main question we are looking to answer?
2. Break the statement into 3-5 sub-questions that would need to be answered to solve the problem. For each of the sub-questions:
  - a. Propose an initial hypothesis.
  - b. Describe the required analysis to test these hypotheses and identify supporting data sources.

Remember to clearly explain your thought process throughout.

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