In [15]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
```

In [17]:
```
data = pd.read_csv('Downloads/archive (1)/amazon_prime_users.csv')
```

In [21]:
```
data.sample(5)
```

Out[21]:

	User ID	Name	Email Address	Username	Date of Birth	Gender
137	138	Jesus Brown	zlee@example.net	zlee	1958-12-03	Female
879	880	Derek Rogers	wilcoxsarah@example.com	wilcoxsarah	1975-06-30	Male
2190	2191	David Wood	wward@example.net	wward	1991-03-24	Male
2479	2480	Mckenzie Nelson	martinezamber@example.net	martinezamber	1947-07-27	Male
1249	1250	Douglas Thomas	jasonrasmussen@example.com	jasonrasmussen	1937-05-22	Male

In [23]:
```
data.columns
```

Out[23]:
```
Index(['User ID', 'Name', 'Email Address', 'Username', 'Date of Birth',
       'Gender', 'Location', 'Membership Start Date', 'Membership End Da
te',
       'Subscription Plan', 'Payment Information', 'Renewal Status',
       'Usage Frequency', 'Purchase History', 'Favorite Genres',
       'Devices Used', 'Engagement Metrics', 'Feedback/Ratings',
       'Customer Support Interactions'],
      dtype='object')
```

In [35]:
```
data.count()
```

Out[35]:

```
User ID                            2500
Name                               2500
Email Address                      2500
Username                           2500
Date of Birth                      2500
Gender                             2500
Location                           2500
Membership Start Date              2500
Membership End Date                2500
Subscription Plan                  2500
Payment Information                2500
Renewal Status                     2500
Usage Frequency                    2500
Purchase History                   2500
Favorite Genres                    2500
Devices Used                       2500
Engagement Metrics                 2500
Feedback/Ratings                   2500
Customer Support Interactions      2500
dtype: int64
```

In [27]:

```
data.isnull().sum()
```

Out[27]:

```
User ID                            0
Name                               0
Email Address                      0
Username                           0
Date of Birth                      0
Gender                             0
Location                           0
Membership Start Date              0
Membership End Date                0
Subscription Plan                  0
Payment Information                0
Renewal Status                     0
Usage Frequency                    0
Purchase History                   0
Favorite Genres                    0
Devices Used                       0
Engagement Metrics                 0
Feedback/Ratings                   0
Customer Support Interactions      0
dtype: int64
```

In [31]:

```
print(f"Dataset contains {data.duplicated().sum()} Duplicate values")
```

```
Dataset contains 0 Duplicate values
```

In [37]:

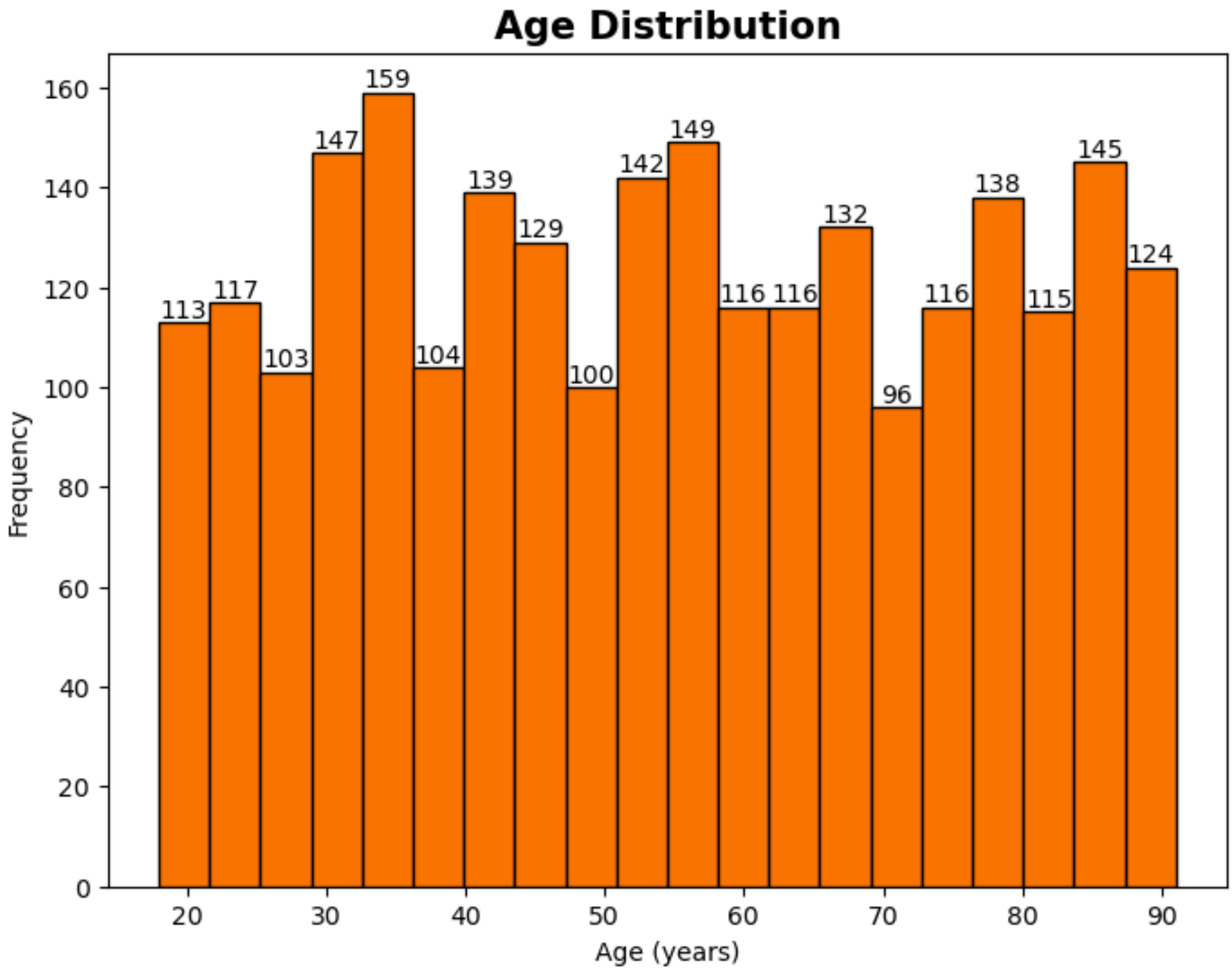
```
data.describe()
```

Out[37]:

	User ID	Feedback/Ratings	Customer Support Interactions
count	2500.00000	2500.000000	2500.000000
mean	1250.50000	4.004760	4.951600
std	721.83216	0.580769	3.191572
min	1.00000	3.000000	0.000000
25%	625.75000	3.500000	2.000000
50%	1250.50000	4.000000	5.000000
75%	1875.25000	4.500000	8.000000
max	2500.00000	5.000000	10.000000

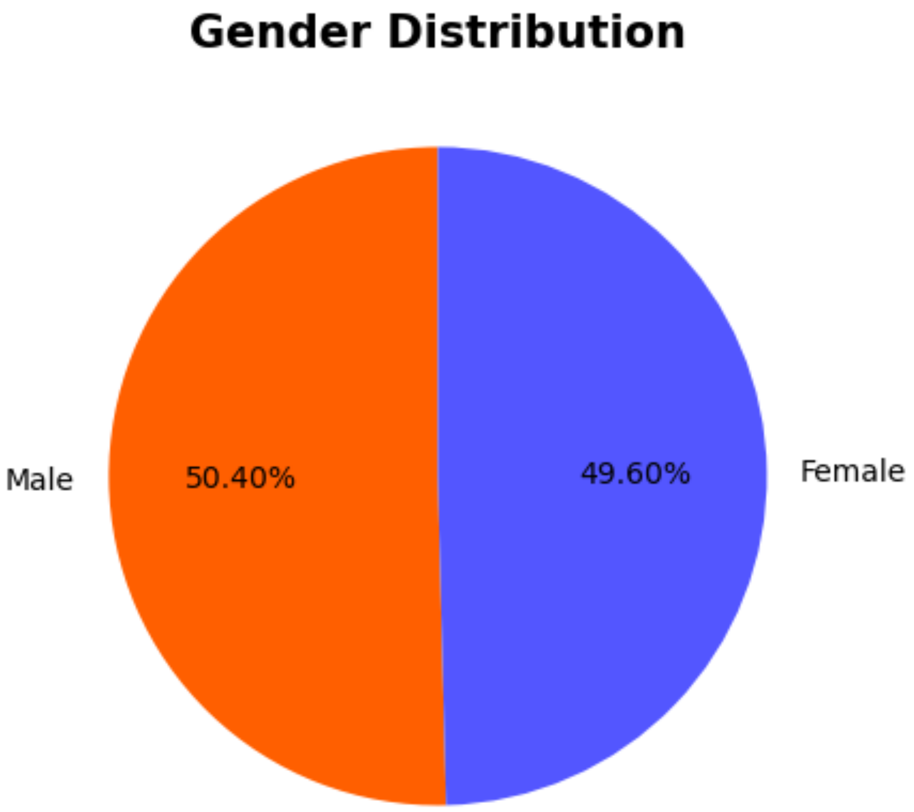
In [41]:

