Introduction

The objective of this project is to analyze flight booking data from Easemytrip, focusing on routes between India's top six metro cities. This analysis aims to uncover patterns in flight prices, durations, and airline frequencies, providing insights for both consumers and airlines.

Data Overview

- **Dataset**: The analysis utilizes a dataset containing 300,261 entries and 11 features, sourced from `Clean_Dataset.csv`.
- **Features**: Key features include airline, source city, destination city, departure time, arrival time, price, and duration

Methodology

We utilized several key libraries for this analysis:

Pandas for data manipulation,

```
import pandas as pd
```

NumPy for numerical operations, and

```
import numpy as np
```

Matplotlib along with **Seaborn** for data visualization.

```
import matplotlib.pyplot as plt
import seaborn as sns
```

These tools allowed us to effectively analyze and visualize flight booking data.

Data Loading

The dataset was loaded into a Pandas DataFrame for analysis .

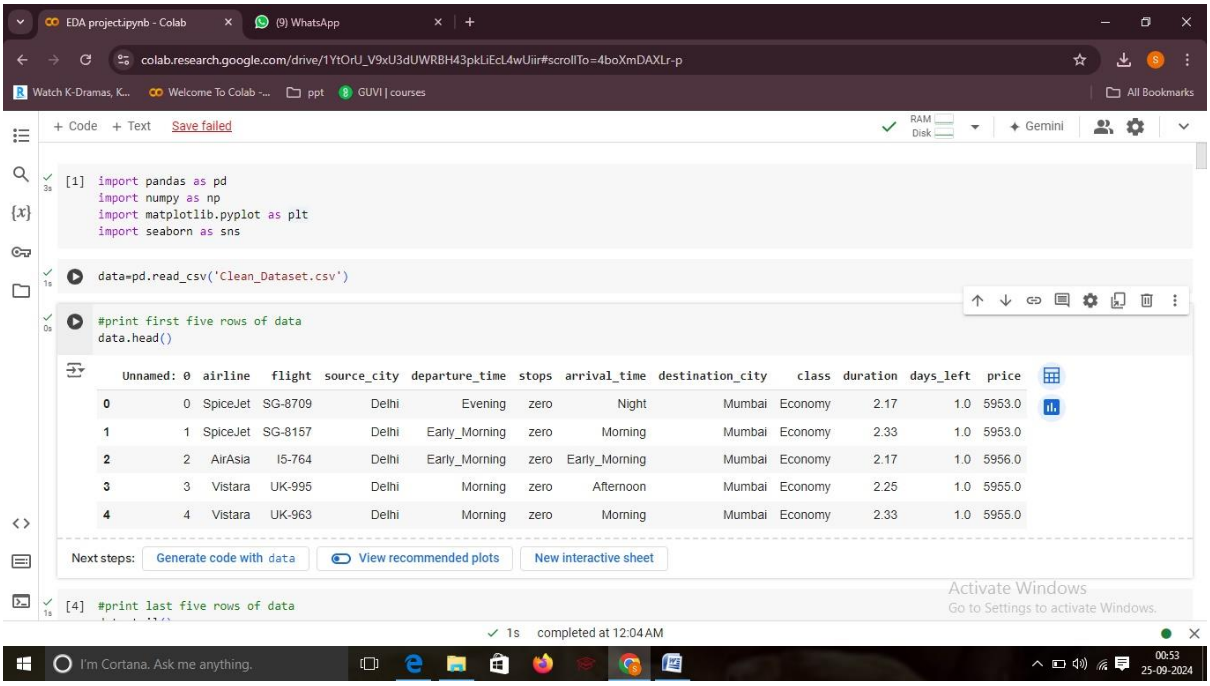
```
data=pd.read_csv('Clean_Dataset.csv')
```

Initial Data Inspection

The first five rows were reviewed to understand the dataset's structure.

```
#print first five rows of data

data.head()
```

