**HOTEL\_BOOKINGS ANALYSIS**

*Programming for Data Science*

1. **Author(s)**

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1. **Project characteristics**

This project explores a hotel bookings dataset to identify trends, patterns, and key factors influencing customer behavior. The dataset includes attributes such as booking status, lead time, customer demographics, and special requests. The analysis involves data cleaning, handling missing values, converting date formats, and generating visualizations to uncover insights such as booking cancellation trends, guest segmentation, and market dynamics. The findings are supported by interactive maps, heatmaps, and advanced visualizations created using libraries like seaborn and plotly.

1. **Used data sources**

* Hotel Bookings dataset (https://www.kaggle.com/datasets/garrettcannonweeks/hotel-bookings)

1. **Used packages**
2. **Pandas**
3. **NumPy**
4. **Matplotlib**
5. **Seaborn**
6. **Folium**
7. **The general elements of a program (pseudo-code)**
8. Importing necessary libraries (pandas, numpy, seaborn, etc.).
9. Loading the dataset and creating a working copy.
10. Performing initial data inspection:
    1. Viewing dataset structure (shape, info, describe).
    2. Checking for missing values and handling them.
11. Preprocessing the data:
    1. Converting date columns to appropriate formats.
    2. Handling categorical data (e.g., reservation status).
12. Performing EDA:
    1. Plotting cancellation rates and booking trends.
    2. Analyzing lead time, customer type, and other features.
13. Generating actionable insights using visualizations.
14. **Main problems that occurred during the implementation**
15. Missing Data:

Due to the large dataset, I had a large amount of NULL and DUPLICATE values needed to get handled carefully.

1. Data Types:

Columns like reservation\_status\_date needed conversion from object to datetime for proper analysis.

1. Complex Visualizations:

Geographical distributions and heatmaps required advanced tools like folium and plotly for clarity.