```
from google.colab import files
uploaded = files.upload()  # Upload 'WA_Fn-UseC_-Telco-Customer-Churn.csv'
```

Choose Files archive (1).zip

- **archive (1).zip**(application/x-zip-compressed) - 175758 bytes, last modified: 5/17/2025 - 100% done

```
Saving archive (1).zip to archive (1).zip
```

```
import zipfile

with zipfile.ZipFile('archive (1).zip', 'r') as zip_ref:
    zip_ref.extractall()
```

```
import os
os.listdir()
```

```
['.config', 'archive (1).zip', 'sample_data']
```

```
['.config', 'archive (1).zip', 'sample_data']
```

```
import pandas as pd

df = pd.read_csv('WA_Fn-UseC_-Telco-Customer-Churn.csv')  # Or actual filename
df.head()
```

	customerID	gender	SeniorCitizen	Partner	Dependents	tenure	PhoneService	MultipleLines	InternetService	OnlineSecurity	...	Dev
0	7590-VHVEG	Female	0	Yes	No	1	No	No phone service	DSL	No	...	
1	5575-GNVDE	Male	0	No	No	34	Yes	No	DSL	Yes	...	
2	3668-QPYBK	Male	0	No	No	2	Yes	No	DSL	Yes	...	
3	7795-CFOCW	Male	0	No	No	45	No	No phone service	DSL	Yes	...	

```
df.info()
df.describe()
df.head()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 7043 entries, 0 to 7042
Data columns (total 21 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   customerID        7043 non-null   object
 1   gender            7043 non-null   object
 2   SeniorCitizen     7043 non-null   int64
 3   Partner           7043 non-null   object
 4   Dependents        7043 non-null   object
 5   tenure            7043 non-null   int64
 6   PhoneService      7043 non-null   object
 7   MultipleLines     7043 non-null   object
 8   InternetService   7043 non-null   object
 9   OnlineSecurity    7043 non-null   object
 10  OnlineBackup      7043 non-null   object
 11  DeviceProtection  7043 non-null   object
 12  TechSupport       7043 non-null   object
 13  StreamingTV       7043 non-null   object
 14  StreamingMovies   7043 non-null   object
 15  Contract          7043 non-null   object
 16  PaperlessBilling  7043 non-null   object
 17  PaymentMethod     7043 non-null   object
 18  MonthlyCharges    7043 non-null   float64
 19  TotalCharges      7043 non-null   object
 20  Churn             7043 non-null   object
dtypes: float64(1), int64(2), object(18)
memory usage: 1.1+ MB
```

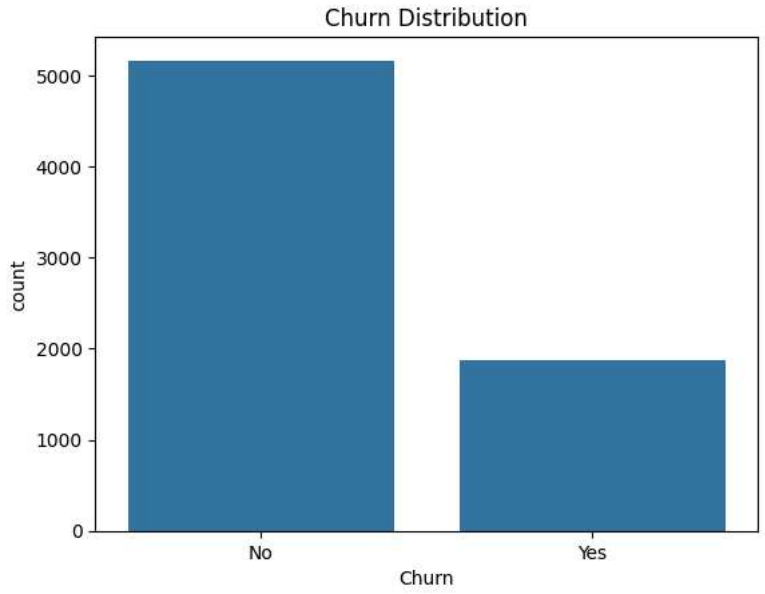
	customerID	gender	SeniorCitizen	Partner	Dependents	tenure	PhoneService	MultipleLines	InternetService	OnlineSecurity	...	Dev
0	7590-VHVEG	Female	0	Yes	No	1	No	No phone service	DSL	No	...	
1	5575-GNVDE	Male	0	No	No	34	Yes	No	DSL	Yes	...	
2	3668-QPYBK	Male	0	No	No	2	Yes	No	DSL	Yes	...	
3	7795-CFOCW	Male	0	No	No	45	No	No phone service	DSL	Yes	...	

```
# Check for missing values
df.isnull().sum()

# Convert 'TotalCharges' column to numeric
df['TotalCharges'] = pd.to_numeric(df['TotalCharges'], errors='coerce')

# Drop rows with NaN in 'TotalCharges'
df.dropna(subset=['TotalCharges'], inplace=True)

# Confirm cleanup
df.isnull().sum()
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Index: 7032 entries, 0 to 7042
Data columns (total 21 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   customerID        7032 non-null   object
 1   gender            7032 non-null   object
 2   SeniorCitizen     7032 non-null   int64
 3   Partner           7032 non-null   object
 4   Dependents        7032 non-null   object
 5   tenure            7032 non-null   int64
 6   PhoneService      7032 non-null   object
 7   MultipleLines     7032 non-null   object
 8   InternetService   7032 non-null   object
 9   OnlineSecurity    7032 non-null   object
 10  OnlineBackup      7032 non-null   object
 11  DeviceProtection  7032 non-null   object
 12  TechSupport       7032 non-null   object
 13  StreamingTV       7032 non-null   object
 14  StreamingMovies   7032 non-null   object
 15  Contract          7032 non-null   object
 16  PaperlessBilling  7032 non-null   object
 17  PaymentMethod     7032 non-null   object
 18  MonthlyCharges    7032 non-null   float64
 19  TotalCharges      7032 non-null   float64
 20  Churn             7032 non-null   object
```

```
dtypes: float64(2), int64(2), object(17)
memory usage: 1.2+ MB
```

