Import Libraries and Load Data

```
# Import necessary libraries
import pandas as pd
import numpy as np

# Mount Google Drive to access the uploaded file (if using Google Colab)
from google.colab import drive
drive.mount('/content/drive')

# Define the path to the dataset (update the path as per your file location)
file_path = '/content/drive/MyDrive/AB_NYC_2019.csv'

# Load the dataset into a DataFrame
df = pd.read_csv(file_path)

# Display the first few rows of the dataset
print("Initial Dataset Preview:")
print(df.head())
```

```
Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/conte
Initial Dataset Preview:
     id                                              name  host_id  \
0  2539                Clean & quiet apt home by the park     2787
1  2595                             Skylit Midtown Castle     2845
2  3647               THE VILLAGE OF HARLEM....NEW YORK !     4632
3  3831                   Cozy Entire Floor of Brownstone     4869
4  5022  Entire Apt: Spacious Studio/Loft by central park     7192

     host_name neighbourhood_group neighbourhood  latitude  longitude  \
0         John            Brooklyn    Kensington  40.64749  -73.97237
1     Jennifer           Manhattan       Midtown  40.75362  -73.98377
2    Elisabeth           Manhattan        Harlem  40.80902  -73.94190
3  LisaRoxanne            Brooklyn  Clinton Hill  40.68514  -73.95976
4        Laura           Manhattan   East Harlem  40.79851  -73.94399

         room_type  price  minimum_nights  number_of_reviews last_review  \
0     Private room    149               1                  9  2018-10-19
1  Entire home/apt    225               1                 45  2019-05-21
2     Private room    150               3                  0         NaN
3  Entire home/apt     89               1                270  2019-07-05
4  Entire home/apt     80              10                  9  2018-11-19

   reviews_per_month  calculated_host_listings_count  availability_365
0               0.21                               6               365
1               0.38                               2               355
2                NaN                               1               365
3               4.64                               1               194
4               0.10                               1                 0
```

Check for Missing Data

```
# Check for missing values in each column
print("\nMissing Values in Each Column:")
print(df.isnull().sum())

# Handle missing values
# Option 1: Drop columns with excessive missing values (e.g., 'last_review', 'reviews_per_month')
df.drop(['last_review', 'reviews_per_month'], axis=1, inplace=True)
```

```
# Option 2: Fill missing numeric values with the median (if applicable)
numeric_columns = df.select_dtypes(include=['float64', 'int64']).columns
for col in numeric_columns:
    if df[col].isnull().sum() > 0:
        df[col].fillna(df[col].median(), inplace=True)

# Verify missing values are handled
print("\nMissing Values After Handling:")
print(df.isnull().sum())
```

```
Missing Values in Each Column:
id                                  0
name                               16
host_id                             0
host_name                          21
neighbourhood_group                 0
neighbourhood                       0
latitude                            0
longitude                           0
room_type                           0
price                               0
minimum_nights                      0
number_of_reviews                   0
last_review                     10052
reviews_per_month               10052
calculated_host_listings_count      0
availability_365                    0
dtype: int64

Missing Values After Handling:
id                                  0
name                               16
host_id                             0
host_name                          21
neighbourhood_group                 0
neighbourhood                       0
latitude                            0
longitude                           0
room_type                           0
price                               0
minimum_nights                      0
number_of_reviews                   0
calculated_host_listings_count      0
availability_365                    0
dtype: int64
```

Remove Duplicate Records

```
# Identify and remove duplicate rows
print("\nNumber of Duplicate Rows Before Removal:", df.duplicated().sum())

# Drop duplicates
df.drop_duplicates(inplace=True)

# Verify duplicates are removed
print("Number of Duplicate Rows After Removal:", df.duplicated().sum())
```

```
Number of Duplicate Rows Before Removal: 0
Number of Duplicate Rows After Removal: 0
```