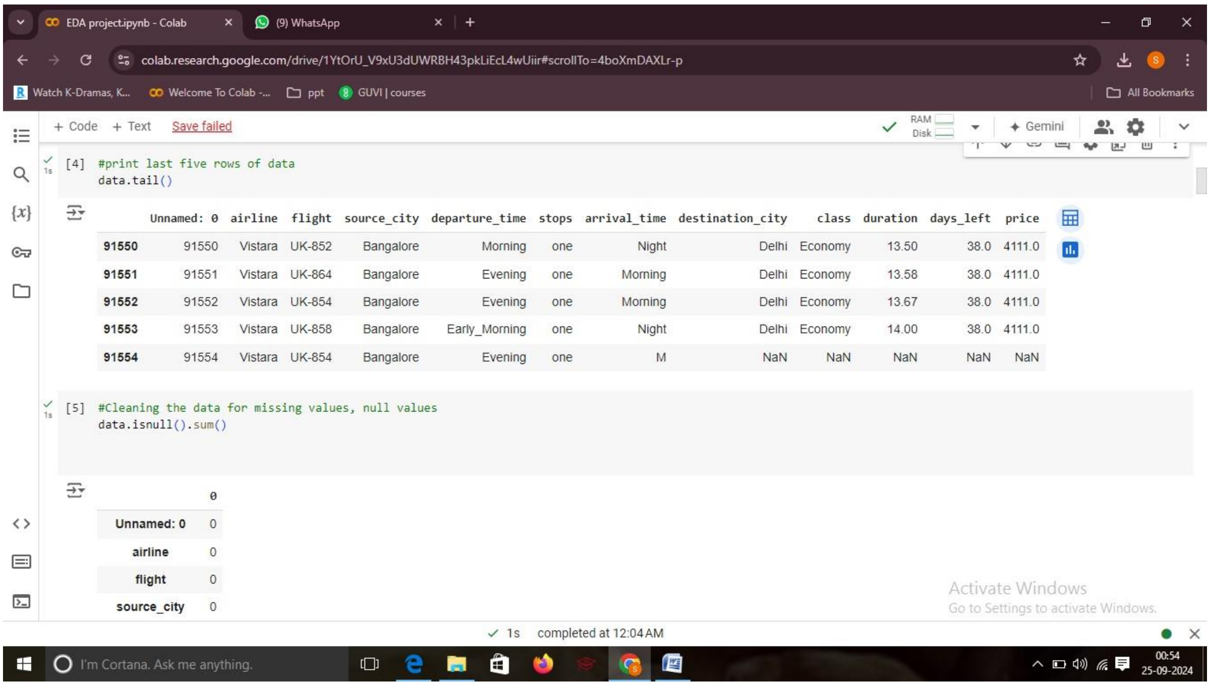


Initial Data Inspection

The last five rows were reviewed to understand the dataset's structure.

```
#print last five rows of data

data.tail()
```



Data Cleaning

Missing Values: Checked for null values and removed any rows with missing data.

```
#Cleaning the data for missing values, null values
data.isnull().sum()
data.dropna(inplace=True)
```

Index Column:

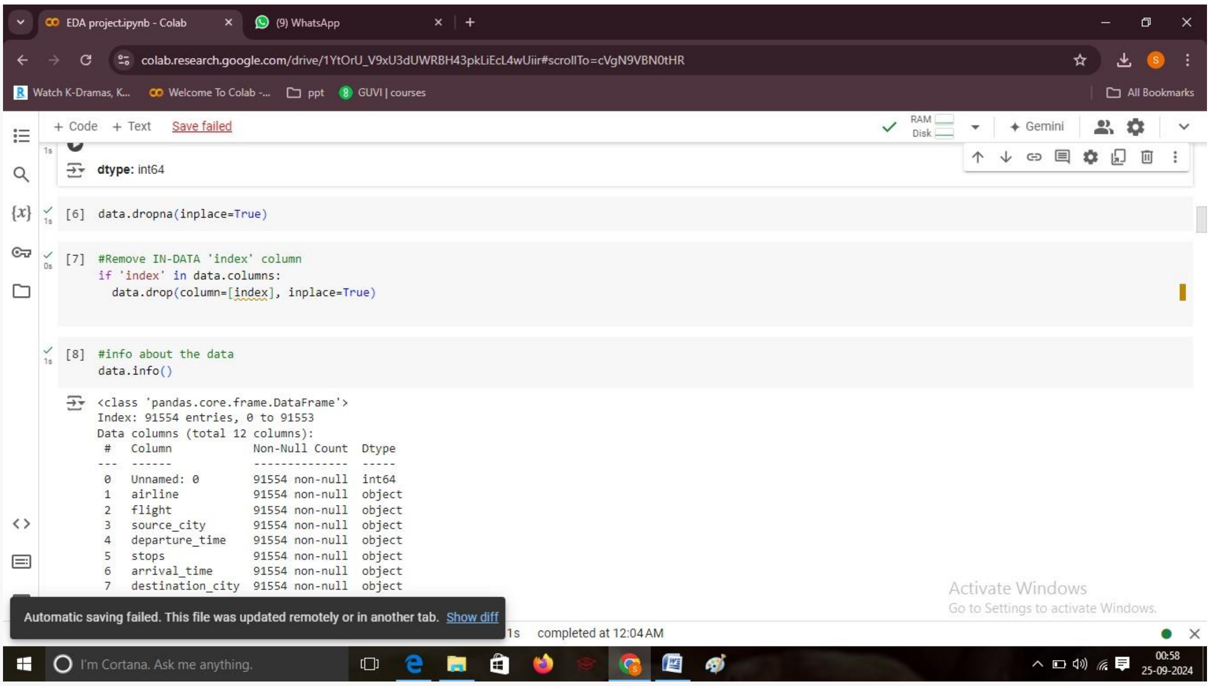
Removed the 'index' column if it was present.

```
#Remove IN-DATA 'index' column
if 'index' in data.columns:
  data.drop(column=[index], inplace=True)
```

