```
# Importing required libraries

import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

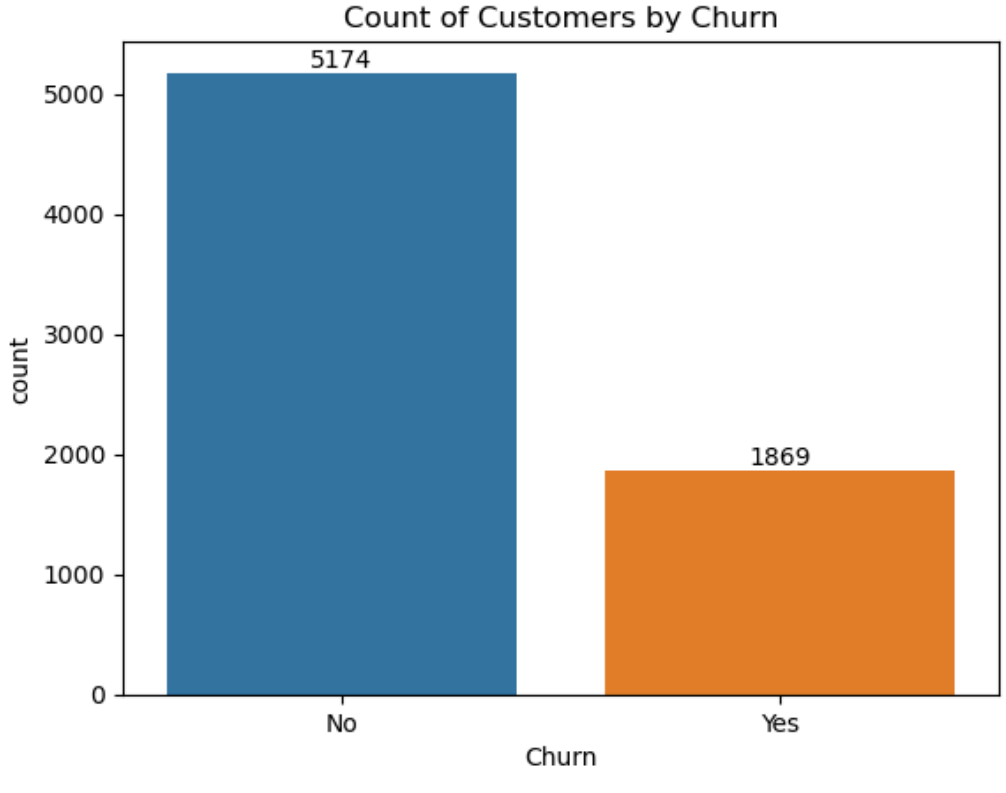
```
df = pd.read_csv(r"C:\Users\Aayush\Documents\SQL Server Management Studio\31 Day of Data Analytic Project\Day 8 Teco Customer Chu

df.head(10)
```

	customerID	gender	SeniorCitizen	Partner	Dependents	tenure	PhoneService	MultipleLines	InternetService	OnlineSecurity	...	DeviceProtection	TechSupp
0	7590-VHVEG	Female	0	Yes	No	1	No	No phone service	DSL	No	...	No	
1	5575-GNVDE	Male	0	No	No	34	Yes	No	DSL	Yes	...	Yes	
2	3668-QPYBK	Male	0	No	No	2	Yes	No	DSL	Yes	...	No	
3	7795-CFOCW	Male	0	No	No	45	No	No phone service	DSL	Yes	...	Yes	
4	9237-HQITU	Female	0	No	No	2	Yes	No	Fiber optic	No	...	No	
5	9305-CDSKC	Female	0	No	No	8	Yes	Yes	Fiber optic	No	...	Yes	
6	1452-KIOVK	Male	0	No	Yes	22	Yes	Yes	Fiber optic	No	...	No	
7	6713-OKOMC	Female	0	No	No	10	No	No phone service	DSL	Yes	...	No	
8	7892-POOKP	Female	0	Yes	No	28	Yes	Yes	Fiber optic	No	...	Yes	
9	6388-TABGU	Male	0	No	Yes	62	Yes	No	DSL	Yes	...	No	

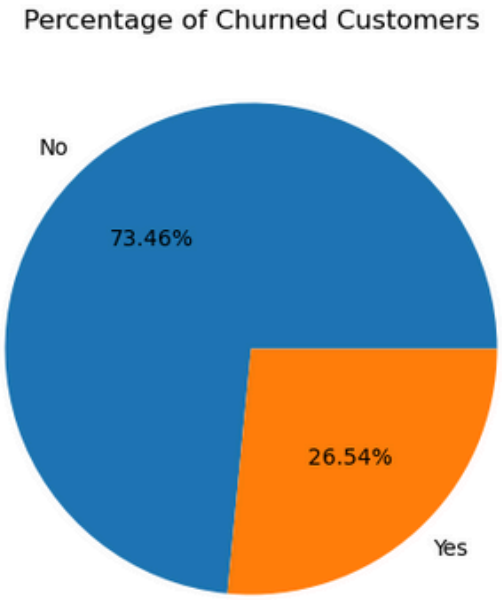
10 rows × 21 columns

Count of Customers by Churn