Standardize Data Formatting

```
# Convert categorical columns to consistent string formatting
categorical_columns = ['neighbourhood_group', 'neighbourhood', 'room_type']
for col in categorical_columns:
    df[col] = df[col].str.strip().str.lower()

# Ensure numeric columns have consistent data types
df['price'] = df['price'].astype(float)
df['minimum_nights'] = df['minimum_nights'].astype(int)

# Preview standardized data
print("\nStandardized Data Preview:")
print(df.head())
```

```
Standardized Data Preview:
     id                                              name  host_id  \
0  2539                Clean & quiet apt home by the park     2787
1  2595                             Skylit Midtown Castle     2845
2  3647               THE VILLAGE OF HARLEM....NEW YORK !     4632
3  3831                   Cozy Entire Floor of Brownstone     4869
4  5022  Entire Apt: Spacious Studio/Loft by central park     7192

     host_name neighbourhood_group neighbourhood  latitude  longitude  \
0         John            brooklyn    kensington  40.64749  -73.97237
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4        Laura           manhattan   east harlem  40.79851  -73.94399

         room_type  price  minimum_nights  number_of_reviews  \
0     private room  149.0               1                  9
1  entire home/apt  225.0               1                 45
2     private room  150.0               3                  0
3  entire home/apt   89.0               1                270
4  entire home/apt   80.0              10                  9

   calculated_host_listings_count  availability_365
0                               6               365
1                               2               355
2                               1               365
3                               1               194
4                               1                 0
```
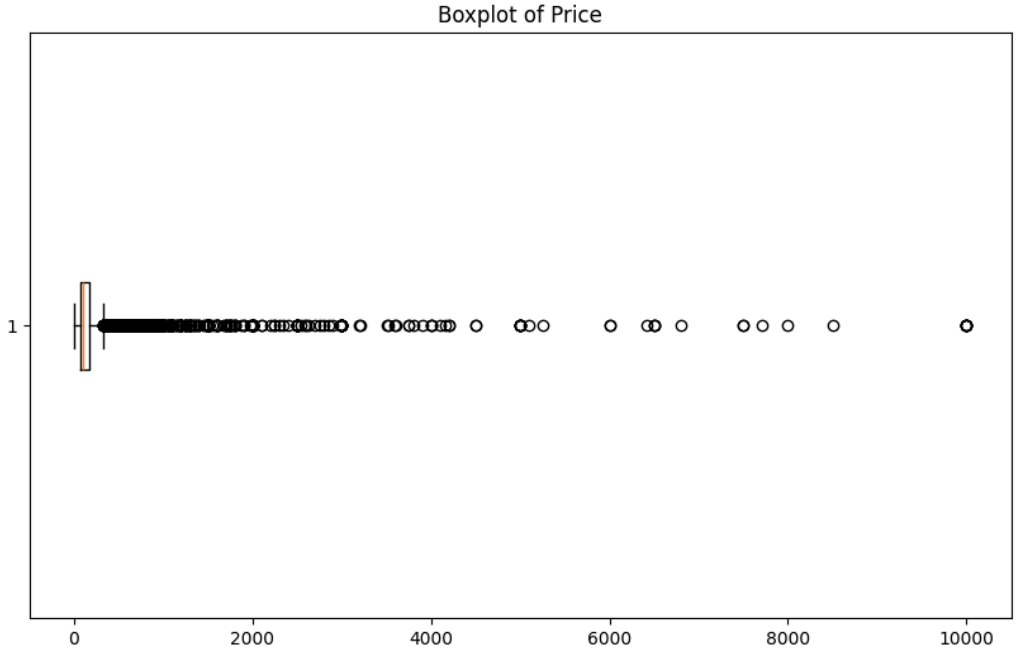

Detect and Handle Outliers

```
# Visualize outliers using boxplots (optional, requires matplotlib)
import matplotlib.pyplot as plt

plt.figure(figsize=(10, 6))
plt.boxplot(df['price'], vert=False)
plt.title('Boxplot of Price')
plt.show()

# Detect outliers using IQR (Interquartile Range)
Q1 = df['price'].quantile(0.25)
Q3 = df['price'].quantile(0.75)
IQR = Q3 - Q1

# Define bounds for outliers
lower_bound = Q1 - 1.5 * IQR
upper_bound = Q3 + 1.5 * IQR
```

```
# Filter out rows with outliers in the 'price' column
df_cleaned = df[(df['price'] >= lower_bound) & (df['price'] <= upper_bound)]

# Compare the shape before and after removing outliers
print("\nShape Before Removing Outliers:", df.shape)
print("Shape After Removing Outliers:", df_cleaned.shape)
```




```
Shape Before Removing Outliers: (48895, 14)
Shape After Removing Outliers: (45923, 14)
```

Save the Cleaned Dataset

```
# Save the cleaned dataset to a new CSV file
output_path = '/content/drive/MyDrive/AB_NYC_2019_cleaned.csv'
df_cleaned.to_csv(output_path, index=False)

print("\nCleaned Dataset Saved Successfully!")
```

```
Cleaned Dataset Saved Successfully!
```