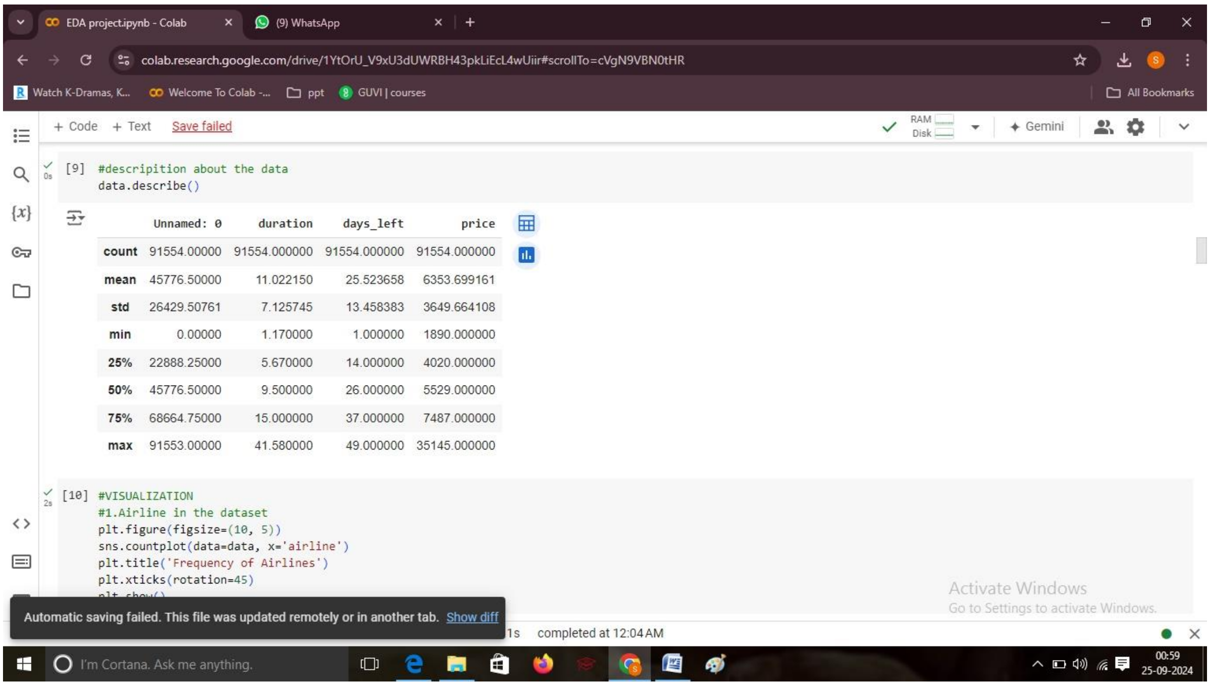
Dataset Insights

Used `info()` and `describe()` to gather information about the data types and statistical properties.

```
#info about the data
data.info()
```




```
#descripition about the data
data.describe()
```



