Project Summary: Telco Customer Churn Analysis

In this project, you analyzed a telecommunications dataset to understand customer behaviors, specifically focusing on churn and retention patterns. Here's a summary of the key steps, findings, and visualizations:

1. **Data Preprocessing**:
   - **Imputation**: Missing values in columns like "Offer," "Internet Type," "Churn Category," and "Churn Reason" were imputed with the most frequent value to ensure continuity in analysis.
   - **Duplicates and Summary Statistics**: The dataset was checked for duplicates, and basic statistics were generated to understand data distribution.
2. **Exploratory Data Analysis (EDA)**:
   - **Customer Status Distribution**:
     - A **count plot** showed the number of customers based on their status (Active, Churned, Recently Joined).
     - A **pie chart** highlighted the percentage of customers who have churned (26.54%).
   - **Gender and Churn Status**:
     - A **count plot** segmented by gender suggested no significant difference in churn rate between male and female customers.
   - **Senior Citizen and Churn Status**:
     - A **stacked bar chart** indicated that senior customers are more likely to churn than younger ones.
   - **Tenure in Months**:
     - A **histogram** illustrated that customers with longer tenures are more likely to stay, while those with shorter tenures (1-2 months) tend to churn.
   - **Contract Type**:
     - **Month-to-month contract customers** showed a higher churn rate compared to those on longer-term contracts.
   - **Offer and Customer Status**:
     - Analysis showed that **Offer E** had a significant churn rate of approximately 52.91%, indicating customers in this plan are more likely to churn.
   - **Service Features**:
     - A series of **count plots** for service-related features (Phone Service, Multiple Lines, Internet Type, Security, Backup, Streaming, etc.) indicated trends in service uptake by customer status.
     - Customers with add-on services like online security, tech support, and device protection showed higher retention, while those without these services or those with "Fiber Optic" internet were more likely to churn.
   - **Payment Method**:

■ **Bank withdrawal** as a payment method was common among customers who had not churned.

Visualizations Recap

The following visualizations were utilized in this analysis:

- **Count Plots**: Used for Customer Status, Gender, Senior Citizen status, Contract type, Offer type, Payment methods, and various service features.
- **Pie Chart**: Illustrated the percentage of customers who have churned.
- **Stacked Bar Chart**: Showed the percentage distribution of churn by Senior Citizen status and by Offer type.
- **Histogram**: Represented the distribution of tenure in months, highlighting long-term vs. short-term customers.

Conclusions

The analysis suggests several factors associated with customer churn and retention:

- **Senior citizens and month-to-month contracts** have higher churn rates, highlighting potential target areas for retention efforts.
- **Customers with additional services** like online security and device protection tend to stay longer, indicating these services may help reduce churn.
- **Fiber optic internet users and Offer E customers** exhibit a higher likelihood of churning, suggesting that adjustments in these offerings could improve retention.
- **Payment Methods**: Customers paying through bank withdrawal have higher retention, potentially indicating a correlation between payment method stability and customer loyalty.

In summary, the project points to several actionable insights that could help the telecom company enhance customer retention by focusing on at-risk groups and promoting value-added services.