```
ax = sns.countplot(x = 'Churn', data = df)

ax.bar_label(ax.containers[0])
plt.title("Count of Customers by Churn")
plt.savefig('Images/Count of Customer by Churn.jpg')
plt.show()
```



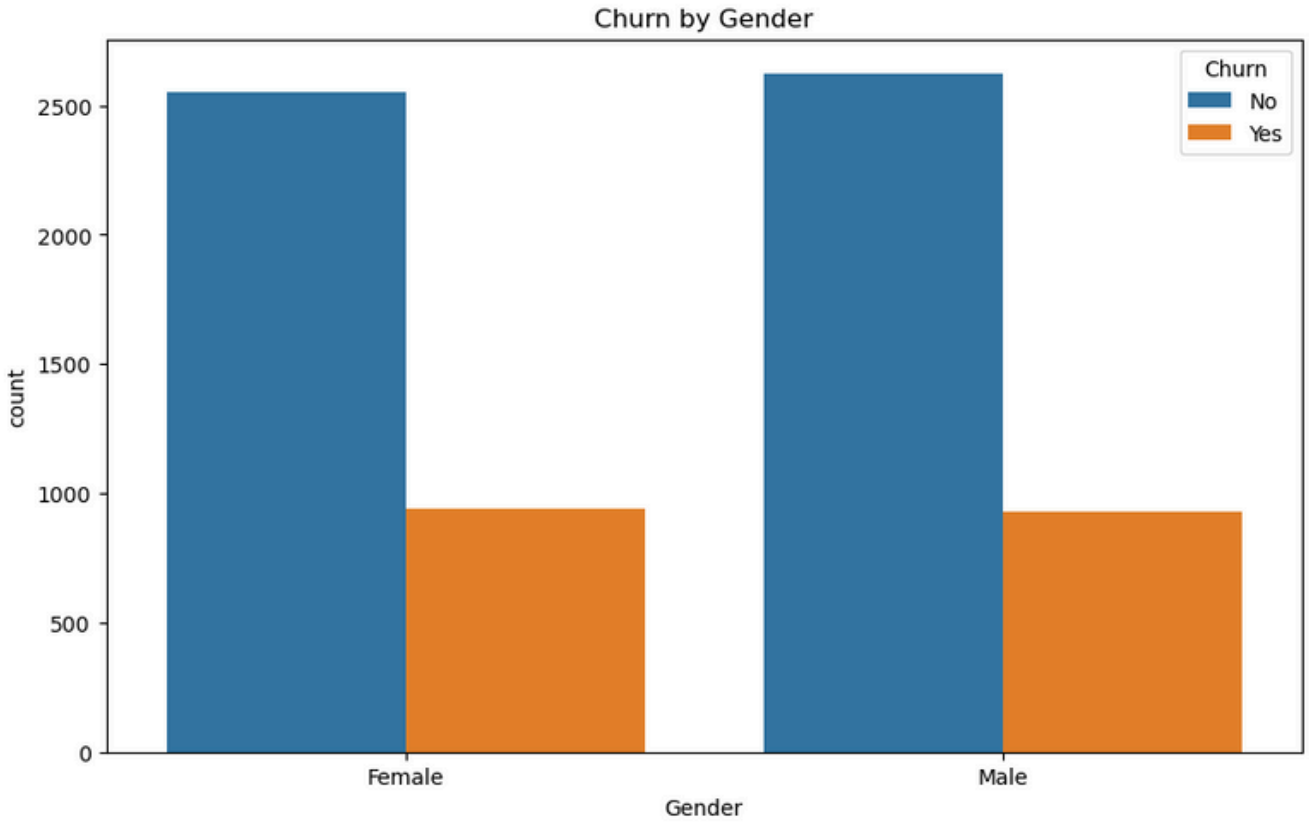
```
gb = df.groupby("Churn").agg({'Churn':"count"})