Visualizations

Airline Frequency

A count plot visualized the distribution of flights across different airlines.

```
#VISUALIZATION
#1.Airline in the dataset
plt.figure(figsize=(10, 5))
sns.countplot(data=data, x='airline')
plt.title('Frequency of Airlines')
plt.xticks(rotation=45)
plt.show()
```

Departure vs. Arrival Time

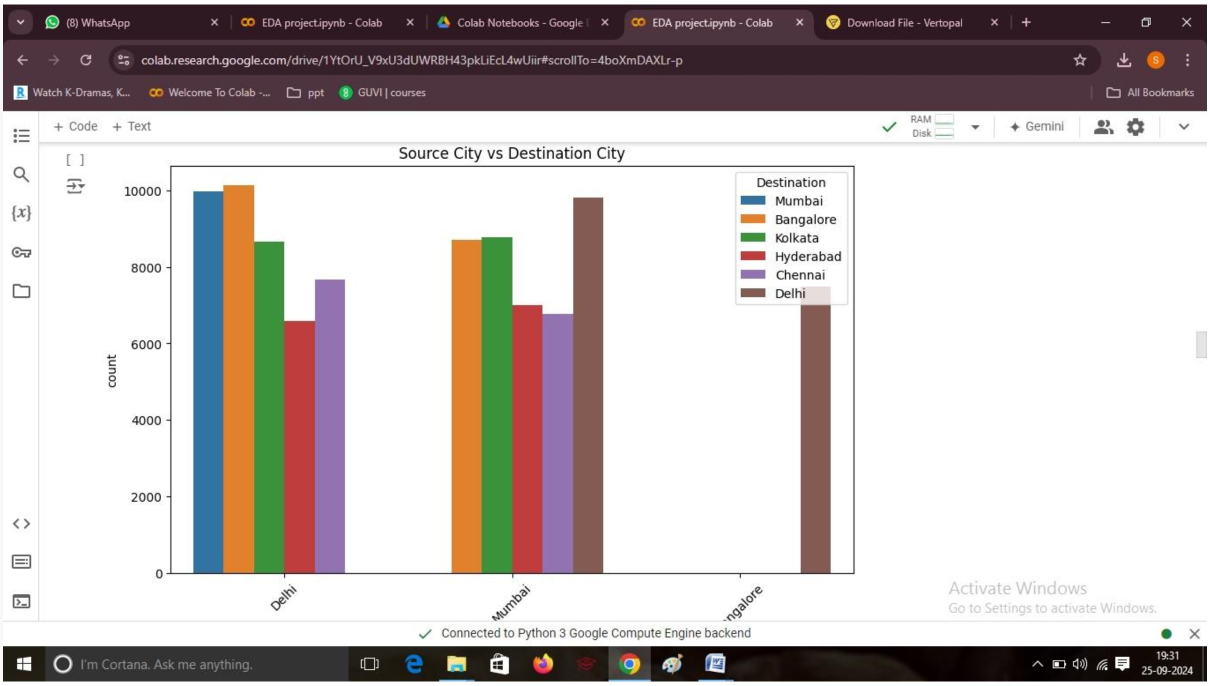
A bar plot displayed the relationship between departure and arrival times.

```
#2.Departure Time Against Arrival Time
plt.figure(figsize=(10, 5))
sns.barplot(data=data, x='departure_time',
y='arrival_time',color='red')
plt.title('Departure Time vs Arrival Time')
plt.xticks(rotation=45)
plt.show()
```

Source vs. Destination Cities

A count plot compared the source cities to destination cities, revealing popular routes.