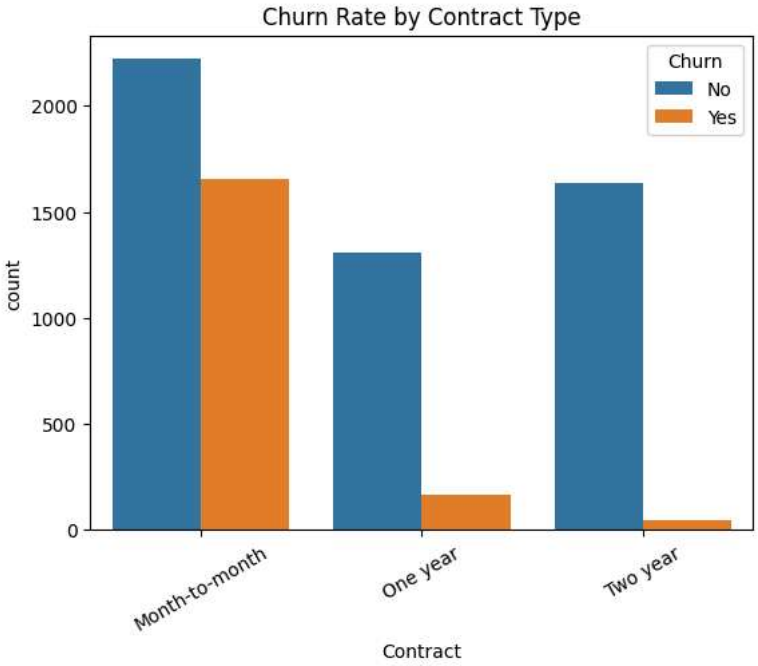
```
import seaborn as sns
import matplotlib.pyplot as plt

sns.countplot(x='Churn', data=df)
plt.title('Churn Distribution')
plt.show()

# Churn value counts
df['Churn'].value_counts(normalize=True)
```