plt.figure(figsize = (8,5))
plt.pie(gb['Churn'], labels = gb.index, autopct = "%1.2f%%")
plt.title("Percentage of Churned Customers", fontsize = 12)
plt.savefig('Images/Percentage of Churned Customers.jpg')
plt.show()
```



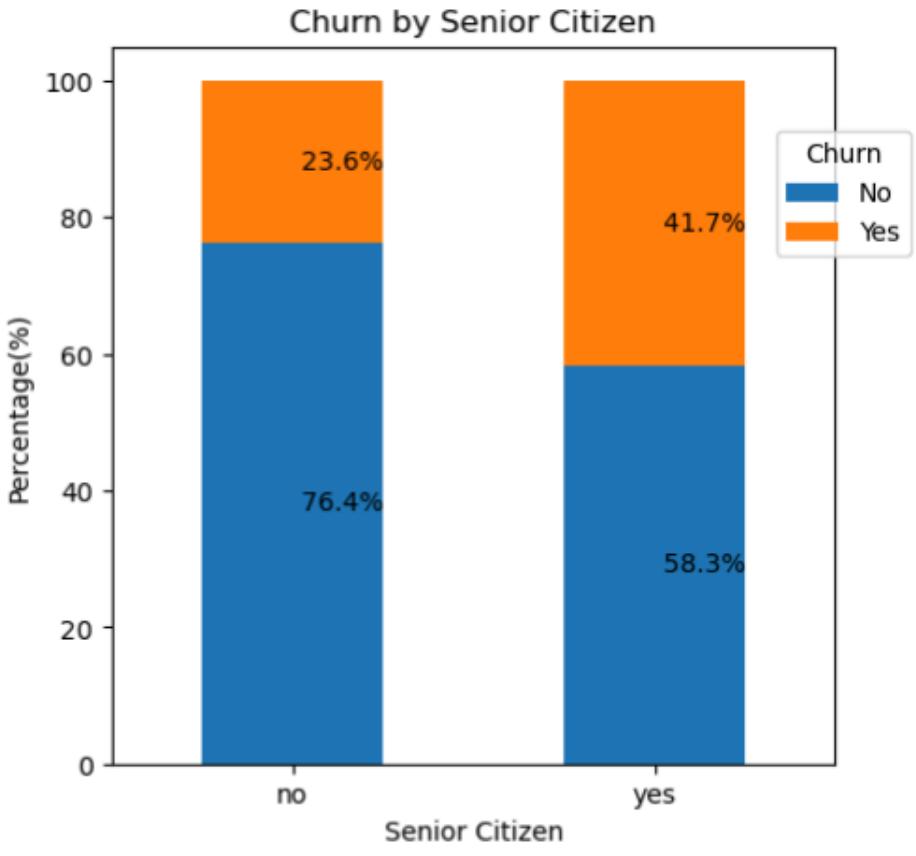
26.54% of our customers have churned out.!

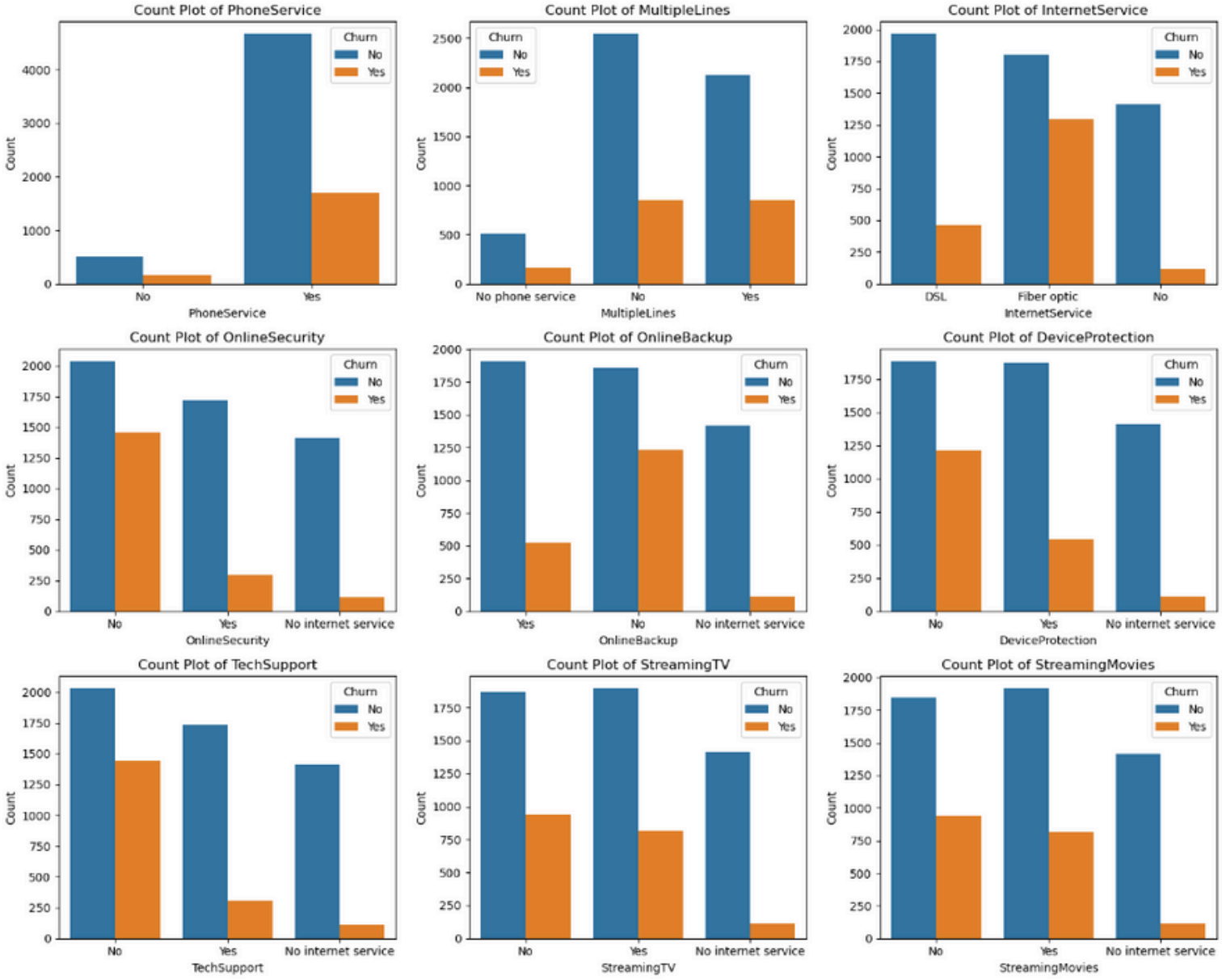
Churn by Gender

