Customer Churn Analysis Summary

📌 1. Data Overview and Cleaning

- **Initial Checks**: You verified column names, data types, and checked for null values.

- **Cleaning Steps**:

  - `TotalCharges` had spaces which were replaced with `"0"` and converted to `float`.

  - The `SeniorCitizen` column was transformed from `0/1` to `"No/Yes"` for better readability.

  - No duplicate customer IDs were found.

📊 2. Churn Distribution

- **Bar Chart**: Used `sns.countplot` to show churn counts.

- **Pie Chart**: Displayed churn distribution percentages.

  - This helps visualize the proportion of customers who churned vs. who stayed.

💡 3. Paperless Billing

- A **pie chart** was used to show the distribution of customers using paperless billing.

  - You grouped the data and aggregated by counts.

👥 4. Gender vs Churn

- **Count Plot** with `hue='Churn'` shows how male and female customers are distributed concerning churn.

- Added **percentage labels** to the bars for clearer understanding of churn ratio by gender.

🌐 **5. Internet Service Distribution**

- A **count plot** visualizing the number of customers per `InternetService` type.

  - Labeling used `plt.bar_label` to show counts above bars.

💸 **6. Total Charges by Internet Service**

- Grouped the dataset by `InternetService`, summing up `TotalCharges`.

- Displayed using `sns.barplot` to show total revenue from each service type.

- Labeled each bar with total amounts.

💳 **7. Monthly Charges by Payment Method**

- Converted `MonthlyCharges` to numeric.

- Aggregated and summed by `PaymentMethod`.

- Used a **bar plot** to compare which payment method generates the most monthly charges.

🔡 **8. Encoding Adjustments**

- You handled categorical variables like `SeniorCitizen`, and created summaries based on them.

✅ Key Observations

- **Churn Rates** can be seen across genders, paperless billing, and internet service types.

- **Revenue Insights**: Internet services and payment methods can be ranked based on their financial contribution.

- **Data Cleaning**: Proper handling of formatting issues in `TotalCharges` and `MonthlyCharges` ensures reliable analysis.