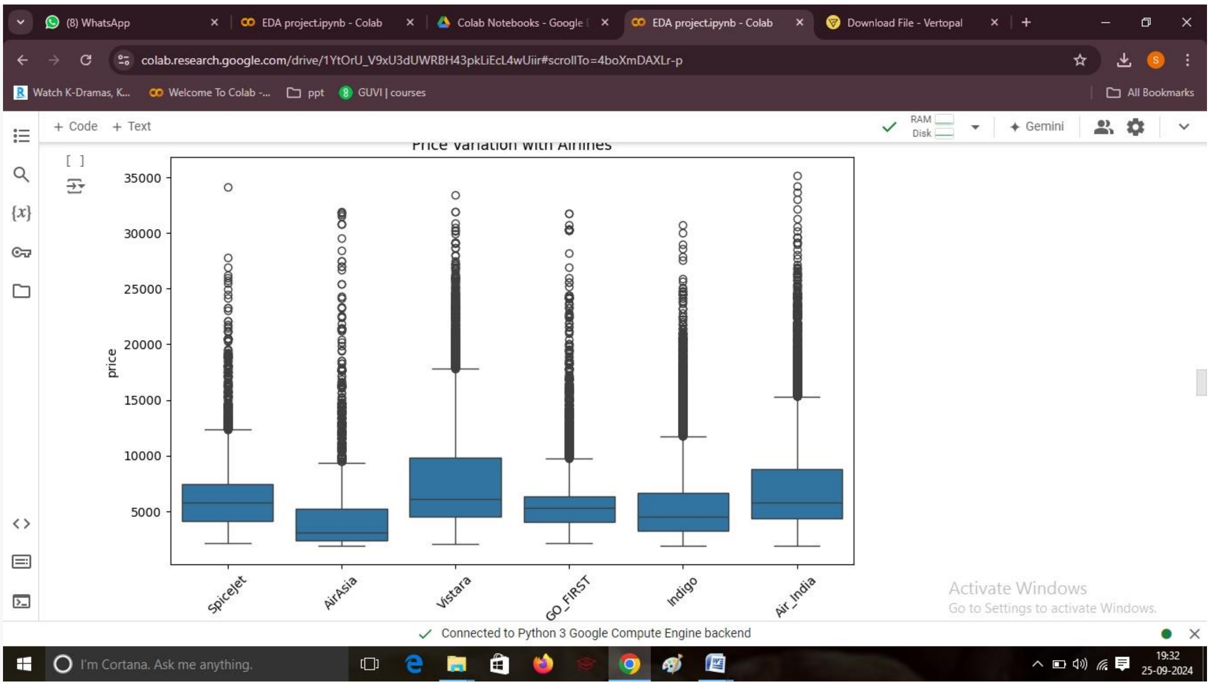
```
#3.Source City Against Destination City
plt.figure(figsize=(10, 6))
sns.countplot(data=data, x='source_city', hue='destination_city')
plt.title('Source City vs Destination City')
plt.xticks(rotation=45)
plt.legend(title='Destination')
plt.show()
```



Price Variation by Airline

A box plot illustrated how ticket prices varied across different airlines.

```
#4.Price Variation with Airlines
plt.figure(figsize=(10, 6))
sns.boxplot(data=data, x='airline', y='price')
plt.title('Price Variation with Airlines')
plt.xticks(rotation=45)
plt.show()
```



Ticket Price Trends

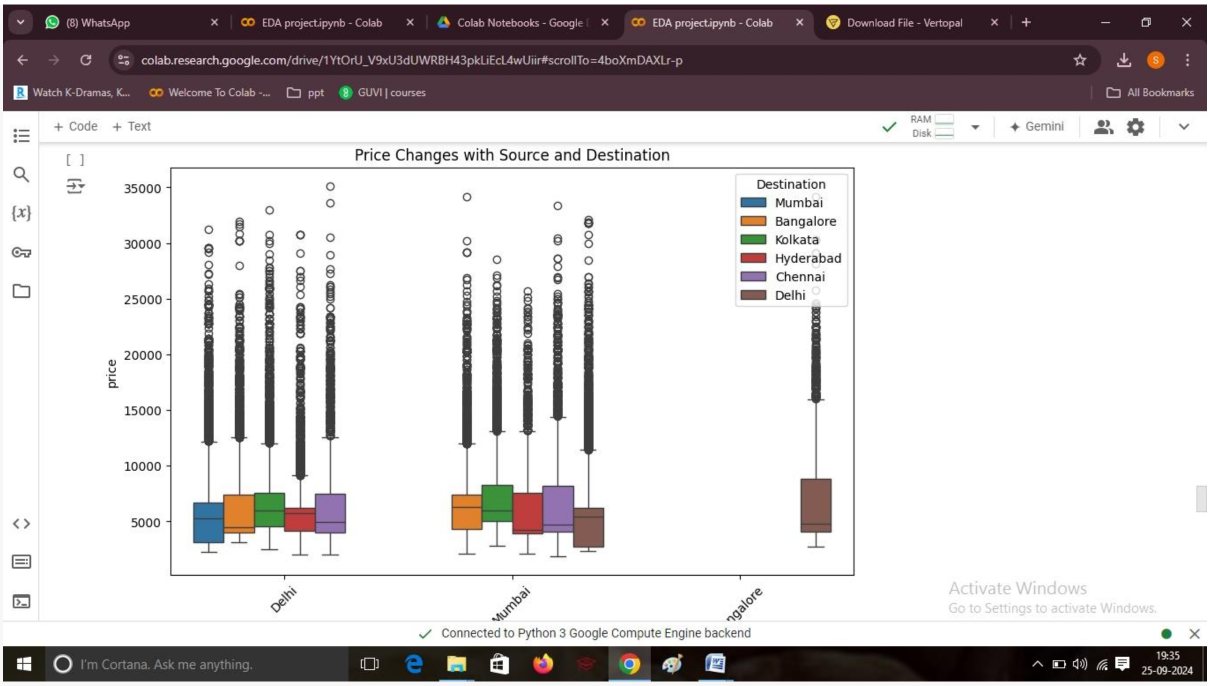
Line plots explored the relationship between ticket prices, departure time, and arrival time.

```
#5.Ticket Price vs Departure and Arrival Time
plt.figure(figsize=(12, 6))
sns.lineplot(data=data, x='departure_time', y='price',
label='departure_price', color='blue')
sns.lineplot(data=data, x='arrival_time', y='price',
label='arrival_price', color='orange')
plt.title('Ticket Price vs Departure and Arrival Time')
plt.xticks(rotation=45)
plt.legend()
plt.show()
```