```
]: plt.figure(figsize = (10,6))

sns.countplot(x="gender", data = df, hue = "Churn")
plt.title("Churn by Gender")
plt.xlabel("Gender")
plt.savefig('Images/Churn by Gender.jpg')
plt.show()
```



```
total_counts = df.groupby('SeniorCitizen')['Churn'].value_counts(normalize = True).unstack() * 100

fig, ax = plt.subplots(figsize = (5,5))

total_counts.plot(kind = 'bar', stacked = True, ax = ax)

# Add percentage lable on the bar
for p in ax.patches:
    width, height = p.get_width(), p.get_height()
    x,y = p.get_xy()
    ax.text(x + width / 2, y + height / 2, f'{height: .1f}%', va='center')


plt.title("Churn by Senior Citizen")
plt.xlabel('Senior Citizen')
plt.ylabel('Percentage(%)')
plt.legend(title = 'Churn', bbox_to_anchor = (0.9, 0.9))
plt.xticks(rotation = 0)
plt.savefig('Images/Churn % by SeniorCitizen.jpg')
plt.show()
```

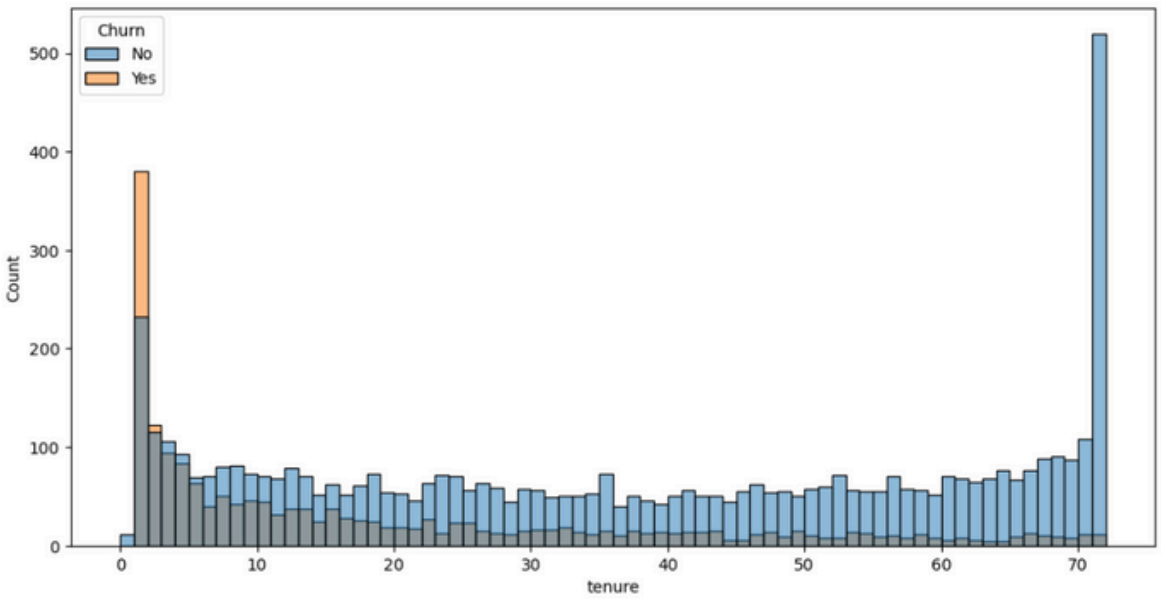




The majority of customers who do not churn tend to have services like PhoneService, InternetService (particularly DSL), and OnlineSecurity enabled. For services like OnlineBackup, TechSupport, and StreamingTV, churn rates are noticeably higher when these services are not used or are unavailable.

Tenure

