**Requirements for EDA Project 1 - Analyzing Airbnb Market Trends**

**Basic Analysis**

1. **Dates of Reviews**
   * What are the dates of the earliest and most recent reviews?
     + Store these values as two separate variables, earliest\_review and most\_recent\_review.
2. **Private Room Listings**
   * How many of the listings are private rooms?
     + Save this count into a variable called nb\_private\_rooms.
3. **Average Price Calculation**
   * What is the average listing price?
     + Round to the nearest two decimal places and store it in a variable called avg\_price.
4. **Summary Table**
   * Combine the calculated values into a new DataFrame called review\_dates with the following columns (in order): first\_reviewed, last\_reviewed, nb\_private\_rooms, and avg\_price. The DataFrame should contain only one row of values.

**Intermediate Analysis**

1. **Neighborhood Trends**
   * Which neighborhoods have the highest and lowest average listing prices?
     + Create a DataFrame with columns neighborhood, average\_price, and number\_of\_listings for the top 5 most expensive neighborhoods.
2. **Word Analysis in Descriptions**
   * Find the top 10 most frequently used words in the description column (excluding stopwords like "the," "and," etc.).
     + Use pandas.Series.str.split and explore the Counter class from the collections module.

**Advanced Analysis**

1. **Room Type Comparison**
   * Compare the average prices for each room\_type (shared rooms, private rooms, entire homes/apartments).
     + Create a bar chart visualizing the differences.
2. **Trend Over Time**
   * Analyze the number of reviews over time for all listings.
     + Plot a line graph showing the trend of reviews per month over the years. (Hint: Use pandas.to\_datetime and groupby.)
3. **Exploring Unique Matplotlib Functions**
   * Create a **scatter plot with a regression line** showing the relationship between price and the length of the description.
     + Use matplotlib.axes.Axes.annotate to highlight outliers in the graph. (Note: Students should explore this function independently.)
4. **Exploring Unique Seaborn Functions**
   * Generate a **strip plot** for prices grouped by room\_type using the hue parameter to distinguish neighborhoods.
     + Students should explore the seaborn.stripplot function.

**Visualization Questions**

1. **Bar Chart**
   * Create a bar chart showing the count of listings for each room type.
     + Add proper labels, titles, and a legend.
2. **Heatmap**
   * Generate a heatmap to show the correlation (if any) between listing price and the frequency of reviews.
     + Use the sns.heatmap function.
3. **Pie Chart**
   * Create a pie chart to visualize the proportion of room types available.
     + Use a custom color palette and annotate the chart with percentages.
4. **Histogram**
   * Plot a histogram showing the distribution of listing prices.
     + Use bins to group prices in increments of $50.
5. **Violin Plot**
   * Create a violin plot to compare price distributions across neighborhoods.

**Submission Requirements**

* Your notebook should include:
  1. **Step-by-step solutions for each question.**
  2. **Explanations for each solution in 2-3 sentences.**
  3. **Properly labeled graphs and visualizations.**
* Ensure all code cells are executed, and the outputs are visible.
* Submit the .ipynb file with the name format: EDA\_Project1\_<YourName>.ipynb.

**Bonus Questions**

1. **Outlier Detection**
   * Identify listings with unusually high prices (outliers) using the interquartile range (IQR) method.
     + Highlight these listings in a scatter plot.
2. **Interactive Visualization**
   * Explore plotly or altair to create an interactive visualization for price trends by neighborhood.
     + Include tooltips to display additional information such as room\_type and description.