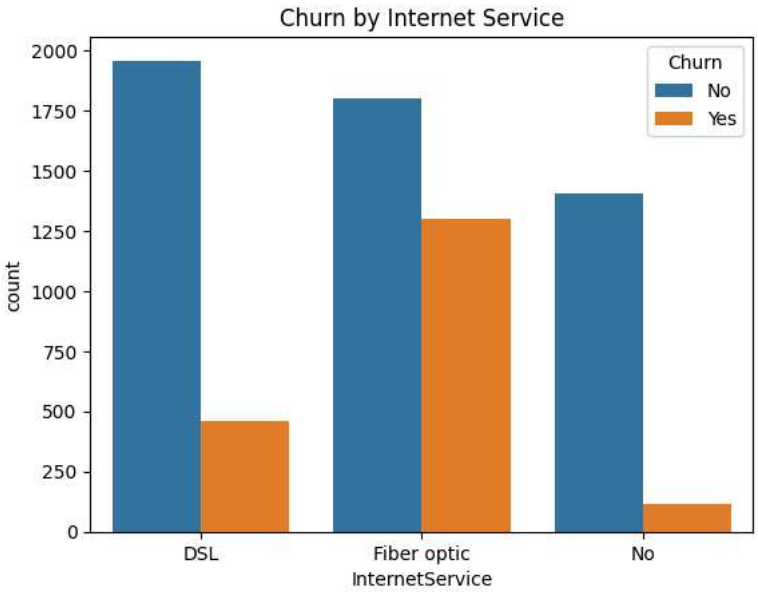


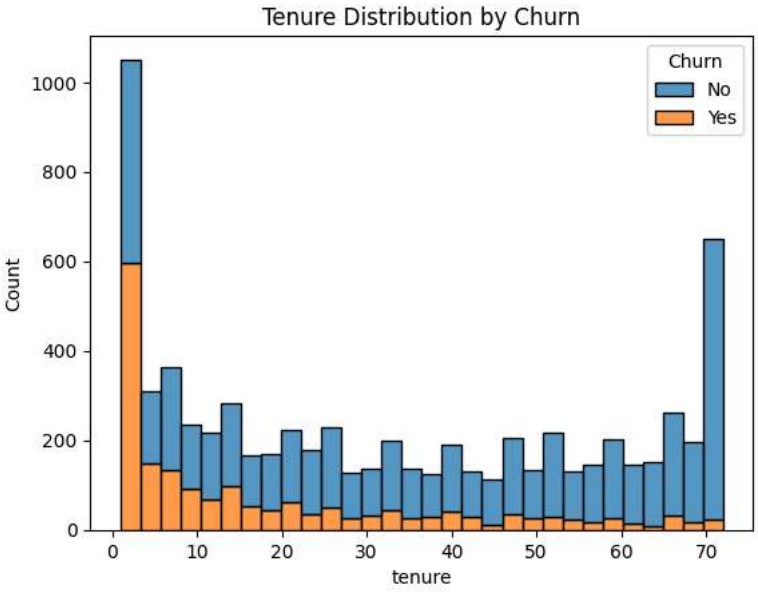
Churn	proportion
No	0.734215
Yes	0.265785

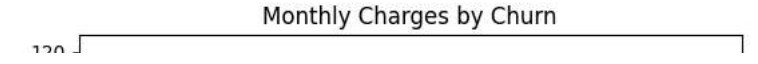
dtype: float64

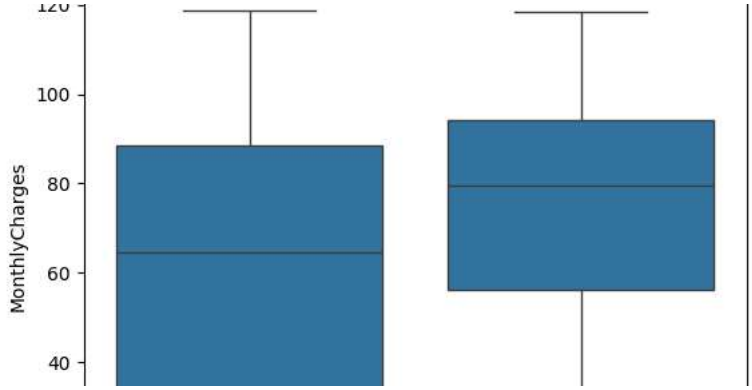
```
# Churn by Contract Type
sns.countplot(x='Contract', hue='Churn', data=df)
plt.title('Churn Rate by Contract Type')
plt.xticks(rotation=30)
plt.show()

# Churn by Internet Service
sns.countplot(x='InternetService', hue='Churn', data=df)
plt.title('Churn by Internet Service')
plt.show()

# Tenure distribution by Churn
sns.histplot(data=df, x='tenure', hue='Churn', multiple='stack', bins=30)
plt.title('Tenure Distribution by Churn')
plt.show()

# Monthly Charges vs Churn
sns.boxplot(x='Churn', y='MonthlyCharges', data=df)
plt.title('Monthly Charges by Churn')
plt.show()
```


Churn Rate by Contract Type
Churn
No
Yes
count
2000
1500
1000
500
0
Month-to-month
One year
Two year
Contract


Churn by Internet Service
Churn
No
Yes
count
2000
1750
1500
1250
1000
750
500
250
0
DSL
Fiber optic
No
InternetService


Tenure Distribution by Churn
Churn
No
Yes
Count
1000
800
600
400
200
0
0
10
20
30
40
50
60
70
tenure


Monthly Charges by Churn


120
100
80
60
40
MonthlyCharges