Price Changes with Source and Destination

A box plot visualized price changes based on source and destination cities.\

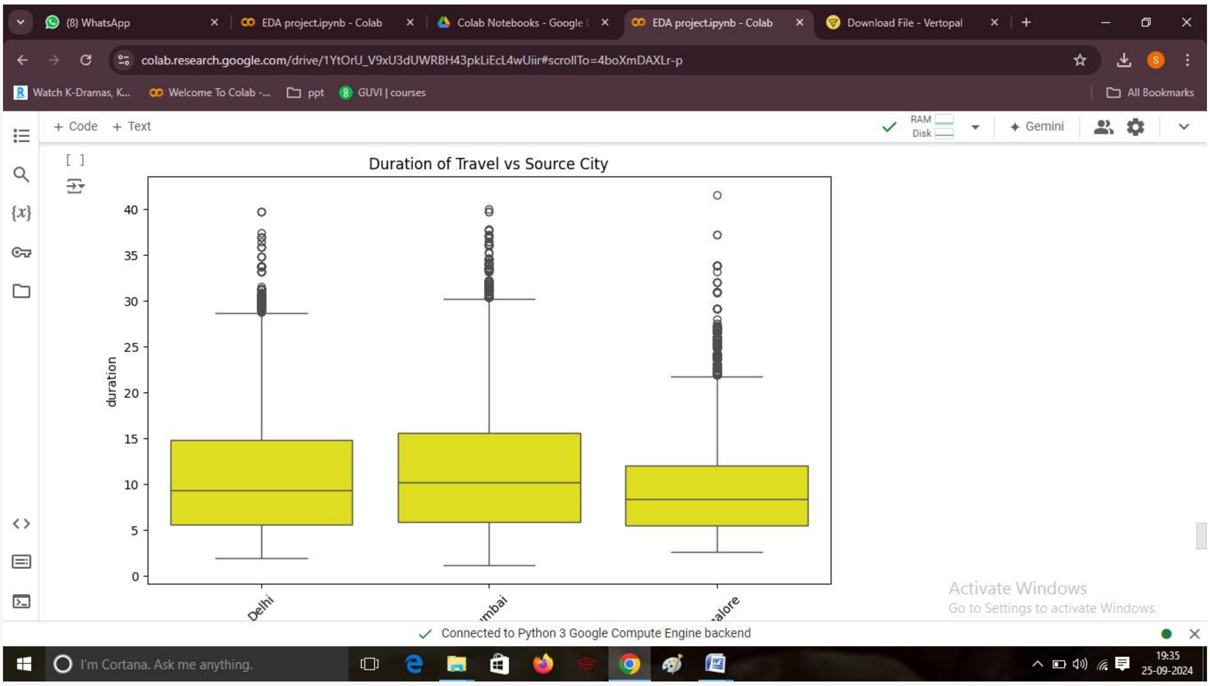
```
#6.Price changes with Source and Destination
plt.figure(figsize=(10, 6))
sns.boxplot(data=data, x='source_city', y='price',
hue='destination_city')
plt.title('Price Changes with Source and Destination')
plt.xticks(rotation=45)
plt.legend(title='Destination')
plt.show()
```



Duration of Travel vs. Source City

A box plot represented travel durations for different source cities.

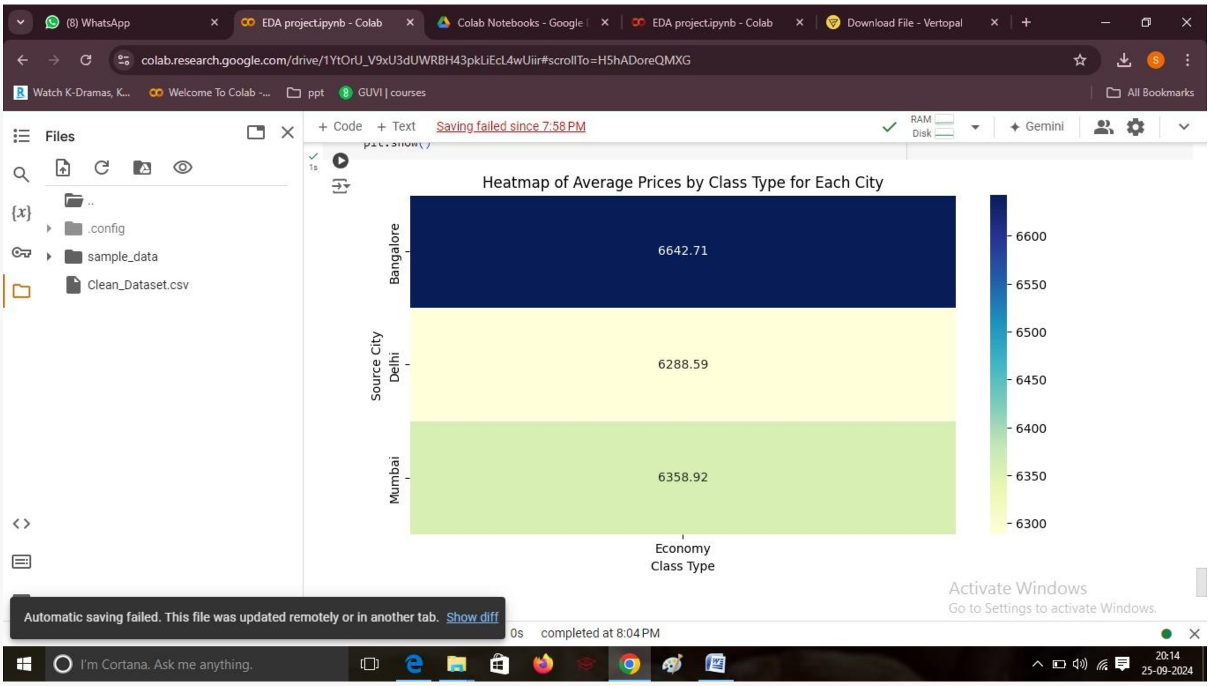
```
#7.Duration of travel vs city
plt.figure(figsize=(10, 6))
sns.boxplot(data=data, x='source_city', y='duration',color='yellow')
plt.title('Duration of Travel vs Source City')
plt.xticks(rotation=45)
plt.show()
```



High price with class type for city.

The heatmap illustrates average flight prices by source city and class type, highlighting pricing variations across different classes.

```
#8.High price with class type for city
average_price = data.groupby(['source_city',
'class'])['price'].mean().unstack()
plt.figure(figsize=(12, 8))
sns.heatmap(average_price, annot=True, fmt=".2f", cmap='YlGnBu',
linewidths=0.5)
plt.title('Heatmap of Average Prices by Class Type for Each City')
plt.xlabel('Class Type')
plt.ylabel('Source City')
plt.show()
```


Heatmap of Average Prices by Class Type for Each City
Bangalore
Delhi
Mumbai
Source City
6642.71
6288.59
6358.92
Economy
Class Type
6600
6550
6500
6450
6400
6350
6300
Files
.config
sample_data
Clean_Dataset.csv
Saving failed since 7:58 PM
Automatic saving failed. This file was updated remotely or in another tab. Show diff
completed at 8:04 PM