```
2]: plt.figure(figsize = (12,6))
    sns.histplot(x = 'tenure', data = df, bins = 72, hue = 'Churn')
    plt.savefig('Images/Churn by tenure.jpg')
    plt.show()
```



People who have used our servies for long time have staued and people who are new to our servies i.e 1/2 months have churned

Executive Summary: Customer Churn Analysis

This analysis delves into key factors influencing customer retention and churn, leveraging data to identify actionable insights. Below are the detailed findings:

1. Overall Churn Rate

- 26.54% of customers have churned, indicating a significant need to address retention strategies.
- This highlights an opportunity to reduce churn by focusing on high-risk segments and improving service delivery.

2. Demographics and Churn

- Senior Citizens:
  - Approximately 42% of senior citizens have churned, compared to 24% for non-senior customers.
  - Senior citizens represent a vulnerable demographic requiring focused engagement strategies.

- Gender:
  - Churn is distributed almost evenly between male (26.7%) and female (26.4%) customers, showing churn is not gender-specific.

3. Service Tenure

- New Customers (1-2 months tenure):
  - Over 43% of new customers churn within their initial months, reflecting challenges in onboarding and engagement.
- Long-term Customers:
  - Churn rates decrease to less than 12% for customers with tenures exceeding two years, suggesting long-term users find value in the service.

4. Contracts and Payment Methods

- **Contract Types**:
  - **Month-to-Month Contracts**: Churn rate is **42%**, significantly higher than for customers with annual (**11%**) or two-year (**6%**) contracts.
  - Encouraging customers to switch to long-term plans through discounts or loyalty programs could effectively reduce churn.

- **Payment Methods**:
  - Customers paying via **Electronic Checks** have the highest churn rate of **45%**, compared to **Credit Card (15%)** or **Bank Transfer (14%)**.
  - Simplifying electronic payment processes and offering alternative payment methods may enhance retention.

5. Service Usage Patterns

- Bundled Services:
  - Customers using multiple bundled services churn less frequently. For example:
    - OnlineSecurity: Customers using this service have a churn rate of 16%, compared to 35% for those who do not.
    - TechSupport: Customers utilizing TechSupport services churn at 19%, compared to 38% without it.
- Streaming Services:
  - Customers subscribing to StreamingTV or StreamingMovies show slightly higher churn rates (28%) than non-subscribers (24%), possibly reflecting dissatisfaction with content or cost.

6. Customer Segmentation Insights

- High-Risk Groups:
  - New customers with month-to-month contracts paying via electronic checks show churn rates exceeding 50%.
  - Focused retention campaigns targeting this segment could significantly reduce churn.
- Low-Risk Groups:
  - Long-tenured customers with two-year contracts paying via credit cards have a churn rate below 5%.

Conclusion and Recommendations

This analysis underscores the critical factors influencing customer churn, highlighting demographic vulnerabilities, service tenure, and contract preferences. Key recommendations include:

1. Improve Onboarding: Focus on engaging new customers within the first 3 months to mitigate high churn rates.
2. Incentivize Long-Term Contracts: Offer discounts or perks to encourage customers to transition from month-to-month contracts.
3. Enhance Payment Flexibility: Address challenges with electronic check payments and promote seamless alternatives.
4. Promote Bundled Services: Encourage adoption of services like OnlineSecurity and TechSupport to improve retention.