```
# 1. Demographic Analysis
# Age Calculation

from dateutil.relativedelta import relativedelta
data["Date of Birth"]=pd.to_datetime(data["Date of Birth"])
today=pd.Timestamp("today").normalize()
data["Age (yrs)"]=data['Date of Birth'].apply(lambda dob:relativedelta(to

data=data.reindex(columns=['User ID', 'Name', 'Email Address', 'Username
       'Gender', 'Location', 'Membership Start Date', 'Membership End Dat
       'Subscription Plan', 'Payment Information', 'Renewal Status',
       'Usage Frequency', 'Purchase History', 'Favorite Genres',
       'Devices Used', 'Engagement Metrics', 'Feedback/Ratings',
       'Customer Support Interactions','TLD'])

plt.figure(figsize=(8, 6))
counts, bins, bars = plt.hist(data["Age (yrs)"], bins=20, color='#F97300
for count, bar in zip(counts, bars):
    plt.text(bar.get_x() + bar.get_width() / 2, count, int(count), ha='ce

plt.xlabel('Age (years)')
plt.ylabel('Frequency')
plt.title('Age Distribution',fontsize=15, fontweight='bold')
plt.show()
```



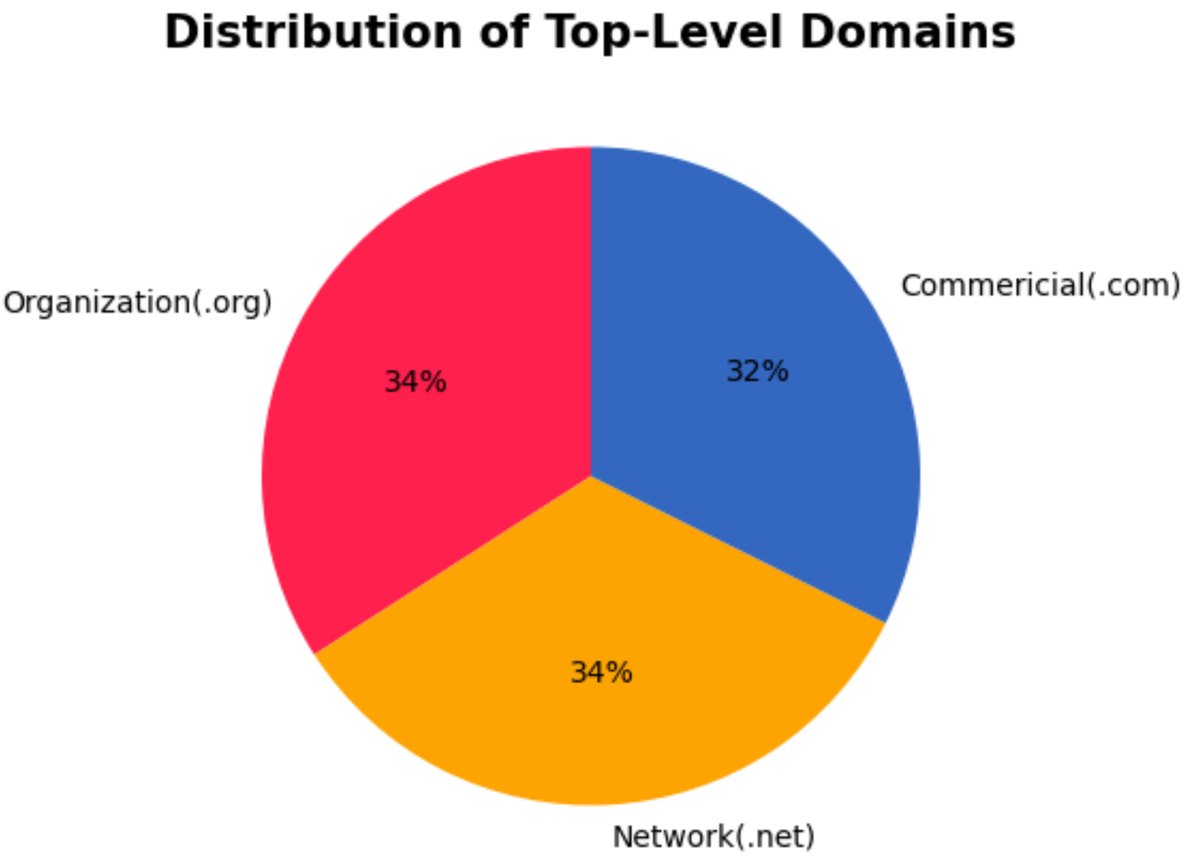
In [43]:

```
# Gender Distribution
gender_count=data["Gender"].value_counts()

plt.figure(figsize=(5, 5))
plt.pie(gender_count, labels=gender_count.index, autopct='%1.2f%%', star
plt.title('Gender Distribution', fontsize=15, fontweight='bold')
plt.show()
```



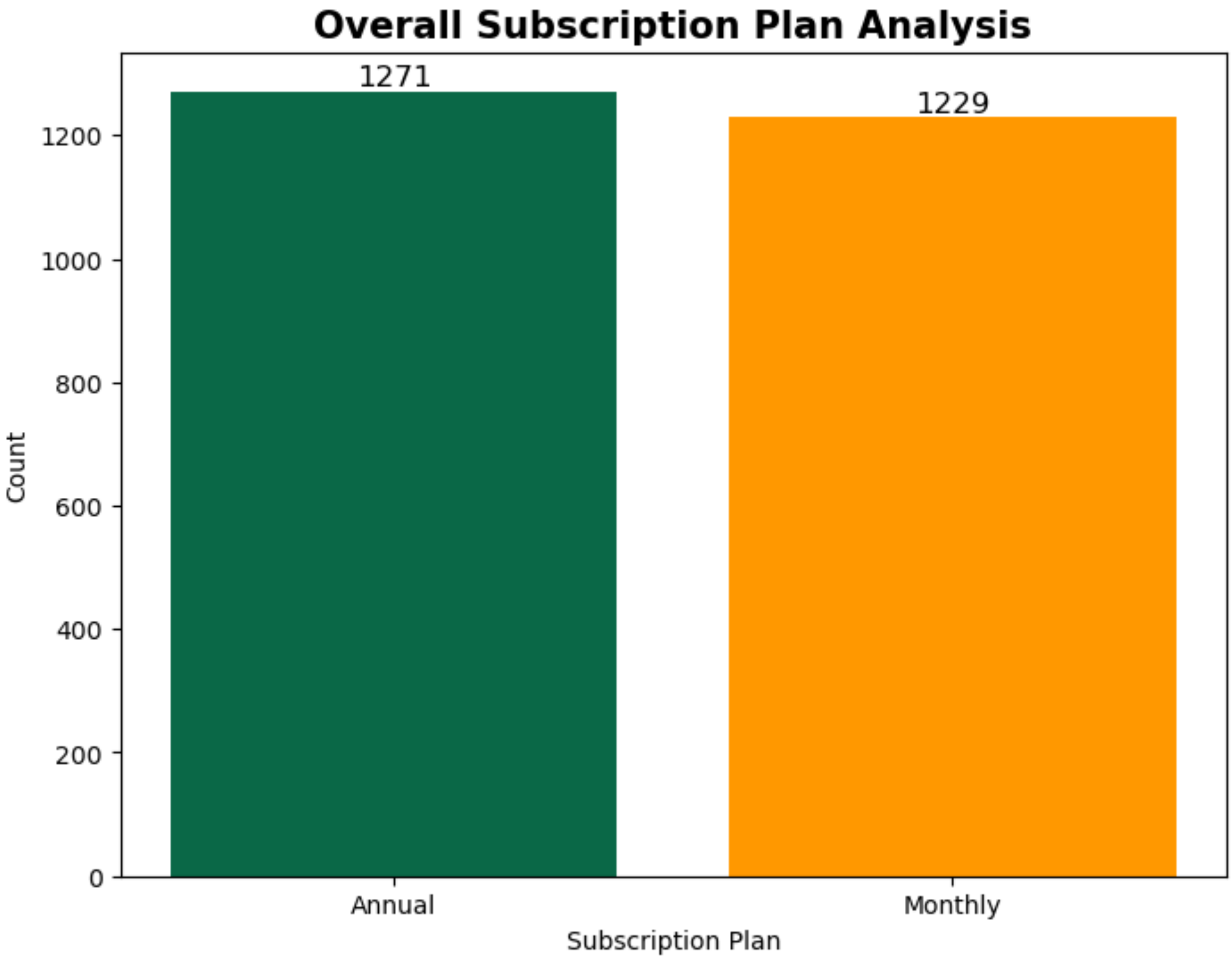
In [45]:

```
# Distribution of email-adresses

tlds=data["Email Address"].str.split(".",expand=True)

data["TLD"]=tlds[1]
data["TLD"]=data["TLD"].replace({"com":"Commericial(.com)","net":"Networ


tld_count=data["TLD"].value_counts()
plt.figure(figsize=(5, 5))
plt.pie(tld_count, labels=tld_count.index, autopct='%1.0f%%', startangle
plt.title('Distribution of Top-Level Domains', fontsize=15, fontweight='
plt.show()
```



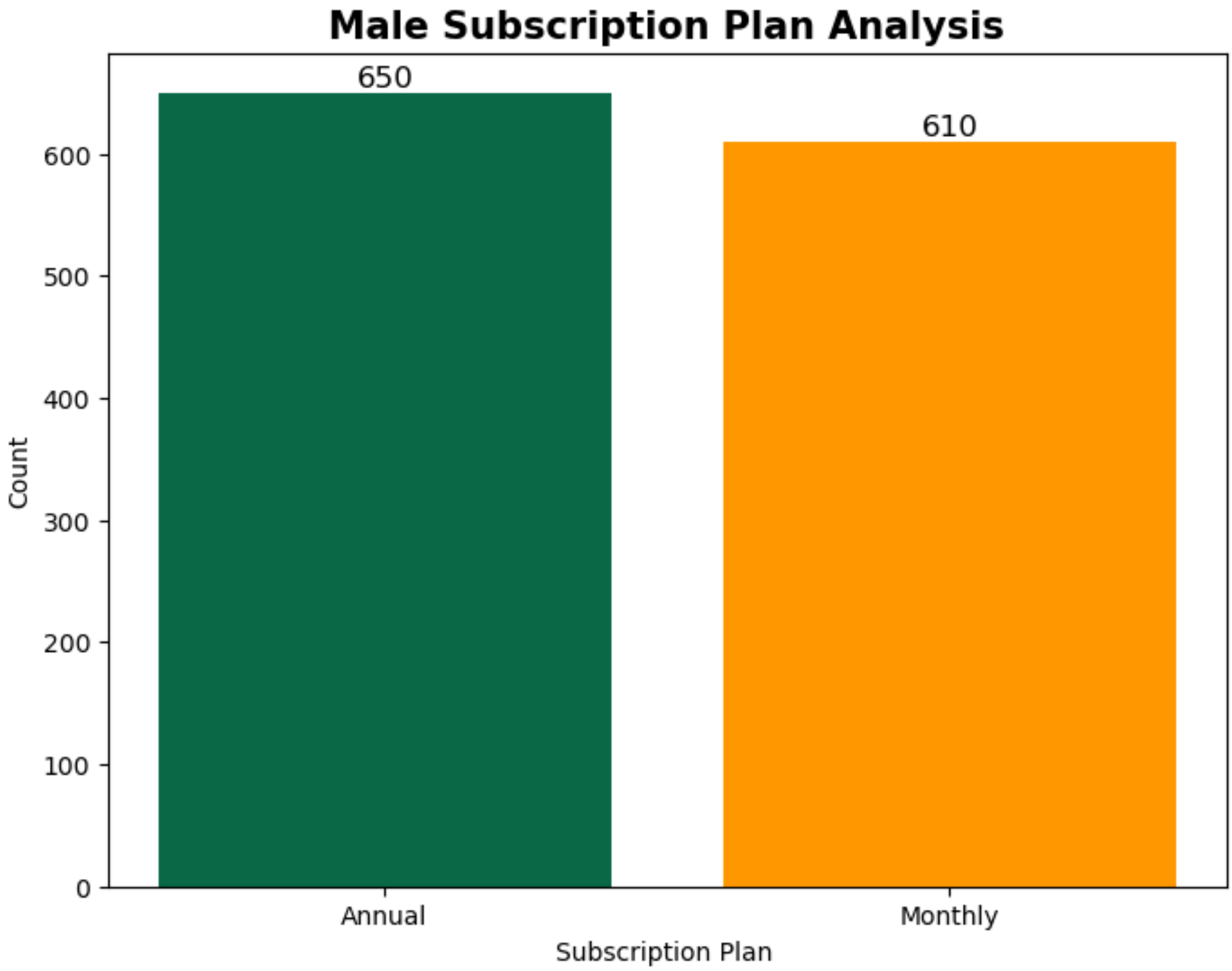
In [47]:

```
# 2. Membership and Subscription Analysis

# Subscription Plan

# Overall Subscription Plan Analysis

plan_count = data['Subscription Plan'].value_counts()

plt.figure(figsize=(8, 6))
bars = plt.bar(plan_count.index, plan_count, color=['#0A6847', '#FF9800'

for bar in bars:
    height = bar.get_height()
    plt.text(bar.get_x() + bar.get_width() / 2, height, int(height), ha=

plt.xlabel('Subscription Plan')
plt.ylabel('Count')
plt.title('Overall Subscription Plan Analysis', fontsize=15, fontweight=
plt.show()
```



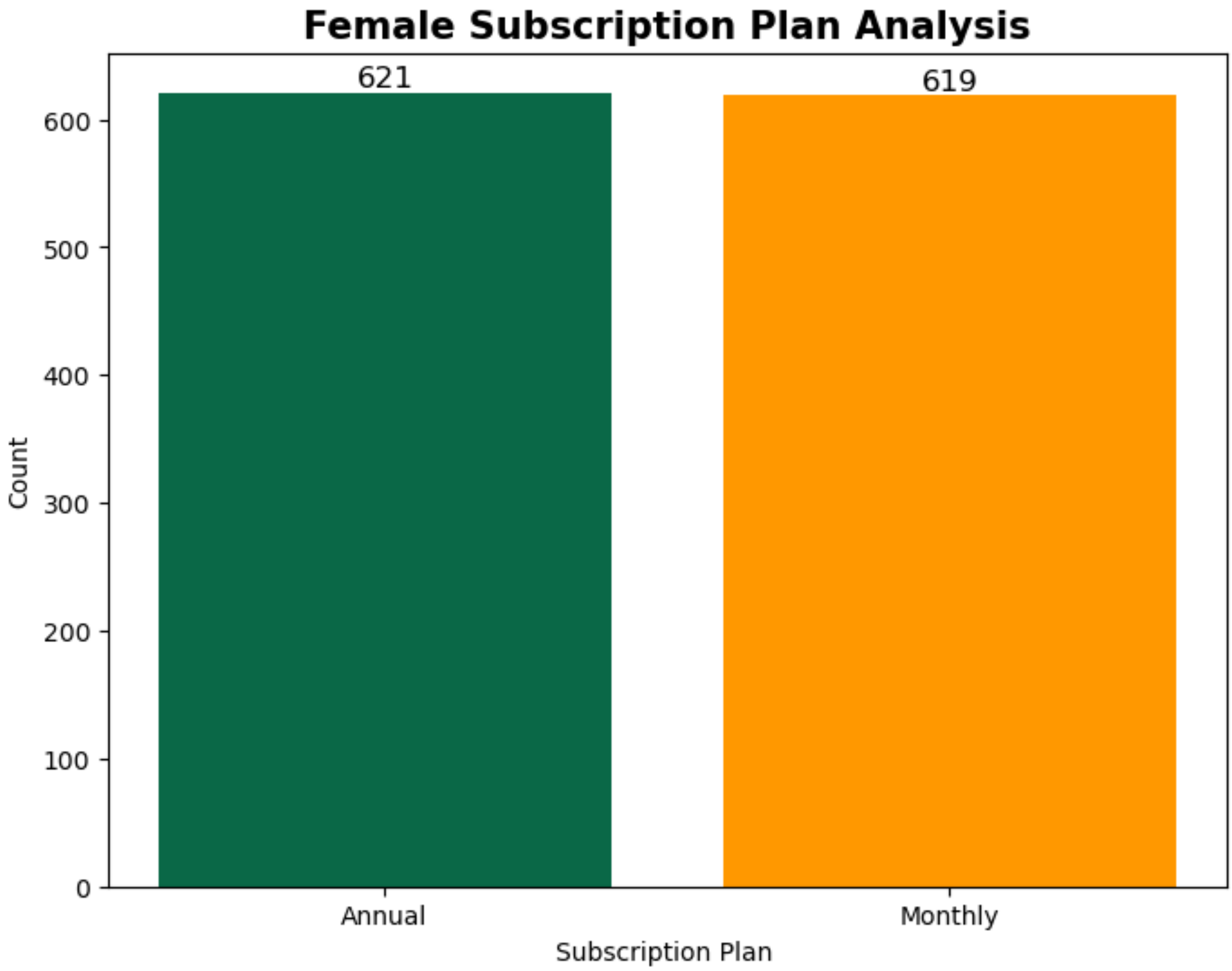
In [53]:

```
# Male Subscription Plan Analysis

men_plan_count=data.loc[data["Gender"]=="Male",'Subscription Plan'].value

plt.figure(figsize=(8, 6))
bars = plt.bar(men_plan_count.index, men_plan_count, color=['#0A6847', '#

for bar in bars:
    height = bar.get_height()
    plt.text(bar.get_x() + bar.get_width() / 2, height, int(height), ha=

plt.xlabel('Subscription Plan ')
plt.ylabel('Count')
plt.title('Male Subscription Plan Analysis', fontsize=15, fontweight='bol
plt.show()
```



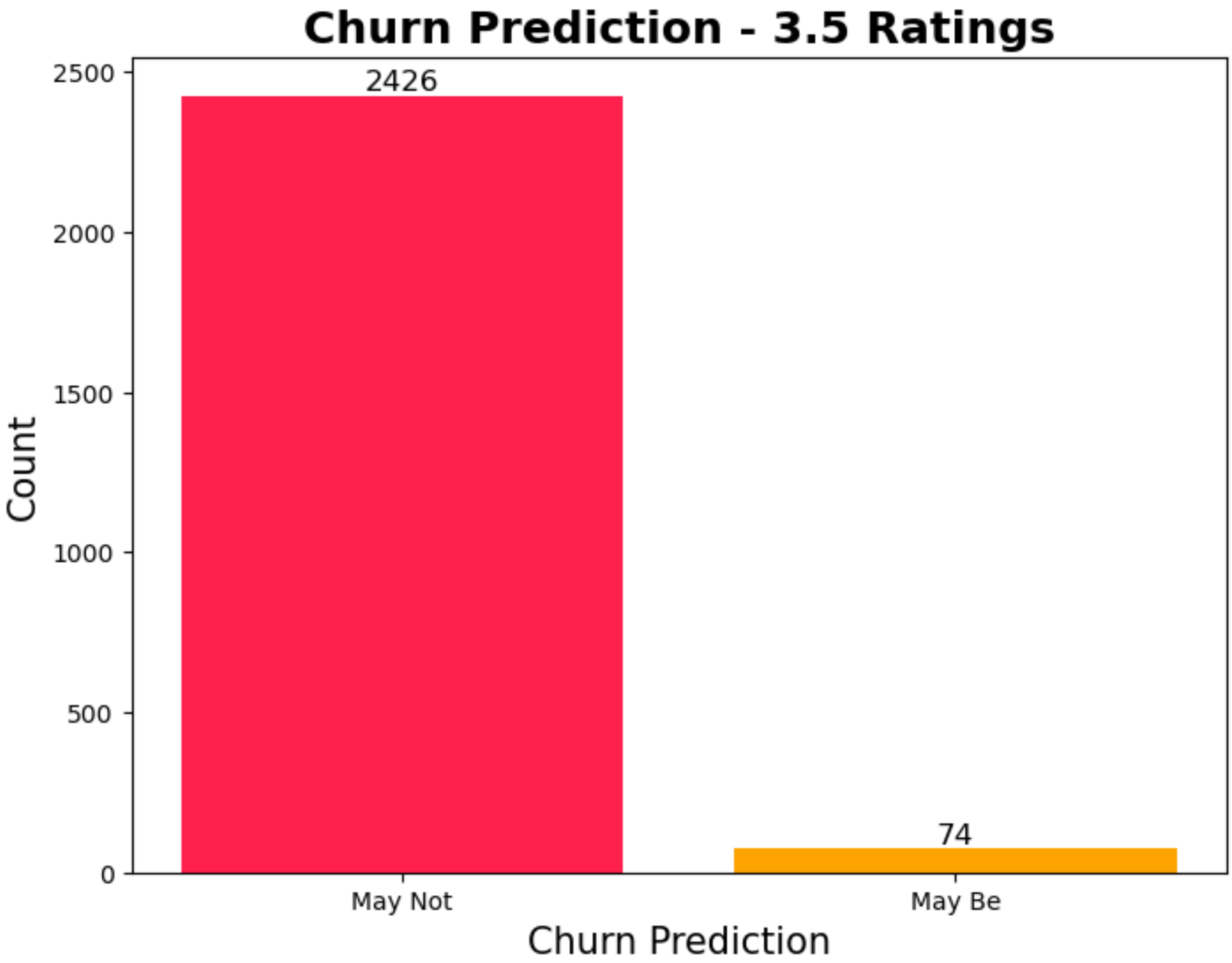
In [55]:

```
# Female Subscription Plan Analysis

women_plan_count=data.loc[data["Gender"]=="Female",'Subscription Plan'].

plt.figure(figsize=(8, 6))
bars = plt.bar(women_plan_count.index, women_plan_count, color=['#0A6847

for bar in bars:
    height = bar.get_height()
    plt.text(bar.get_x() + bar.get_width() / 2, height, int(height), ha=

plt.xlabel('Subscription Plan ')
plt.ylabel('Count')
plt.title('Female Subscription Plan Analysis', fontsize=15, fontweight='
plt.show()
```



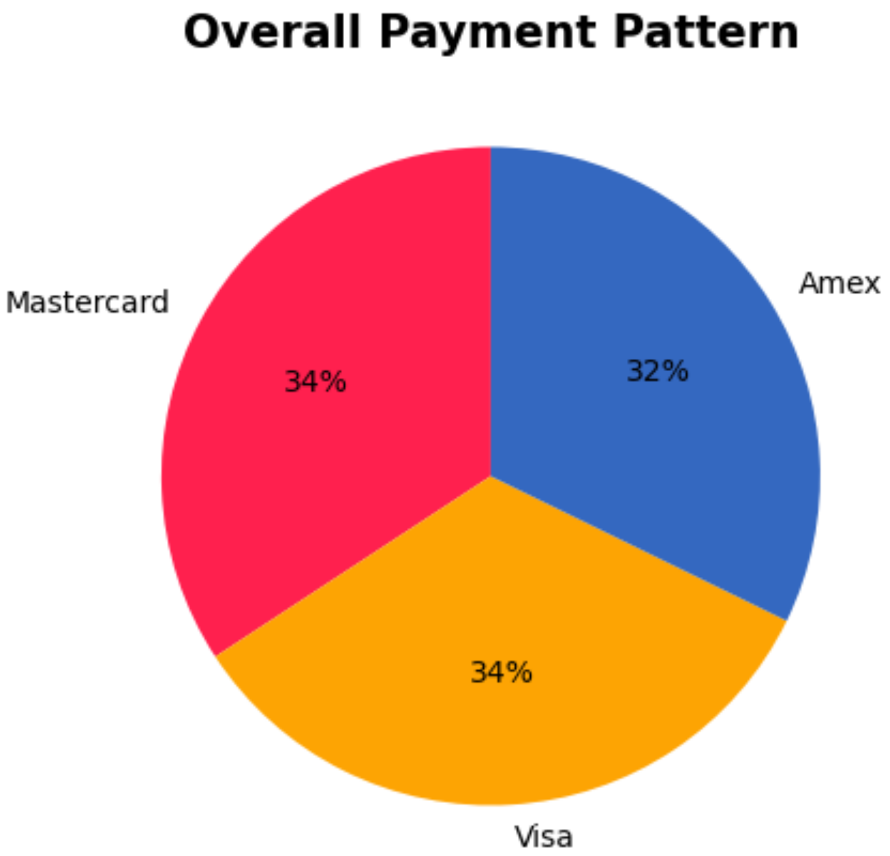
In [57]:

```
# Churn Analysis & Prediction

data["Churn Prediction"]="May Not"

cond_1=data["Usage Frequency"]=="Occasional"
cond_2=data["Engagement Metrics"]=='Low'
cond_3=data["Feedback/Ratings"]<3.6

# Churn Prediction for Ratings-3.5

data.loc[(cond_1)&(cond_2)&(cond_3),"Churn Prediction"]="May Be"

churn_count=data["Churn Prediction"].value_counts()

plt.figure(figsize=(8, 6))
bars = plt.bar(churn_count.index, churn_count, color=['#FF204E', '#FDA40
for bar in bars:
    height = bar.get_height()
    plt.text(bar.get_x() + bar.get_width() / 2, height, int(height), ha=

plt.xlabel('Churn Prediction', fontsize=15)
plt.ylabel('Count', fontsize=15)
plt.title('Churn Prediction - 3.5 Ratings', fontsize=18, fontweight='bol
plt.show()
```



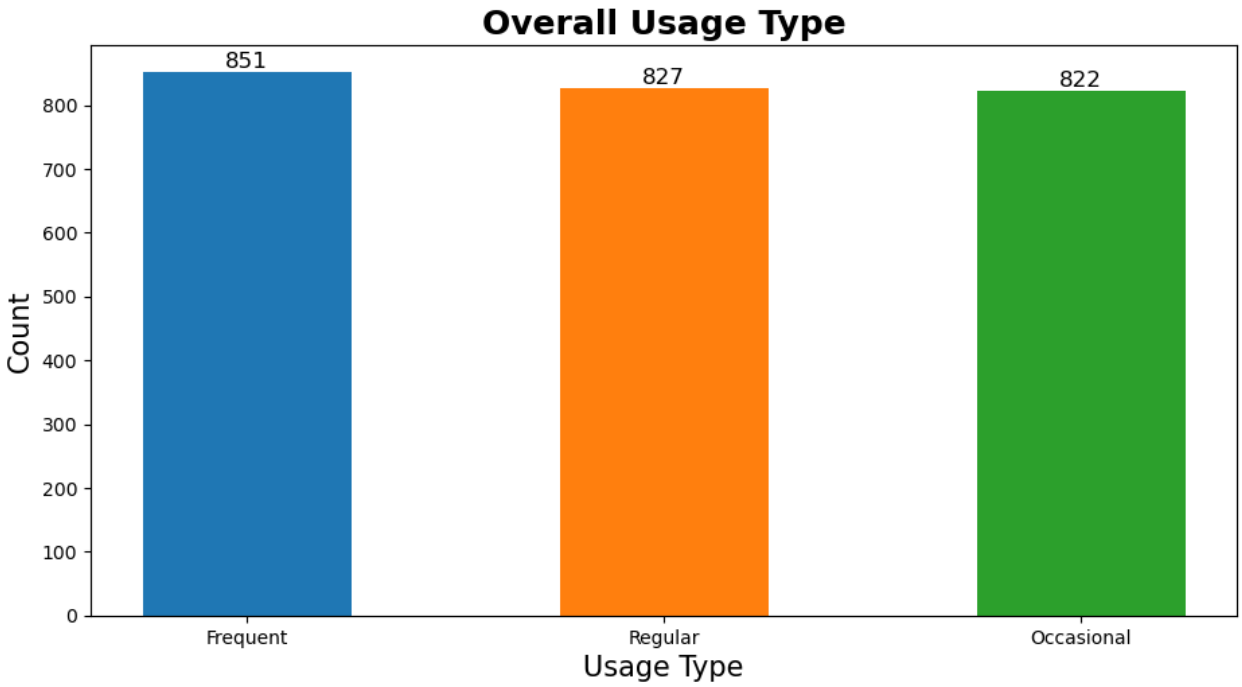
In [59]:

```
# 3. Payment Analysis

# Payment Patterns

data["Payment Information"].value_counts()

# Overall Payment Pattern

pay_count=data["Payment Information"].value_counts()
plt.figure(figsize=(5, 5))
plt.pie(pay_count, labels=pay_count.index, autopct='%1.0f%%', startangle=
plt.title('Overall Payment Pattern', fontsize=15, fontweight='bold')
plt.show()
```



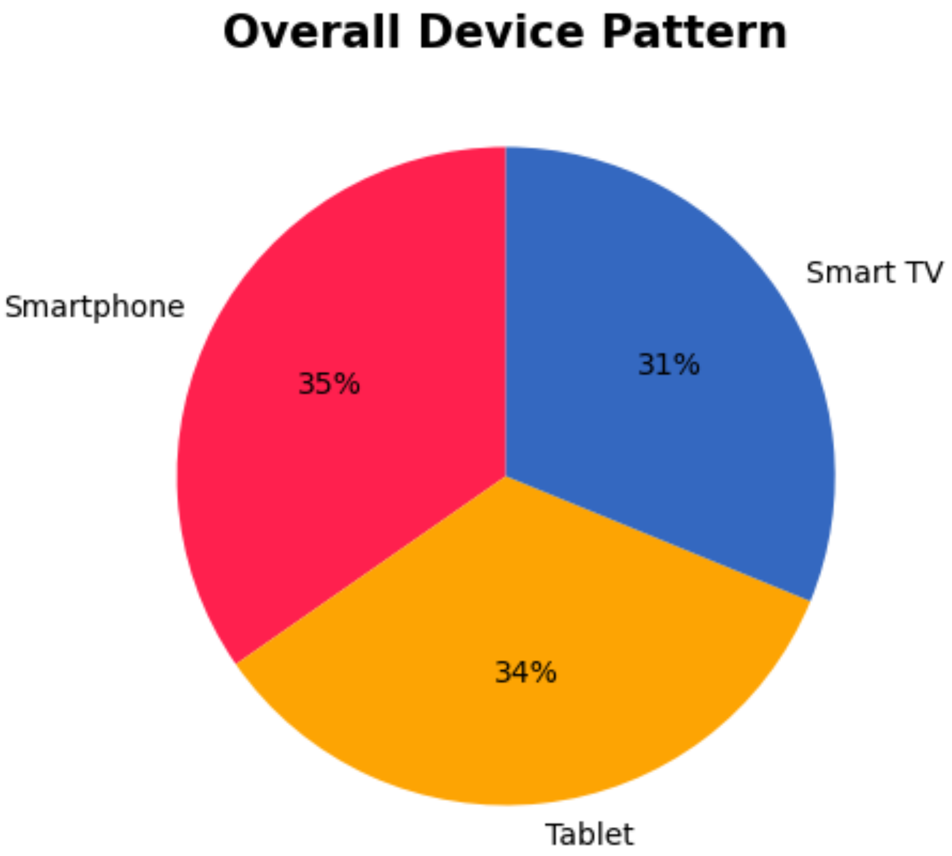
In [61]:

```
# 4. User Activity and Engagement

# Usage Patterns

data["Usage Frequency"].value_counts()

# Overall Usage Type

usage_count=data["Usage Frequency"].value_counts()
plt.figure(figsize=(11, 5.5))
bars = plt.bar(usage_count.index, usage_count, width=0.5, color=['#1f77b

for bar in bars:
    height = bar.get_height()
    plt.text(bar.get_x() + bar.get_width() / 2, height, int(height), ha=

plt.xlabel('Usage Type',fontsize=15)
plt.ylabel('Count',fontsize=15)
plt.title('Overall Usage Type', fontsize=18, fontweight='bold')
plt.show()
```



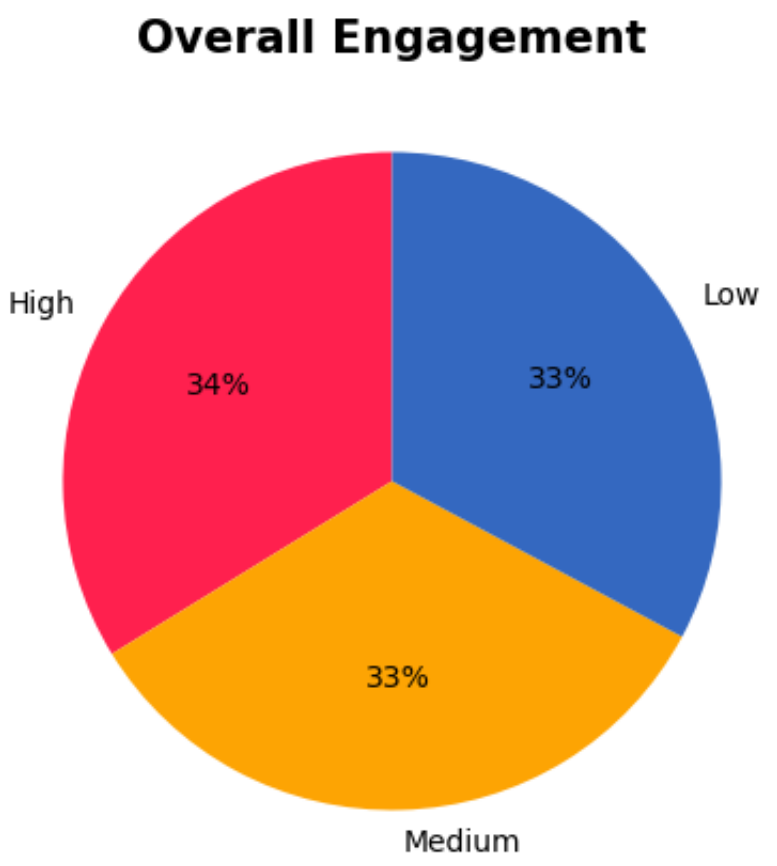
In [63]:

```
# Device Analysis

# Overall Device Analysis

data["Devices Used"].value_counts()

device_count=data["Devices Used"].value_counts()
plt.figure(figsize=(5, 5))
plt.pie(device_count, labels=device_count.index, autopct='%1.0f%%', start
plt.title('Overall Device Pattern', fontsize=15, fontweight='bold')
plt.show()
```



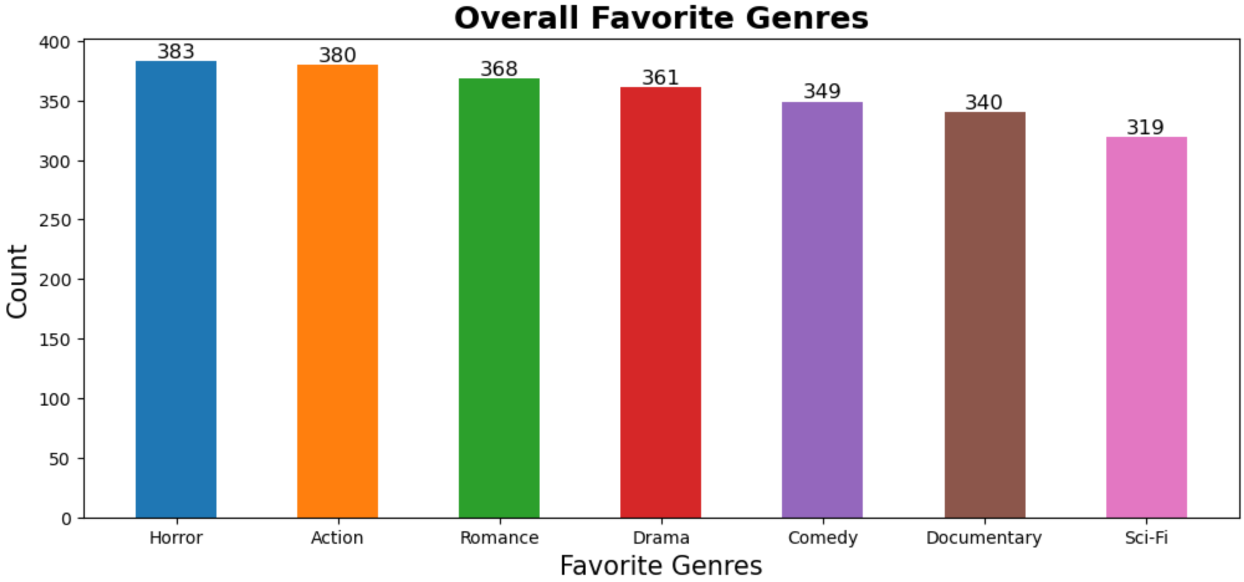
In [65]:

```
# Engagement Metrics

data["Engagement Metrics"].value_counts()

# Overall Engagement

engagement_count=data["Engagement Metrics"].value_counts()
plt.figure(figsize=(5, 5))
plt.pie(engagement_count, labels=engagement_count.index, autopct='%1.0f%
plt.title('Overall Engagement', fontsize=15, fontweight='bold')
plt.show()
```



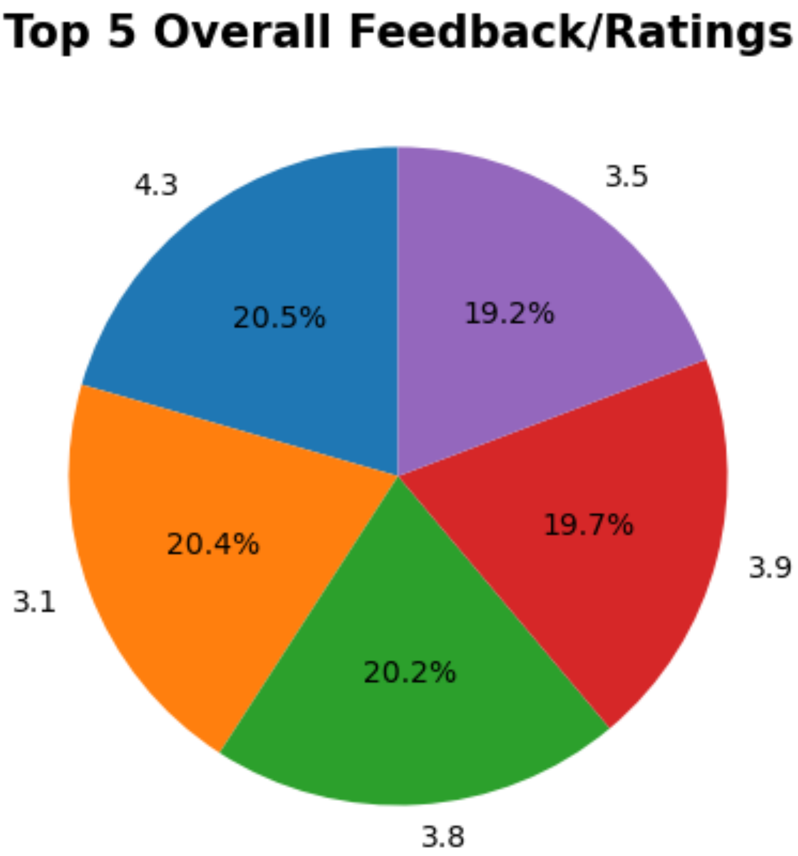
In [67]:

```
# 5. Content Preferences

# Genre Popularity

data["Favorite Genres"].value_counts()

# Overall Genre Analysis

genre_count = data["Favorite Genres"].value_counts()
plt.figure(figsize=(12, 5))
bars = plt.bar(genre_count.index, genre_count, width=0.5, color=['#1f77b
for bar in bars:
    height = bar.get_height()
    plt.text(bar.get_x() + bar.get_width() / 2, height, int(height), ha=

plt.xlabel('Favorite Genres', fontsize=15)
plt.ylabel('Count', fontsize=15)
plt.title('Overall Favorite Genres', fontsize=18, fontweight='bold')
plt.show()
```



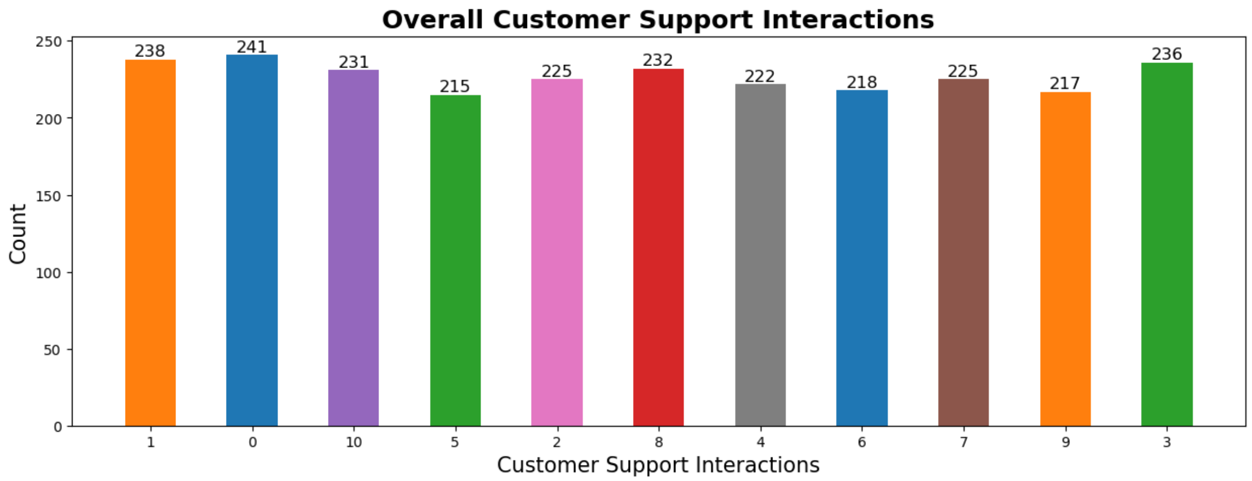
In [69]:

```
# 6. Customer Satisfaction and Support

data["Feedback/Ratings"].value_counts()

# Top 5 Overall Feedback/Ratings

feedback_count = data["Feedback/Ratings"].value_counts().nlargest(5)
plt.figure(figsize=(5, 5))
plt.pie(feedback_count, labels=feedback_count.index, autopct='%1.1f%%', s
plt.title('Top 5 Overall Feedback/Ratings', fontsize=15, fontweight='bol
plt.show()
```



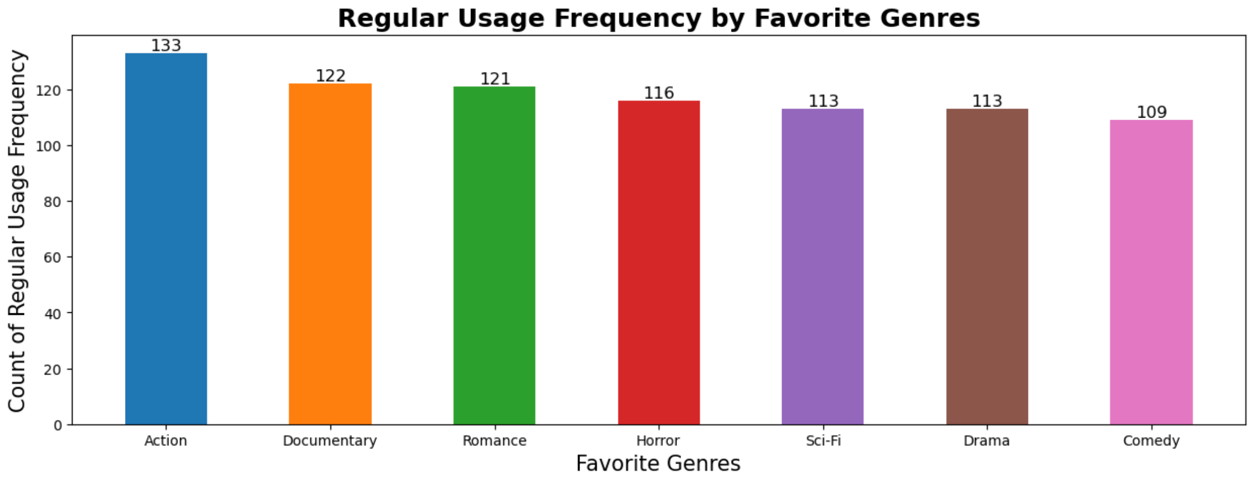
In [71]:

```
data["Customer Support Interactions"].value_counts()

support_interaction_count = data["Customer Support Interactions"].value_c

plt.figure(figsize=(15, 5))
bars = plt.bar(support_interaction_count.index, support_interaction_coun
for bar in bars:
    height = bar.get_height()
    plt.text(bar.get_x() + bar.get_width() / 2, height, int(height), ha=

plt.xlabel('Customer Support Interactions', fontsize=15)
plt.ylabel('Count', fontsize=15)
plt.title('Overall Customer Support Interactions', fontsize=18, fontweigl
plt.xticks(ticks=range(len(support_interaction_count.index)), labels=sup|
plt.show()
```



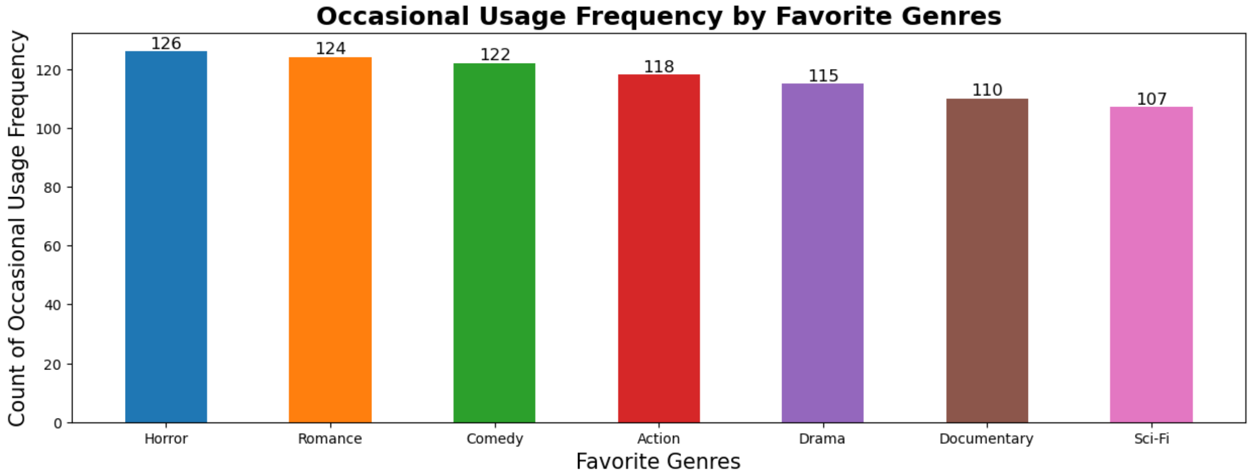
In [75]:

```
# Usage Frequency by Favorite Genres

# Regular Usage Frequency by Favorite Genres

regular_usage_count = data.loc[data["Usage Frequency"] == "Regular","Favo

plt.figure(figsize=(15, 5))
bars = plt.bar(regular_usage_count.index, regular_usage_count, width=0.5
for bar in bars:
    height = bar.get_height()
    plt.text(bar.get_x() + bar.get_width() / 2, height, int(height), ha=

plt.xlabel('Favorite Genres', fontsize=15)
plt.ylabel('Count of Regular Usage Frequency', fontsize=15)
plt.title('Regular Usage Frequency by Favorite Genres', fontsize=18, font
plt.show()
```



In [79]:

```
# Occasional Usage Frequency by Favorite Genres

occasional_usage_count = data.loc[data["Usage Frequency"] == "Occasional

plt.figure(figsize=(15, 5))
bars = plt.bar(occasional_usage_count.index, occasional_usage_count, widt
for bar in bars:
    height = bar.get_height()
    plt.text(bar.get_x() + bar.get_width() / 2, height, int(height), ha=

plt.xlabel('Favorite Genres', fontsize=15)
plt.ylabel('Count of Occasional Usage Frequency', fontsize=15)
plt.title('Occasional Usage Frequency by Favorite Genres', fontsize=18, 
plt.show()
```



In [ ]: