FINAL PROJECT SUBMISSION

Smaira

23112314

Objectives

- To Familiarise Project Planning and Deployment Strategies
- To have an understanding of Technical Components contributing to an analytics-based project
- To create an analysis involving KDD Process, Data Analytics & Predictive Modelling using Python and other practices as discussed during the Python Sessions
- To integrate good coding practices while deducing solutions to challenges

In [1]:
```
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error
import seaborn as sns
from sklearn.preprocessing import LabelEncoder
from sklearn.preprocessing import MinMaxScaler
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score
import warnings as w
import numpy as np
import matplotlib.pyplot as plt
from sklearn.metrics import roc_curve, auc
from sklearn.preprocessing import label_binarize
from sklearn.metrics import confusion_matrix
w.filterwarnings('ignore')
```

In [2]:
```
df=pd.read_csv(r"C:\Users\smair\Downloads\CIA 3 Data - Dinner - Smaira.csv")
```

In [3]:
```
df
```

Out[3]:

	Register Number	Name	Date	Food Type	Location	Where in College ?	Variety	Avg money	Dinner time
0	23112301	Arghya Basu	4.3	Veg	Market	Not in college	Italian	₹100-₹150	7pm-8pm
1	23112302	Aryan Singhal	4.3	Non - Veg	College	Steaming Mugs	Chinese	₹200-₹250	6pm-7pm
2	23112303	Avinash Ruthvik	4.3	Non - Veg	Market	Not in college	Indian	₹100-₹150	9pm-10pm
3	23112305	Harshil Mishra	4.3	Non - Veg	Market	Not in college	Chinese	₹150-₹200	6pm-7pm
4	23112306	Juhi Rathore	4.3	Veg	Home-Cooked	Not in college	Chinese	₹50-₹100	7pm-8pm
...	...	...	...	...	...	...	...	...	...
794	23112316	Tarit Kumar Singh	1.6	Veg	College	Cafe by the Valley	Chinese	₹100-₹150	9pm-10pm
795	23112317	Urvi Saran	1.6	Non - Veg	Market	Not in college	Indian	₹200-₹250	9pm-10pm
796	23112318	Veda Yogesh Rane	1.6	Veg	College	Cafe by the Valley	Indian	₹150-₹200	Past 10pm
797	23112320	Abhimanyu Sharma	1.6	Veg	College	Chopsticks	Chinese	₹50-₹100	7pm-8pm
798	23112321	Kratik Lodha	1.6	Veg	Home-Cooked	Not in college	Indian	₹50-₹100	9pm-10pm

799 rows × 9 columns

In [4]:
```
df['Food Type']
```

Out[4]:
```
0           Veg
1      Non - Veg
2      Non - Veg
3      Non - Veg
4           Veg
         ...
794         Veg
795    Non - Veg
796         Veg
797         Veg
798         Veg
Name: Food Type, Length: 799, dtype: object
```

In [5]:
```
df
```

Out[5]:

	Register Number	Name	Date	Food Type	Location	Where in College ?	Variety	Avg money	Dinner time
0	23112301	Arghya Basu	4.3	Veg	Market	Not in college	Italian	₹100-₹150	7pm-8pm
1	23112302	Aryan Singhal	4.3	Non - Veg	College	Steaming Mugs	Chinese	₹200-₹250	6pm-7pm
2	23112303	Avinash Ruthvik	4.3	Non - Veg	Market	Not in college	Indian	₹100-₹150	9pm-10pm
3	23112305	Harshil Mishra	4.3	Non - Veg	Market	Not in college	Chinese	₹150-₹200	6pm-7pm
4	23112306	Juhi Rathore	4.3	Veg	Home-Cooked	Not in college	Chinese	₹50-₹100	7pm-8pm
...	...	...	...	...	...	...	...	...	...
794	23112316	Tarit Kumar Singh	1.6	Veg	College	Cafe by the Valley	Chinese	₹100-₹150	9pm-10pm
795	23112317	Urvi Saran	1.6	Non - Veg	Market	Not in college	Indian	₹200-₹250	9pm-10pm
796	23112318	Veda Yogesh Rane	1.6	Veg	College	Cafe by the Valley	Indian	₹150-₹200	Past 10pm
797	23112320	Abhimanyu Sharma	1.6	Veg	College	Chopsticks	Chinese	₹50-₹100	7pm-8pm
798	23112321	Kratik Lodha	1.6	Veg	Home-Cooked	Not in college	Indian	₹50-₹100	9pm-10pm

799 rows × 9 columns

In [6]:
```
df.describe()
```

Out[6]:

	Register Number	Date
count	7.990000e+02	799.000000
mean	2.311231e+07	14.930038
std	6.314041e+00	7.915728
min	2.311230e+07	1.400000
25%	2.311231e+07	8.300000
50%	2.311231e+07	15.300000
75%	2.311232e+07	21.300000
max	2.311232e+07	30.500000

In [7]:
```
df.keys()
```

Out[7]:
```
Index(['Register Number ', 'Name', 'Date ', 'Food Type', 'Location',
       'Where in College ?', 'Variety', 'Avg money', 'Dinner time'],
      dtype='object')
```

In [8]:
```
df
```

Out[8]:

	Register Number	Name	Date	Food Type	Location	Where in College ?	Variety	Avg money	Dinner time
0	23112301	Arghya Basu	4.3	Veg	Market	Not in college	Italian	₹100-₹150	7pm-8pm
1	23112302	Aryan Singhal	4.3	Non - Veg	College	Steaming Mugs	Chinese	₹200-₹250	6pm-7pm
2	23112303	Avinash Ruthvik	4.3	Non - Veg	Market	Not in college	Indian	₹100-₹150	9pm-10pm
3	23112305	Harshil Mishra	4.3	Non - Veg	Market	Not in college	Chinese	₹150-₹200	6pm-7pm
4	23112306	Juhi Rathore	4.3	Veg	Home-Cooked	Not in college	Chinese	₹50-₹100	7pm-8pm
...	...	...	...	...	...	...	...	...	...
794	23112316	Tarit Kumar Singh	1.6	Veg	College	Cafe by the Valley	Chinese	₹100-₹150	9pm-10pm
795	23112317	Urvi Saran	1.6	Non - Veg	Market	Not in college	Indian	₹200-₹250	9pm-10pm
796	23112318	Veda Yogesh Rane	1.6	Veg	College	Cafe by the Valley	Indian	₹150-₹200	Past 10pm
797	23112320	Abhimanyu Sharma	1.6	Veg	College	Chopsticks	Chinese	₹50-₹100	7pm-8pm
798	23112321	Kratik Lodha	1.6	Veg	Home-Cooked	Not in college	Indian	₹50-₹100	9pm-10pm

799 rows × 9 columns

In [9]:
```
df.keys()
```

Out[9]:
```
Index(['Register Number ', 'Name', 'Date ', 'Food Type', 'Location',
       'Where in College ?', 'Variety', 'Avg money', 'Dinner time'],
      dtype='object')
```

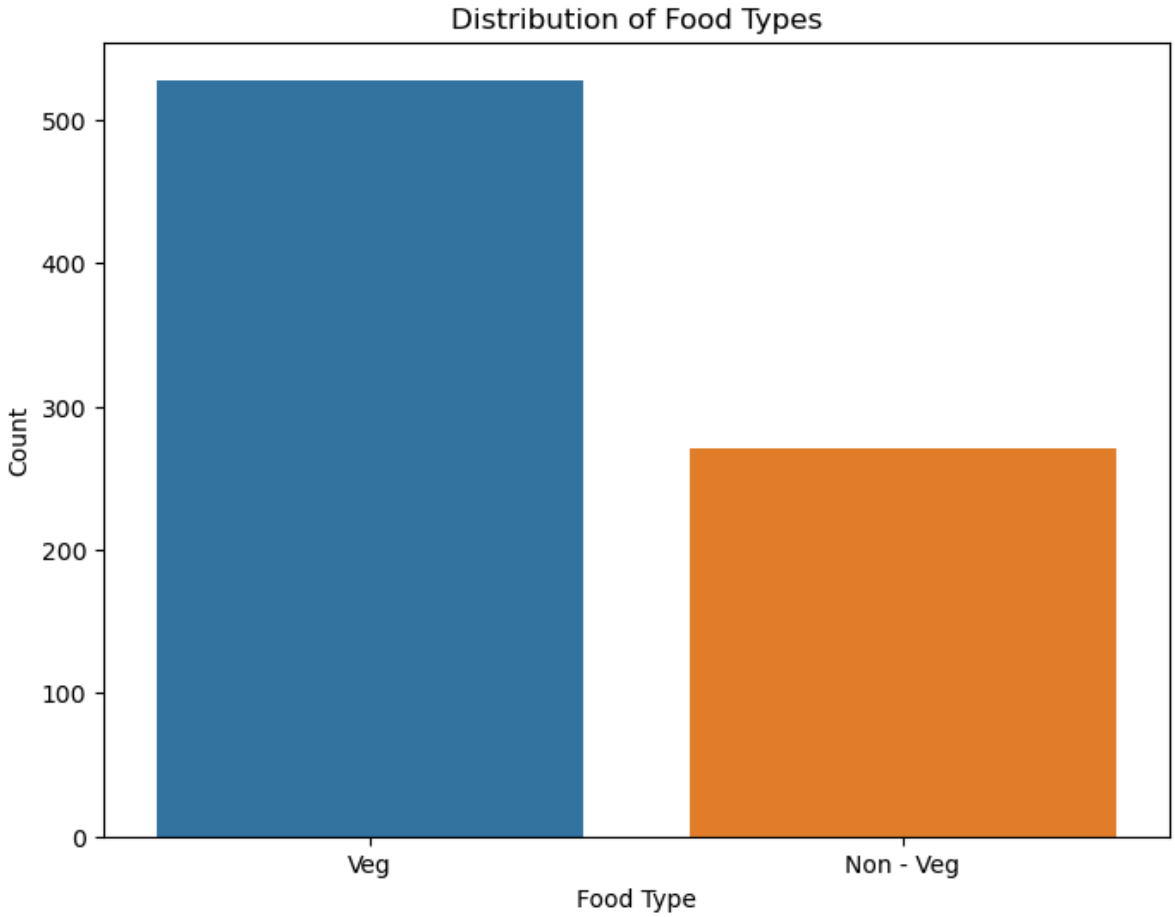
In [10]:
```
df
```

Out[10]:

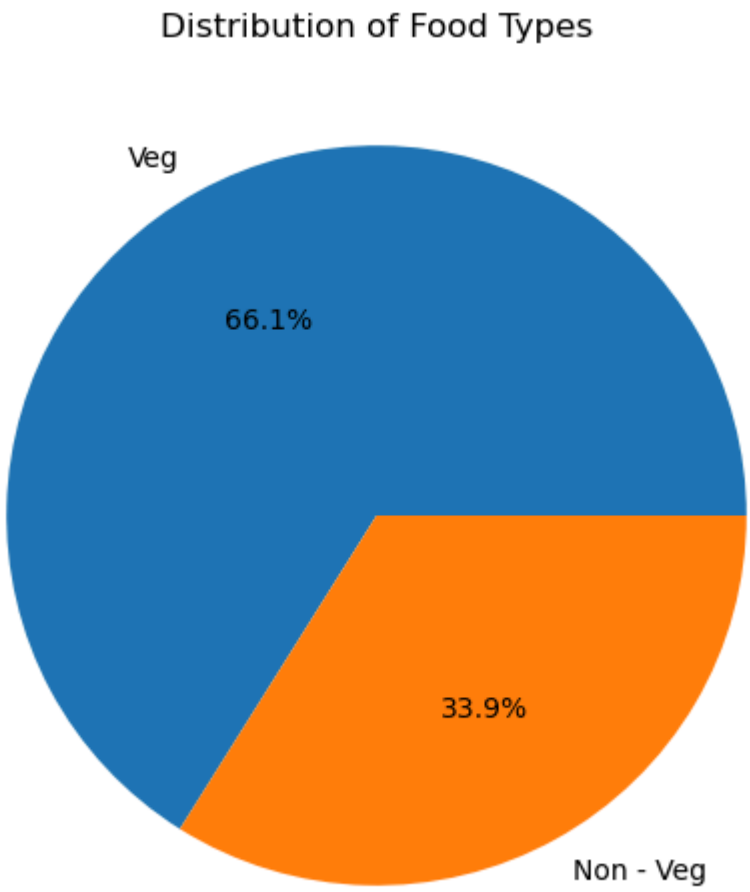
	Register Number	Name	Date	Food Type	Location	Where in College ?	Variety	Avg money	Dinner time
0	23112301	Arghya Basu	4.3	Veg	Market	Not in college	Italian	₹100-₹150	7pm-8pm
1	23112302	Aryan Singhal	4.3	Non - Veg	College	Steaming Mugs	Chinese	₹200-₹250	6pm-7pm
2	23112303	Avinash Ruthvik	4.3	Non - Veg	Market	Not in college	Indian	₹100-₹150	9pm-10pm
3	23112305	Harshil Mishra	4.3	Non - Veg	Market	Not in college	Chinese	₹150-₹200	6pm-7pm
4	23112306	Juhi Rathore	4.3	Veg	Home-Cooked	Not in college	Chinese	₹50-₹100	7pm-8pm
...	...	...	...	...	...	...	...	...	...
794	23112316	Tarit Kumar Singh	1.6	Veg	College	Cafe by the Valley	Chinese	₹100-₹150	9pm-10pm
795	23112317	Urvi Saran	1.6	Non - Veg	Market	Not in college	Indian	₹200-₹250	9pm-10pm
796	23112318	Veda Yogesh Rane	1.6	Veg	College	Cafe by the Valley	Indian	₹150-₹200	Past 10pm
797	23112320	Abhimanyu Sharma	1.6	Veg	College	Chopsticks	Chinese	₹50-₹100	7pm-8pm
798	23112321	Kratik Lodha	1.6	Veg	Home-Cooked	Not in college	Indian	₹50-₹100	9pm-10pm

799 rows × 9 columns

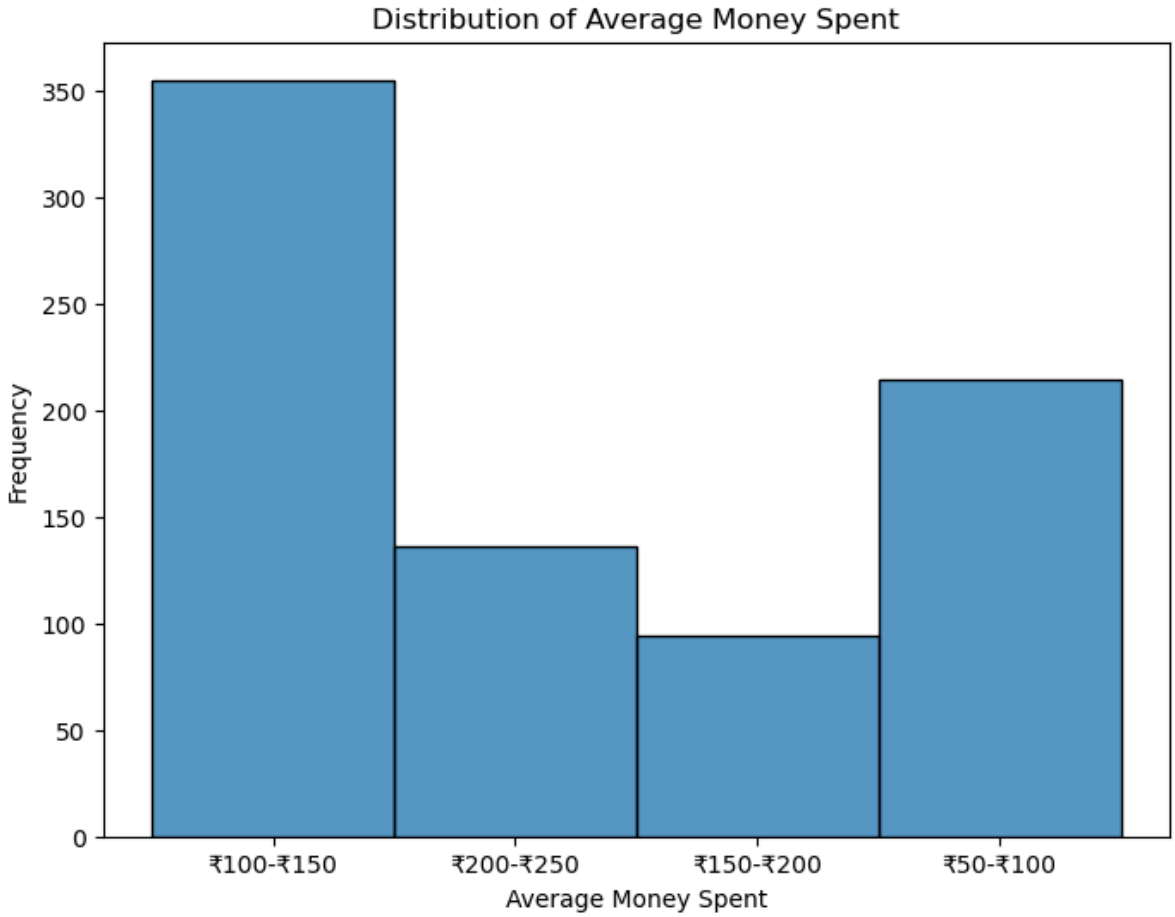
In [11]:
```
plt.figure(figsize=(8, 6))
sns.countplot(data=df, x='Food Type')
plt.title('Distribution of Food Types')
plt.xlabel('Food Type')
plt.ylabel('Count')
plt.show()
```



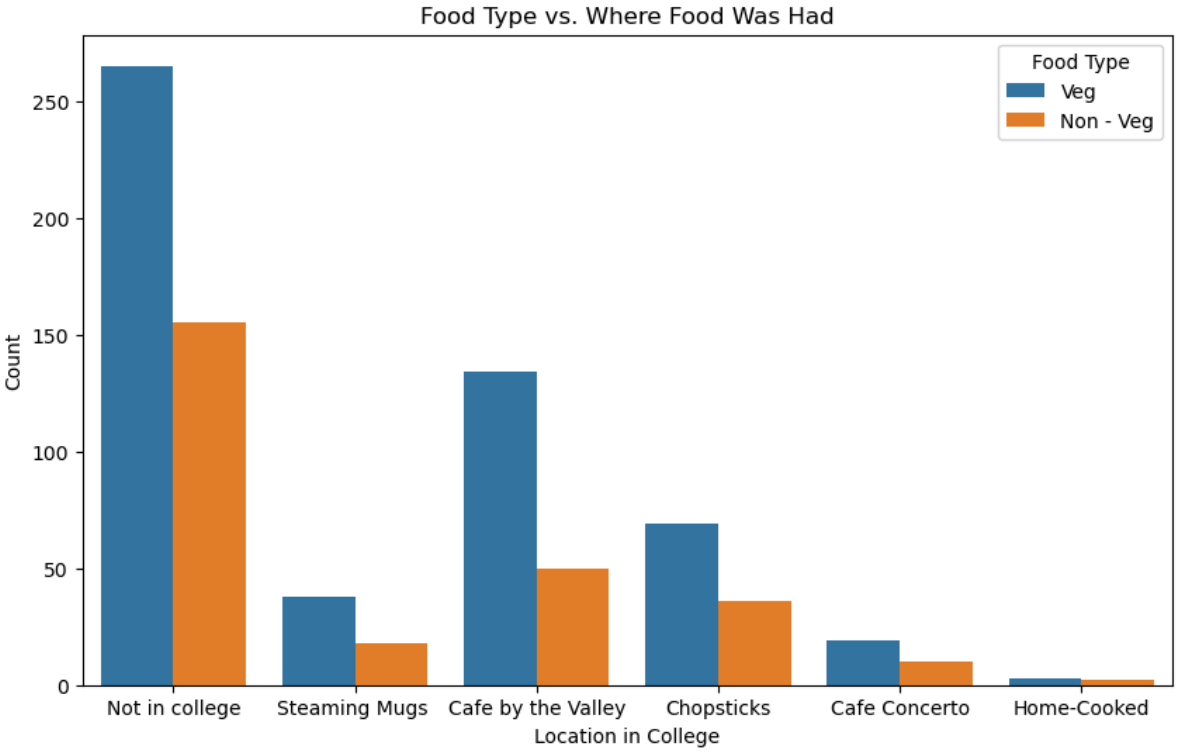
In [12]:
```
plt.figure(figsize=(8, 6))
df['Food Type'].value_counts().plot(kind='pie', autopct='%1.1f%%')
plt.title('Distribution of Food Types')
plt.ylabel('')
plt.show()
```



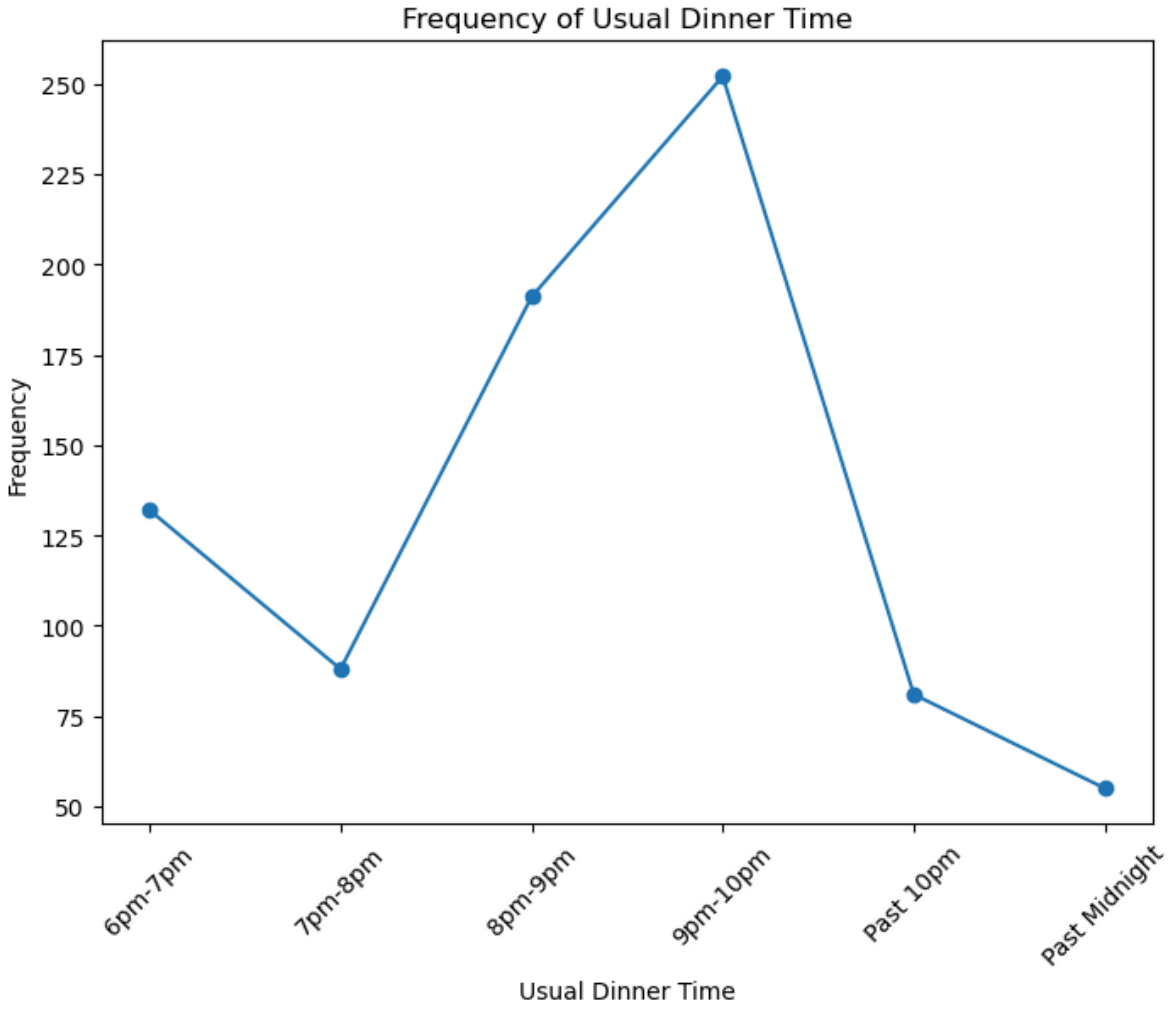
In [13]:
```
plt.figure(figsize=(8, 6))
sns.histplot(data=df, x='Avg money', bins=10)
plt.title('Distribution of Average Money Spent')
plt.xlabel('Average Money Spent')
plt.ylabel('Frequency')
plt.show()
```



In [14]:
```
plt.figure(figsize=(10, 6))
sns.countplot(data=df, x='Where in College ?', hue='Food Type')
plt.title('Food Type vs. Where Food Was Had')
plt.xlabel('Location in College')
plt.ylabel('Count')
plt.legend(title='Food Type')
plt.show()
```



In [15]:
```
plt.figure(figsize=(8, 6))
df['Dinner time'].value_counts().sort_index().plot(kind='line', marker='o')
plt.title('Frequency of Usual Dinner Time')
plt.xlabel('Usual Dinner Time')
plt.ylabel('Frequency')
plt.xticks(rotation=45)
plt.show()
```



In [20]:
```
df.columns = df.columns.str.strip()
df
```

Out[20]:

	Register Number	Name	Date	Food Type	Location	Where in College ?	Variety	Avg money	Dinner time
0	23112301	Arghya Basu	4.3	Veg	Market	Not in college	Italian	₹100-₹150	7pm-8pm
1	23112302	Aryan Singhal	4.3	Non - Veg	College	Steaming Mugs	Chinese	₹200-₹250	6pm-7pm
2	23112303	Avinash Ruthvik	4.3	Non - Veg	Market	Not in college	Indian	₹100-₹150	9pm-10pm
3	23112305	Harshil Mishra	4.3	Non - Veg	Market	Not in college	Chinese	₹150-₹200	6pm-7pm
4	23112306	Juhi Rathore	4.3	Veg	Home-Cooked	Not in college	Chinese	₹50-₹100	7pm-8pm
...	...	...	...	...	...	...	...	...	...
794	23112316	Tarit Kumar Singh	1.6	Veg	College	Cafe by the Valley	Chinese	₹100-₹150	9pm-10pm
795	23112317	Urvi Saran	1.6	Non - Veg	Market	Not in college	Indian	₹200-₹250	9pm-10pm
796	23112318	Veda Yogesh Rane	1.6	Veg	College	Cafe by the Valley	Indian	₹150-₹200	Past 10pm
797	23112320	Abhimanyu Sharma	1.6	Veg	College	Chopsticks	Chinese	₹50-₹100	7pm-8pm
798	23112321	Kratik Lodha	1.6	Veg	Home-Cooked	Not in college	Indian	₹50-₹100	9pm-10pm

799 rows × 9 columns

In [21]:
```
if 'Date' in df.columns:
    df['Date'] = df['Date'].astype("str")
    df['Date'] = pd.to_datetime(df['Date'], format='%d.%m')

    df['Date'] = df['Date'].dt.strftime('%Y-%m-%d').str.replace('1900', '2024')

    df['Weekday'] = pd.to_datetime(df['Date']).dt.strftime('%A')

    df
else:
    print("Column 'Date' not found in the DataFrame.")
```

In [22]:
```
df
```

Out[22]:

	Register Number	Name	Date	Food Type	Location	Where in College ?	Variety	Avg money	Dinner time	Weekday
0	23112301	Arghya Basu	2024-03-04	Veg	Market	Not in college	Italian	₹100-₹150	7pm-8pm	Monday
1	23112302	Aryan Singhal	2024-03-04	Non - Veg	College	Steaming Mugs	Chinese	₹200-₹250	6pm-7pm	Monday
2	23112303	Avinash Ruthvik	2024-03-04	Non - Veg	Market	Not in college	Indian	₹100-₹150	9pm-10pm	Monday
3	23112305	Harshil Mishra	2024-03-04	Non - Veg	Market	Not in college	Chinese	₹150-₹200	6pm-7pm	Monday
4	23112306	Juhi Rathore	2024-03-04	Veg	Home-Cooked	Not in college	Chinese	₹50-₹100	7pm-8pm	Monday
...	...	...	...	...	...	...	...	...	...	...
794	23112316	Tarit Kumar Singh	2024-06-01	Veg	College	Cafe by the Valley	Chinese	₹100-₹150	9pm-10pm	Saturday
795	23112317	Urvi Saran	2024-06-01	Non - Veg	Market	Not in college	Indian	₹200-₹250	9pm-10pm	Saturday
796	23112318	Veda Yogesh Rane	2024-06-01	Veg	College	Cafe by the Valley	Indian	₹150-₹200	Past 10pm	Saturday
797	23112320	Abhimanyu Sharma	2024-06-01	Veg	College	Chopsticks	Chinese	₹50-₹100	7pm-8pm	Saturday
798	23112321	Kratik Lodha	2024-06-01	Veg	Home-Cooked	Not in college	Indian	₹50-₹100	9pm-10pm	Saturday

799 rows × 10 columns

In [23]:
```
df.head()
```

Out[23]:

	Register Number	Name	Date	Food Type	Location	Where in College ?	Variety	Avg money	Dinner time	Weekday
0	23112301	Arghya Basu	2024-03-04	Veg	Market	Not in college	Italian	₹100-₹150	7pm-8pm	Monday
1	23112302	Aryan Singhal	2024-03-04	Non - Veg	College	Steaming Mugs	Chinese	₹200-₹250	6pm-7pm	Monday
2	23112303	Avinash Ruthvik	2024-03-04	Non - Veg	Market	Not in college	Indian	₹100-₹150	9pm-10pm	Monday
3	23112305	Harshil Mishra	2024-03-04	Non - Veg	Market	Not in college	Chinese	₹150-₹200	6pm-7pm	Monday
4	23112306	Juhi Rathore	2024-03-04	Veg	Home-Cooked	Not in college	Chinese	₹50-₹100	7pm-8pm	Monday

In [24]:
```
df.tail()
```

Out[24]:

	Register Number	Name	Date	Food Type	Location	Where in College ?	Variety	Avg money	Dinner time	Weekday
794	23112316	Tarit Kumar Singh	2024-06-01	Veg	College	Cafe by the Valley	Chinese	₹100-₹150	9pm-10pm	Saturday
795	23112317	Urvi Saran	2024-06-01	Non - Veg	Market	Not in college	Indian	₹200-₹250	9pm-10pm	Saturday
796	23112318	Veda Yogesh Rane	2024-06-01	Veg	College	Cafe by the Valley	Indian	₹150-₹200	Past 10pm	Saturday
797	23112320	Abhimanyu Sharma	2024-06-01	Veg	College	Chopsticks	Chinese	₹50-₹100	7pm-8pm	Saturday
798	23112321	Kratik Lodha	2024-06-01	Veg	Home-Cooked	Not in college	Indian	₹50-₹100	9pm-10pm	Saturday

In [25]:
```
df['Date'] = pd.to_datetime(df['Date'])
date_cutoff = pd.to_datetime('2024-04-15')
df = df[df['Date'] <= date_cutoff]
```

In [26]:
```
df
```

Out[26]:

	Register Number	Name	Date	Food Type	Location	Where in College ?	Variety	Avg money	Dinner time	Weekday
0	23112301	Arghya Basu	2024-03-04	Veg	Market	Not in college	Italian	₹100-₹150	7pm-8pm	Monday
1	23112302	Aryan Singhal	2024-03-04	Non - Veg	College	Steaming Mugs	Chinese	₹200-₹250	6pm-7pm	Monday
2	23112303	Avinash Ruthvik	2024-03-04	Non - Veg	Market	Not in college	Indian	₹100-₹150	9pm-10pm	Monday
3	23112305	Harshil Mishra	2024-03-04	Non - Veg	Market	Not in college	Chinese	₹150-₹200	6pm-7pm	Monday
4	23112306	Juhi Rathore	2024-03-04	Veg	Home-Cooked	Not in college	Chinese	₹50-₹100	7pm-8pm	Monday
...	...	...	...	...	...	...	...	...	...	...
538	23112316	Tarit Kumar Singh	2024-04-15	Veg	College	Cafe by the Valley	Indian	₹100-₹150	6pm-7pm	Monday
539	23112317	Urvi Saran	2024-04-15	Veg	Market	Not in college	Chinese	₹150-₹200	9pm-10pm	Monday
540	23112318	Veda Yogesh Rane	2024-04-15	Veg	Market	Not in college	Indian	₹50-₹100	7pm-8pm	Monday
541	23112320	Abhimanyu Sharma	2024-04-15	Non - Veg	Market	Not in college	Indian	₹100-₹150	Past 10pm	Monday
542	23112321	Kratik Lodha	2024-04-15	Non - Veg	Market	Not in college	Indian	₹200-₹250	6pm-7pm	Monday

543 rows × 10 columns

In [27]:
```
df.columns
```

Out[27]:
```
Index(['Register Number', 'Name', 'Date', 'Food Type', 'Location',
       'Where in College ?', 'Variety', 'Avg money', 'Dinner time', 'Weekday'],
      dtype='object')
```

In [28]:
```
df_1 = df.copy()
df_1
```

Out[28]:

	Register Number	Name	Date	Food Type	Location	Where in College ?	Variety	Avg money	Dinner time	Weekday
0	23112301	Arghya Basu	2024-03-04	Veg	Market	Not in college	Italian	₹100-₹150	7pm-8pm	Monday
1	23112302	Aryan Singhal	2024-03-04	Non - Veg	College	Steaming Mugs	Chinese	₹200-₹250	6pm-7pm	Monday
2	23112303	Avinash Ruthvik	2024-03-04	Non - Veg	Market	Not in college	Indian	₹100-₹150	9pm-10pm	Monday
3	23112305	Harshil Mishra	2024-03-04	Non - Veg	Market	Not in college	Chinese	₹150-₹200	6pm-7pm	Monday
4	23112306	Juhi Rathore	2024-03-04	Veg	Home-Cooked	Not in college	Chinese	₹50-₹100	7pm-8pm	Monday
...	...	...	...	...	...	...	...	...	...	...
538	23112316	Tarit Kumar Singh	2024-04-15	Veg	College	Cafe by the Valley	Indian	₹100-₹150	6pm-7pm	Monday
539	23112317	Urvi Saran	2024-04-15	Veg	Market	Not in college	Chinese	₹150-₹200	9pm-10pm	Monday
540	23112318	Veda Yogesh Rane	2024-04-15	Veg	Market	Not in college	Indian	₹50-₹100	7pm-8pm	Monday
541	23112320	Abhimanyu Sharma	2024-04-15	Non - Veg	Market	Not in college	Indian	₹100-₹150	Past 10pm	Monday
542	23112321	Kratik Lodha	2024-04-15	Non - Veg	Market	Not in college	Indian	₹200-₹250	6pm-7pm	Monday

543 rows × 10 columns

In [29]:
```
df_1 = df_1[df_1['Avg money'] != 'Above 300']
```

In [30]:
```
df_1['Avg money'].value_counts()
```

Out[30]:
```
₹100-₹150    236
₹50-₹100     146
₹200-₹250     91
₹150-₹200     70
Name: Avg money, dtype: int64
```

In [31]:
```
def convert_currency_to_mean(currency_str):
    currency_str = currency_str.replace('₹', '').replace(',', '')
    lower, upper = map(int, currency_str.split('-'))
    return (lower + upper) / 2

df['Avg money'] = df['Avg money'].apply(convert_currency_to_mean)

scaler = MinMaxScaler()
df['Avg money (Normalized)'] = scaler.fit_transform(df['Avg money'].values.reshape(

df
```

Out[31]:

	Register Number	Name	Date	Food Type	Location	Where in College ?	Variety	Avg money	Dinner time	Weekday
0	23112301	Arghya Basu	2024-03-04	Veg	Market	Not in college	Italian	125.0	7pm-8pm	Monday
1	23112302	Aryan Singhal	2024-03-04	Non - Veg	College	Steaming Mugs	Chinese	225.0	6pm-7pm	Monday
2	23112303	Avinash Ruthvik	2024-03-04	Non - Veg	Market	Not in college	Indian	125.0	9pm-10pm	Monday
3	23112305	Harshil Mishra	2024-03-04	Non - Veg	Market	Not in college	Chinese	175.0	6pm-7pm	Monday
4	23112306	Juhi Rathore	2024-03-04	Veg	Home-Cooked	Not in college	Chinese	75.0	7pm-8pm	Monday
...	...	...	...	...	...	...	...	...	...	...
538	23112316	Tarit Kumar Singh	2024-04-15	Veg	College	Cafe by the Valley	Indian	125.0	6pm-7pm	Monday
539	23112317	Urvi Saran	2024-04-15	Veg	Market	Not in college	Chinese	175.0	9pm-10pm	Monday
540	23112318	Veda Yogesh Rane	2024-04-15	Veg	Market	Not in college	Indian	75.0	7pm-8pm	Monday
541	23112320	Abhimanyu Sharma	2024-04-15	Non - Veg	Market	Not in college	Indian	125.0	Past 10pm	Monday
542	23112321	Kratik Lodha	2024-04-15	Non - Veg	Market	Not in college	Indian	225.0	6pm-7pm	Monday

543 rows × 11 columns

In [32]:
```
def categorize_avg_money(amount):
    if amount >= 200:
        return 'High'
    elif amount >= 100:
        return 'Medium'
    else:
        return 'Low'
df['Avg money category'] = df['Avg money'].apply(categorize_avg_money)
print(df)
```

```
     Register Number               Name       Date  Food Type     Location  \
0           23112301        Arghya Basu 2024-03-04        Veg       Market
1           23112302      Aryan Singhal 2024-03-04  Non - Veg     College
2           23112303    Avinash Ruthvik 2024-03-04  Non - Veg       Market
3           23112305     Harshil Mishra 2024-03-04  Non - Veg       Market
4           23112306       Juhi Rathore 2024-03-04        Veg  Home-Cooked
..               ...                ...        ...        ...          ...
538         23112316  Tarit Kumar Singh 2024-04-15        Veg     College
539         23112317         Urvi Saran 2024-04-15        Veg       Market
540         23112318   Veda Yogesh Rane 2024-04-15        Veg       Market
541         23112320   Abhimanyu Sharma 2024-04-15  Non - Veg       Market
542         23112321       Kratik Lodha 2024-04-15  Non - Veg       Market

     Where in College ?  Variety  Avg money Dinner time Weekday  \
0        Not in college  Italian      125.0     7pm-8pm  Monday
1        Steaming Mugs   Chinese      225.0     6pm-7pm  Monday
2        Not in college   Indian      125.0    9pm-10pm  Monday
3        Not in college  Chinese      175.0     6pm-7pm  Monday
4        Not in college  Chinese       75.0     7pm-8pm  Monday
..                  ...      ...        ...         ...     ...
538  Cafe by the Valley   Indian      125.0     6pm-7pm  Monday
539      Not in college  Chinese      175.0    9pm-10pm  Monday
540      Not in college   Indian       75.0     7pm-8pm  Monday
541      Not in college   Indian      125.0   Past 10pm  Monday
542      Not in college   Indian      225.0     6pm-7pm  Monday

     Avg money (Normalized) Avg money category
0                  0.333333             Medium
1                  1.000000               High
2                  0.333333             Medium
3                  0.666667             Medium
4                  0.000000                Low
..                      ...                ...
538                0.333333             Medium
539                0.666667             Medium
540                0.000000                Low
541                0.333333             Medium
542                1.000000               High

[543 rows x 12 columns]
```

In [33]:
```
new=df.drop(columns=['Name'])
new
```

Out[33]:

	Register Number	Date	Food Type	Location	Where in College ?	Variety	Avg money	Dinner time	Weekday	Avg money (Normalized)
0	23112301	2024-03-04	Veg	Market	Not in college	Italian	125.0	7pm-8pm	Monday	0.333333
1	23112302	2024-03-04	Non - Veg	College	Steaming Mugs	Chinese	225.0	6pm-7pm	Monday	1.000000
2	23112303	2024-03-04	Non - Veg	Market	Not in college	Indian	125.0	9pm-10pm	Monday	0.333333
3	23112305	2024-03-04	Non - Veg	Market	Not in college	Chinese	175.0	6pm-7pm	Monday	0.666667
4	23112306	2024-03-04	Veg	Home-Cooked	Not in college	Chinese	75.0	7pm-8pm	Monday	0.000000
...	...	...	...	...	...	...	...	...	...	...
538	23112316	2024-04-15	Veg	College	Cafe by the Valley	Indian	125.0	6pm-7pm	Monday	0.333333
539	23112317	2024-04-15	Veg	Market	Not in college	Chinese	175.0	9pm-10pm	Monday	0.666667
540	23112318	2024-04-15	Veg	Market	Not in college	Indian	75.0	7pm-8pm	Monday	0.000000
541	23112320	2024-04-15	Non - Veg	Market	Not in college	Indian	125.0	Past 10pm	Monday	0.333333
542	23112321	2024-04-15	Non - Veg	Market	Not in college	Indian	225.0	6pm-7pm	Monday	1.000000

543 rows × 11 columns

In [34]:
```
dinner_time_counts = df['Dinner time'].value_counts()
print(dinner_time_counts)
```

```
9pm-10pm         167
8pm-9pm          131
6pm-7pm           92
7pm-8pm           61
Past 10pm         54
Past Midnight     38
Name: Dinner time, dtype: int64
```

In [35]:
```
label_encoder = LabelEncoder()
df['Dinner time (Encoded)'] = label_encoder.fit_transform(df['Dinner time'])
df[['Dinner time', 'Dinner time (Encoded)']]
```

Out[35]:

	Dinner time	Dinner time (Encoded)
0	7pm-8pm	1
1	6pm-7pm	0
2	9pm-10pm	3
3	6pm-7pm	0
4	7pm-8pm	1
...	...	...
538	6pm-7pm	0
539	9pm-10pm	3
540	7pm-8pm	1
541	Past 10pm	4
542	6pm-7pm	0

543 rows × 2 columns

In [36]:
```
variety_counts = df['Variety'].value_counts()
print(variety_counts)
```

```
Indian     371
Chinese    124
Italian     48
Name: Variety, dtype: int64
```

In [37]:
```
label_encoder = LabelEncoder()

df['variety (Encoded)'] = label_encoder.fit_transform(df['Variety'])

df[['Variety', 'variety (Encoded)']]
```

Out[37]:

	Variety	variety (Encoded)
0	Italian	2
1	Chinese	0
2	Indian	1
3	Chinese	0
4	Chinese	0
...	...	...
538	Indian	1
539	Chinese	0
540	Indian	1
541	Indian	1
542	Indian	1

543 rows × 2 columns

In [38]:
```
df
```

Out[38]:

	Register Number	Name	Date	Food Type	Location	Where in College ?	Variety	Avg money	Dinner time	Weekday
0	23112301	Arghya Basu	2024-03-04	Veg	Market	Not in college	Italian	125.0	7pm-8pm	Monday
1	23112302	Aryan Singhal	2024-03-04	Non - Veg	College	Steaming Mugs	Chinese	225.0	6pm-7pm	Monday
2	23112303	Avinash Ruthvik	2024-03-04	Non - Veg	Market	Not in college	Indian	125.0	9pm-10pm	Monday
3	23112305	Harshil Mishra	2024-03-04	Non - Veg	Market	Not in college	Chinese	175.0	6pm-7pm	Monday
4	23112306	Juhi Rathore	2024-03-04	Veg	Home-Cooked	Not in college	Chinese	75.0	7pm-8pm	Monday
...	...	...	...	...	...	...	...	...	...	...
538	23112316	Tarit Kumar Singh	2024-04-15	Veg	College	Cafe by the Valley	Indian	125.0	6pm-7pm	Monday
539	23112317	Urvi Saran	2024-04-15	Veg	Market	Not in college	Chinese	175.0	9pm-10pm	Monday
540	23112318	Veda Yogesh Rane	2024-04-15	Veg	Market	Not in college	Indian	75.0	7pm-8pm	Monday
541	23112320	Abhimanyu Sharma	2024-04-15	Non - Veg	Market	Not in college	Indian	125.0	Past 10pm	Monday
542	23112321	Kratik Lodha	2024-04-15	Non - Veg	Market	Not in college	Indian	225.0	6pm-7pm	Monday

543 rows × 14 columns

In [39]:
```
X = df[['Avg money (Normalized)', 'Dinner time (Encoded)','variety (Encoded)']]
y = df['Where in College ?']
```

In [40]:
```
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_sta
```

In [44]:
```
model2= LogisticRegression()
model2.fit(X_train, y_train)
```

Out[44]:
```
▾ LogisticRegression

LogisticRegression()
```

In [45]:
```
y_pred = model2.predict(X_test)
accuracy = accuracy_score(y_test, y_pred)
print("Accuracy:", accuracy)
```

```
Accuracy: 0.6697247706422018
```

In [46]:
```
new_data = [[10, 20,0.3]]
predicted_location = model2.predict(new_data)
print("Predicted Location:", predicted_location)
```

```
Predicted Location: ['Cafe by the Valley']
```

In [47]:
```
results_data = {
    'Actual_Location': y_test,
    'Predicted_Location': y_pred
}

results_df = pd.DataFrame(results_data)
results_df['Error'] = results_df['Actual_Location'] != results_df['Predicted_Locati
results_df.reset_index(drop=True, inplace=True)

results_df
```

Out[47]:

	Actual_Location	Predicted_Location	Error
0	Not in college	Not in college	False
1	Chopsticks	Not in college	True
2	Cafe by the Valley	Not in college	True
3	Not in college	Not in college	False
4	Not in college	Not in college	False
...	...	...	...
104	Not in college	Not in college	False
105	Not in college	Not in college	False
106	Cafe by the Valley	Not in college	True
107	Not in college	Not in college	False
108	Not in college	Not in college	False

109 rows × 3 columns

In [48]:
```
new_df = df.drop(columns=['Register Number'])
new_df
```

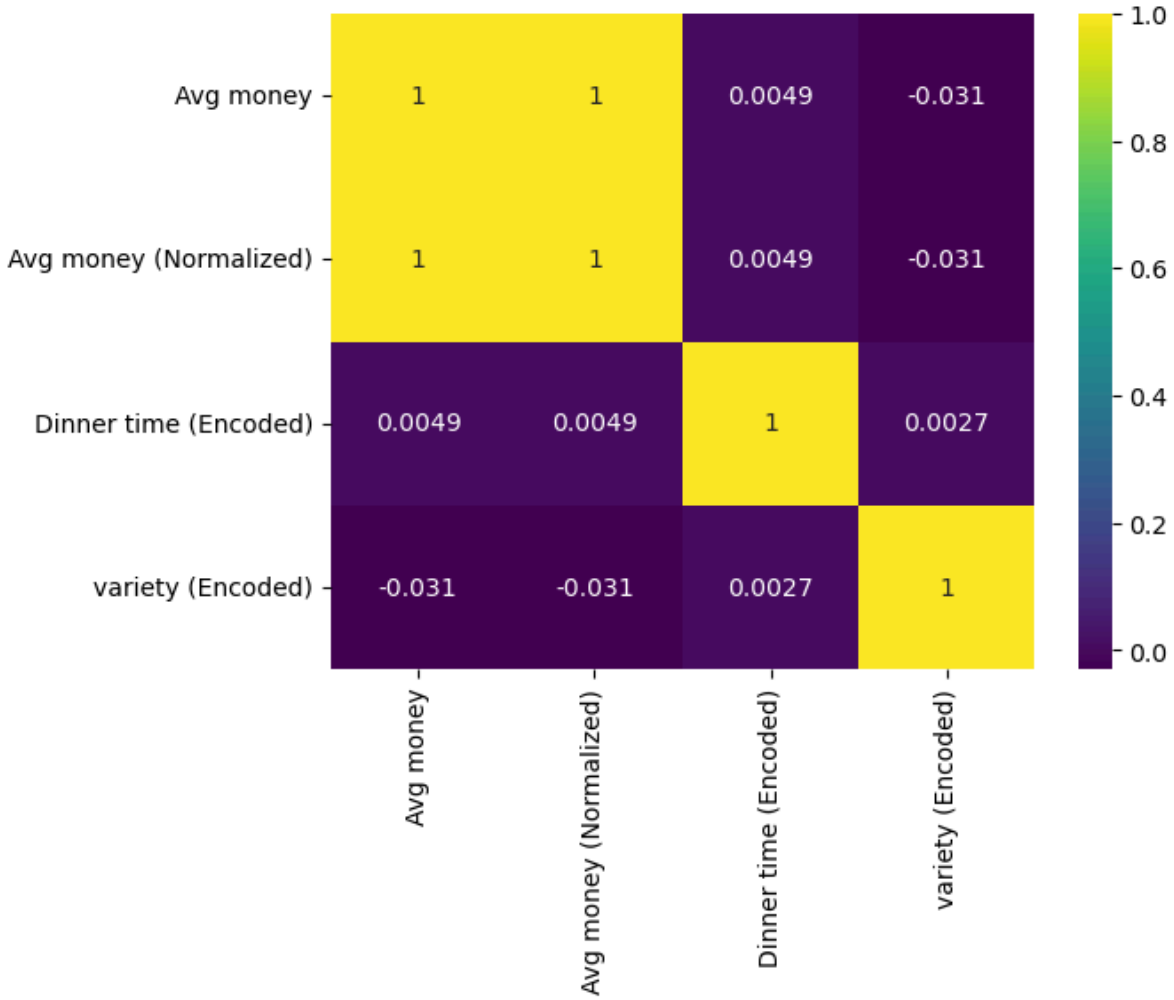
Out[48]:

	Name	Date	Food Type	Location	Where in College ?	Variety	Avg money	Dinner time	Weekday	Avg mon (Normalize
0	Arghya Basu	2024-03-04	Veg	Market	Not in college	Italian	125.0	7pm-8pm	Monday	0.3333
1	Aryan Singhal	2024-03-04	Non - Veg	College	Steaming Mugs	Chinese	225.0	6pm-7pm	Monday	1.0000
2	Avinash Ruthvik	2024-03-04	Non - Veg	Market	Not in college	Indian	125.0	9pm-10pm	Monday	0.3333
3	Harshil Mishra	2024-03-04	Non - Veg	Market	Not in college	Chinese	175.0	6pm-7pm	Monday	0.6666
4	Juhi Rathore	2024-03-04	Veg	Home-Cooked	Not in college	Chinese	75.0	7pm-8pm	Monday	0.0000
...	...	...	...	...	...	...	...	...	...	
538	Tarit Kumar Singh	2024-04-15	Veg	College	Cafe by the Valley	Indian	125.0	6pm-7pm	Monday	0.3333
539	Urvi Saran	2024-04-15	Veg	Market	Not in college	Chinese	175.0	9pm-10pm	Monday	0.6666
540	Veda Yogesh Rane	2024-04-15	Veg	Market	Not in college	Indian	75.0	7pm-8pm	Monday	0.0000
541	Abhimanyu Sharma	2024-04-15	Non - Veg	Market	Not in college	Indian	125.0	Past 10pm	Monday	0.3333
542	Kratik Lodha	2024-04-15	Non - Veg	Market	Not in college	Indian	225.0	6pm-7pm	Monday	1.0000

543 rows × 13 columns

In [49]:
```
sns.heatmap(new_df.corr(),annot=True,cmap="viridis")
```

Out[49]: <Axes: >

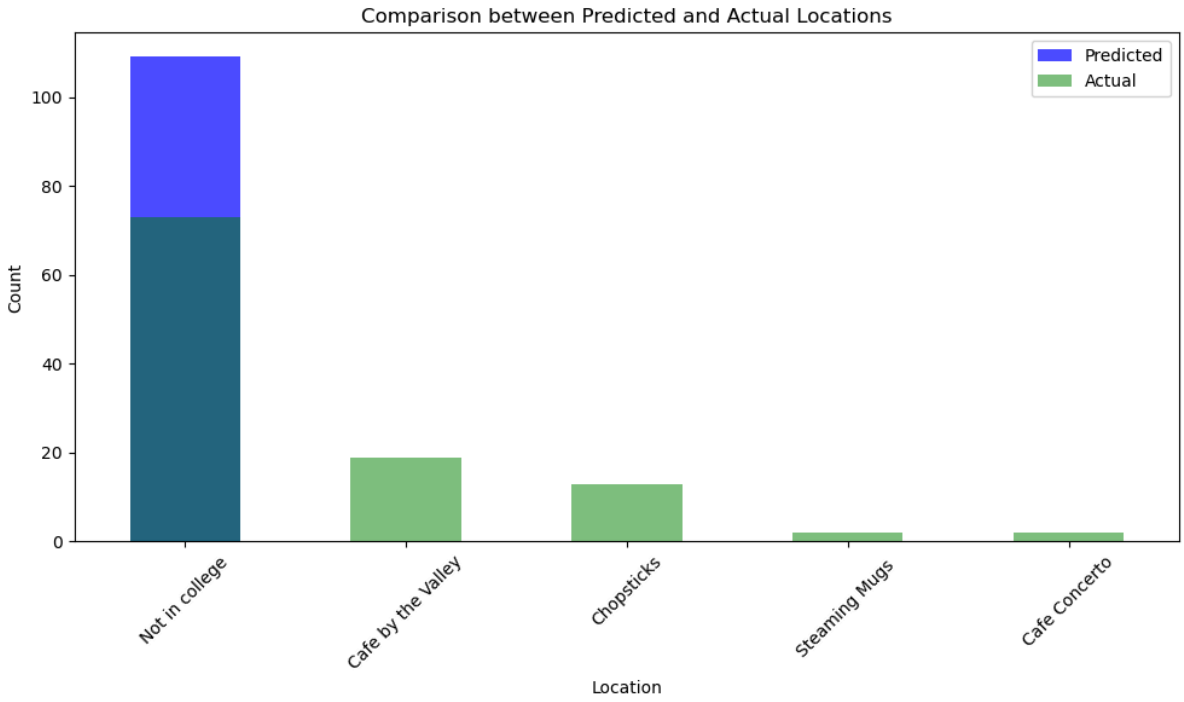


In [50]:
```
df.corr()
```

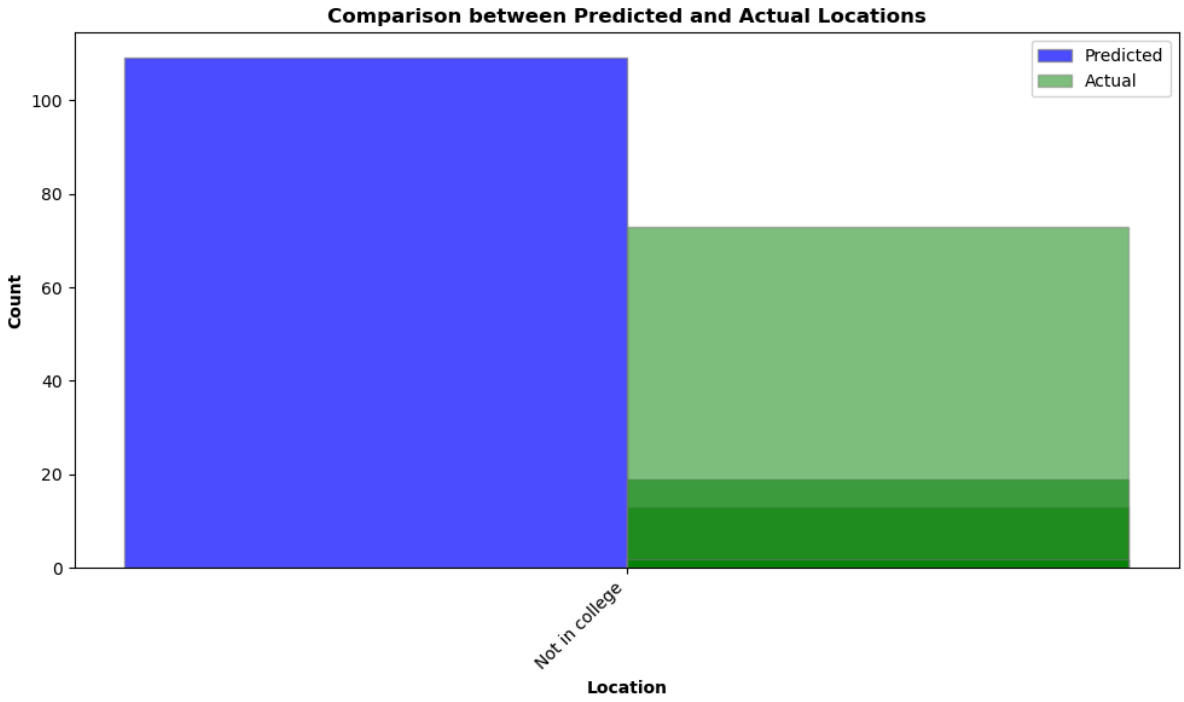
Out[50]:

	Register Number	Avg money	Avg money (Normalized)	Dinner time (Encoded)	variety (Encoded)
Register Number	1.000000	0.008144	0.008144	0.032416	0.026840
Avg money	0.008144	1.000000	1.000000	0.004923	-0.030504
Avg money (Normalized)	0.008144	1.000000	1.000000	0.004923	-0.030504
Dinner time (Encoded)	0.032416	0.004923	0.004923	1.000000	0.002721
variety (Encoded)	0.026840	-0.030504	-0.030504	0.002721	1.000000

In [51]:
```
plt.figure(figsize=(10, 6))
results_df['Predicted_Location'].value_counts().plot(kind='bar', color='blue', alph
results_df['Actual_Location'].value_counts().plot(kind='bar', color='green', alpha=
plt.title('Comparison between Predicted and Actual Locations')
plt.xlabel('Location')
plt.ylabel('Count')
plt.legend()
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```

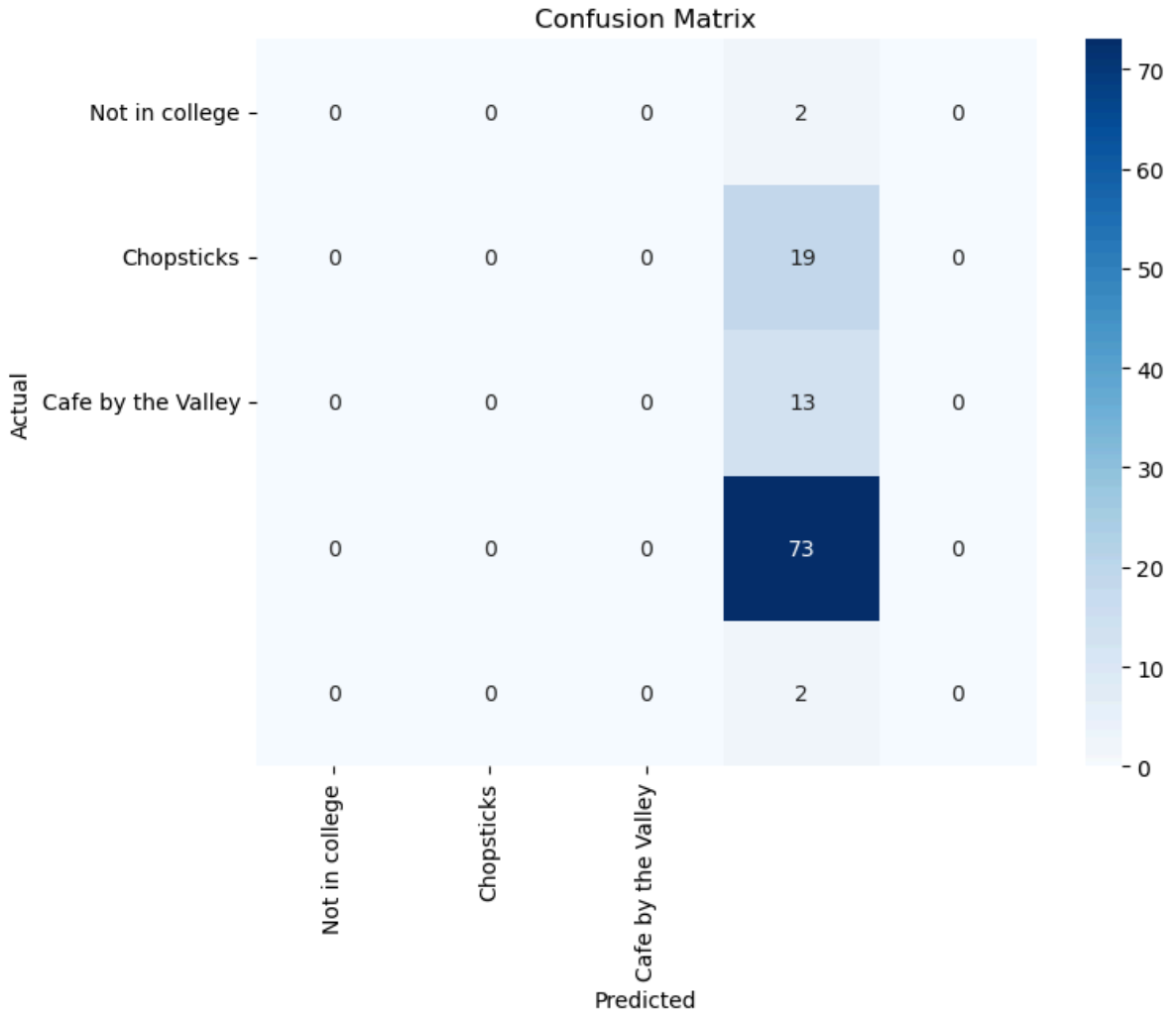


In [52]:
```
fig, ax = plt.subplots(figsize=(10, 6))

locations = results_df['Predicted_Location'].unique()

bar_width = 0.35

r1 = range(len(locations))
r2 = [x + bar_width for x in r1]

predicted_bars = ax.bar(r1, results_df['Predicted_Location'].value_counts().sort_ir
actual_bars = ax.bar(r2, results_df['Actual_Location'].value_counts().sort_index(),

ax.set_xlabel('Location', fontweight='bold')
ax.set_ylabel('Count', fontweight='bold')
ax.set_title('Comparison between Predicted and Actual Locations', fontweight='bold'
ax.set_xticks([r + bar_width/2 for r in range(len(locations))])
ax.set_xticklabels(locations, rotation=45, ha='right')

ax.legend()

plt.tight_layout()
plt.show()
```

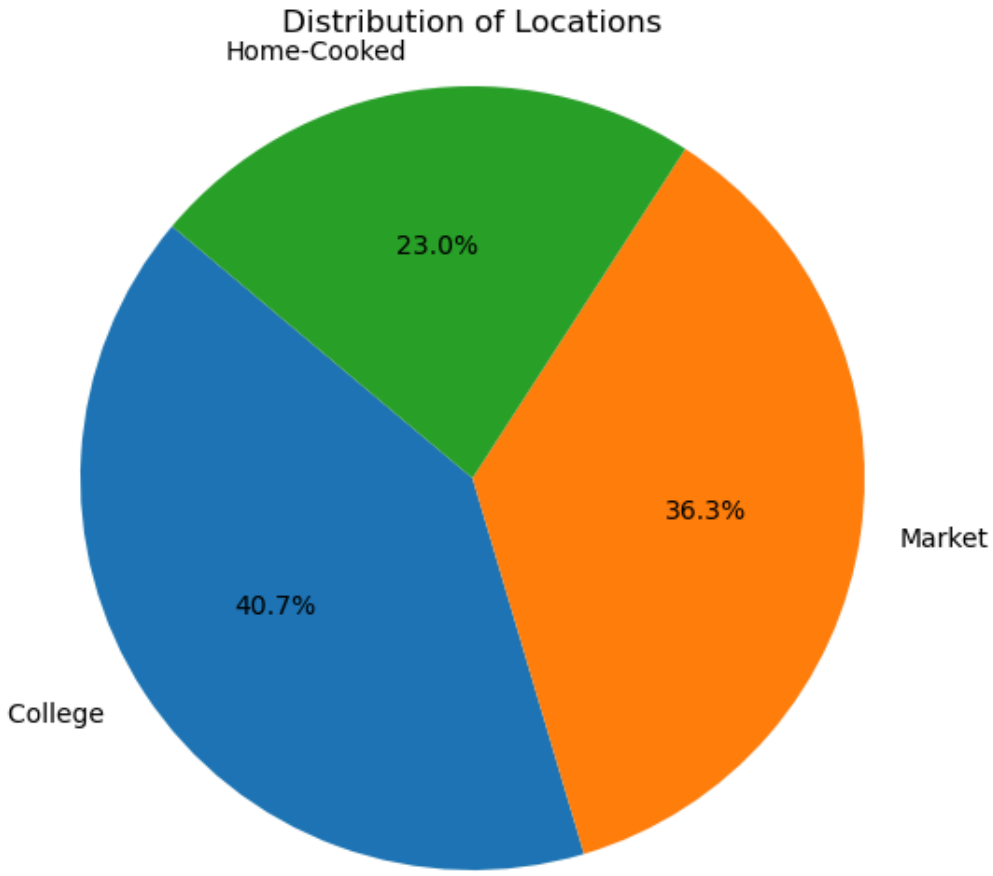


In [ ]:

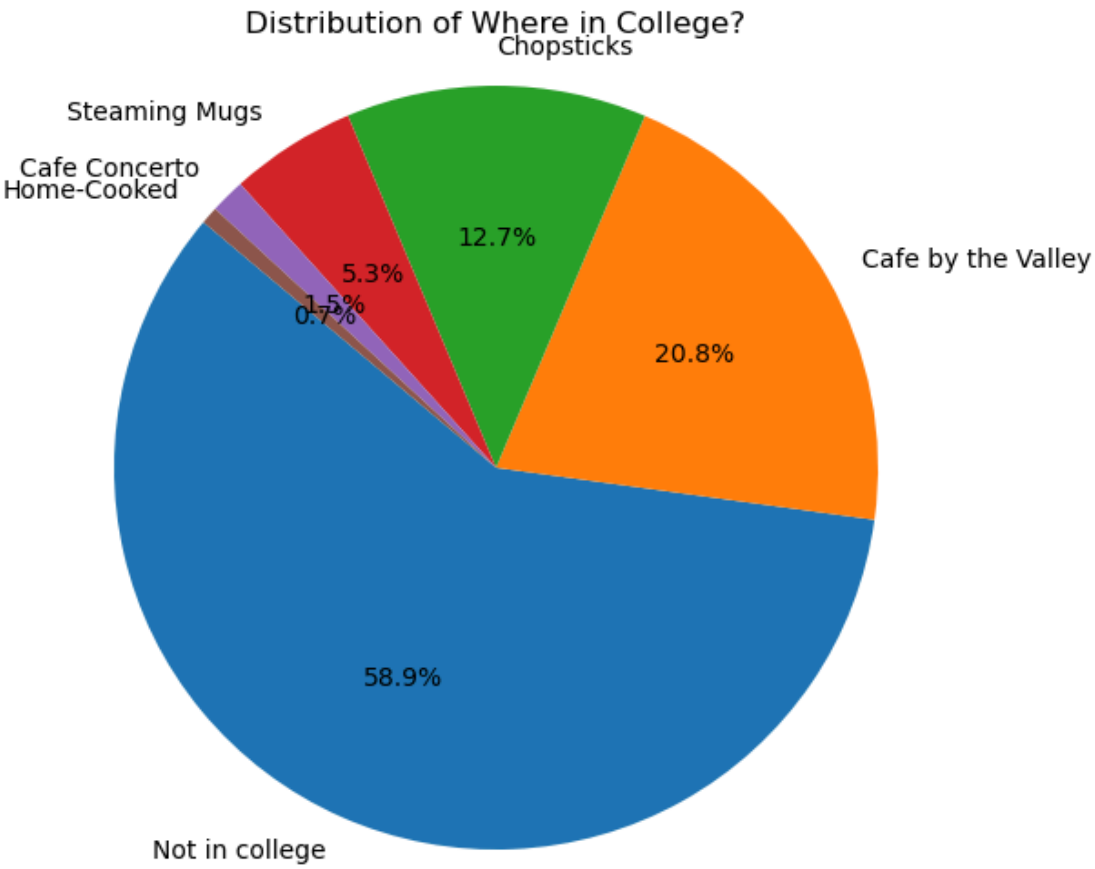
In [53]:
```
cm = confusion_matrix(results_df['Actual_Location'], results_df['Predicted_Location

plt.figure(figsize=(8, 6))
sns.heatmap(cm, annot=True, cmap='Blues', fmt='g', xticklabels=['Not in college', '
plt.xlabel('Predicted')
plt.ylabel('Actual')
plt.title('Confusion Matrix')
plt.show()
```



In [54]:
```
location_counts = df['Location'].value_counts()
plt.figure(figsize=(8, 6))
plt.pie(location_counts, labels=location_counts.index, autopct='%1.1f%%', startangl
plt.title('Distribution of Locations')
plt.axis('equal')
plt.show()
```



In [55]:
```
where_counts = df['Where in College ?'].value_counts()
plt.figure(figsize=(8, 6))
plt.pie(where_counts, labels=where_counts.index, autopct='%1.1f%%', startangle=140)
plt.title('Distribution of Where in College?')
plt.axis('equal')
plt.show()
```


Distribution of Where in College?
Chopsticks
Steaming Mugs
Cafe Concerto
Home-Cooked
12.7%
Cafe by the Valley
5.3%
1.5%
0.7%
20.8%
58.9%
Not in college

In [56]:
```
df
```

Out[56]:

	Register Number	Name	Date	Food Type	Location	Where in College ?	Variety	Avg money	Dinner time	Weekday
0	23112301	Arghya Basu	2024-03-04	Veg	Market	Not in college	Italian	125.0	7pm-8pm	Monday
1	23112302	Aryan Singhal	2024-03-04	Non - Veg	College	Steaming Mugs	Chinese	225.0	6pm-7pm	Monday
2	23112303	Avinash Ruthvik	2024-03-04	Non - Veg	Market	Not in college	Indian	125.0	9pm-10pm	Monday
3	23112305	Harshil Mishra	2024-03-04	Non - Veg	Market	Not in college	Chinese	175.0	6pm-7pm	Monday
4	23112306	Juhi Rathore	2024-03-04	Veg	Home-Cooked	Not in college	Chinese	75.0	7pm-8pm	Monday
...	...	...	...	...	...	...	...	...	...	...
538	23112316	Tarit Kumar Singh	2024-04-15	Veg	College	Cafe by the Valley	Indian	125.0	6pm-7pm	Monday
539	23112317	Urvi Saran	2024-04-15	Veg	Market	Not in college	Chinese	175.0	9pm-10pm	Monday
540	23112318	Veda Yogesh Rane	2024-04-15	Veg	Market	Not in college	Indian	75.0	7pm-8pm	Monday
541	23112320	Abhimanyu Sharma	2024-04-15	Non - Veg	Market	Not in college	Indian	125.0	Past 10pm	Monday
542	23112321	Kratik Lodha	2024-04-15	Non - Veg	Market	Not in college	Indian	225.0	6pm-7pm	Monday

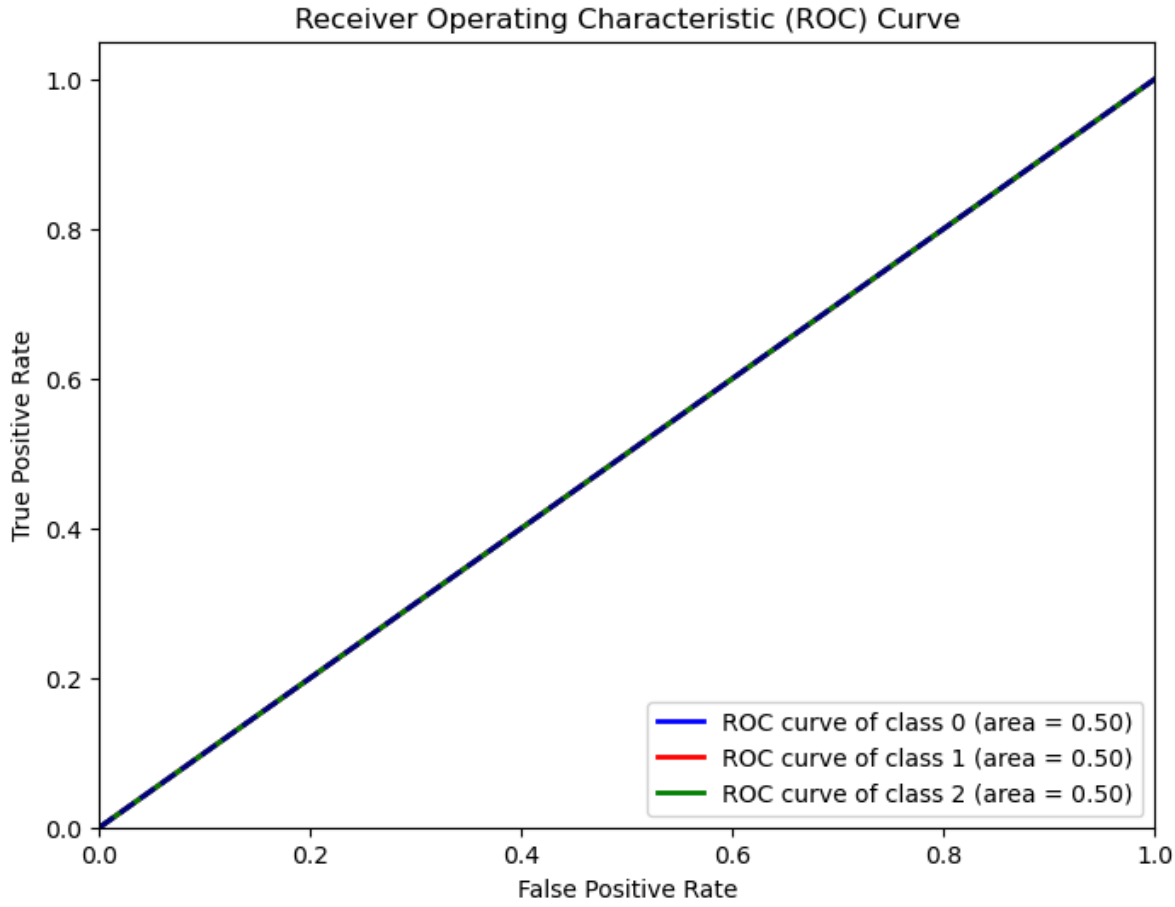
543 rows × 14 columns

In [57]:

```
def get_info(register_number, date):
    filtered_df = df[(df['Register Number'] == register_number) & (df['Date'] == da

    if filtered_df.empty:
        return "No information found for the given register number and date."

    where_ate = filtered_df.iloc[0]['Where in College ?']
    avg_spent = filtered_df['Avg money'].mean()
    what_ate = filtered_df.iloc[0]['Variety']

    return f"Where they ate: {where_ate}\nAverage spent: {avg_spent}\nWhat they ate

register_number = int(input("Enter the register number: "))
date = input("Enter the date (yyyy-mm-dd): ")

print(get_info(register_number, date))
```

```
Enter the register number: 23112320
Enter the date (yyyy-mm-dd): 2024-04-04
Where they ate: Not in college
Average spent: 75.0
What they ate: Indian
```

In [58]:
```
y_bin = label_binarize(results_df['Actual_Location'], classes=['Not in college', 'C
fpr = dict()
tpr = dict()
roc_auc = dict()
for i in range(len(y_bin[0])):
    fpr[i], tpr[i], _ = roc_curve(y_bin[:, i], results_df['Predicted_Location'] ==
    roc_auc[i] = auc(fpr[i], tpr[i])

plt.figure(figsize=(8, 6))
colors = ['blue', 'red', 'green']
for i, color in zip(range(len(y_bin[0])), colors):
    plt.plot(fpr[i], tpr[i], color=color, lw=2, label='ROC curve of class {0} (area

plt.plot([0, 1], [0, 1], color='navy', lw=2, linestyle='--')
plt.xlim([0.0, 1.0])
plt.ylim([0.0, 1.05])
plt.xlabel('False Positive Rate')
plt.ylabel('True Positive Rate')
plt.title('Receiver Operating Characteristic (ROC) Curve')
plt.legend(loc="lower right")
plt.show()
```



In [61]:
```
import pickle
with open('Dinner prediction.pkl', 'wb') as file:
    pickle.dump(model2, file)
```

In [ ]:
```
from flask import Flask, request, jsonify
from flask_cors import CORS
import pickle
import pandas as pd

app = Flask(__name__)
CORS(app,support_credentials=True)
```

```
with open('Dinner prediction.pkl', 'rb') as model_file:
    model = pickle.load(model_file)

@app.route("/sampleGet")
def sample_endpoint():
    return "Yes, Server Received!"

@app.route('/predict_location', methods=['POST'])
def predict_location():
    data = request.json
    new_data = [[data['avg_money'], data['dinner_time'], data['variety']]]
    predicted_location = model.predict(new_data)
    return jsonify({"predicted_location": predicted_location[0]})

@app.route('/get_info', methods=['POST'])
def get_info():
    data = request.json
    register_number = data['register_number']
    date = data['date']
    filtered_df = df[(df['Register Number'] == register_number) & (df['Date'] == da

    if filtered_df.empty:
        return jsonify({"message": "No information found for the given register num

    where_ate = filtered_df.iloc[0]['Where in College ?']
    avg_spent = filtered_df['Avg money (Normalized)'].mean()
    what_ate = filtered_df.iloc[0]['Variety']

    return jsonify({
        "where_ate": where_ate,
        "avg_spent": avg_spent,
        "what_ate": what_ate
    })

if __name__ == '__main__':
    app.run(host='0.0.0.0',port='8000')
```

```
 * Serving Flask app '__main__'
 * Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. U
se a production WSGI server instead.
 * Running on all addresses (0.0.0.0)
 * Running on http://127.0.0.1:8000
 * Running on http://10.21.104.113:8000
Press CTRL+C to quit
10.21.104.113 - - [15/May/2024 13:10:37] "OPTIONS /predict_location HTTP/1.1" 200
-
10.21.104.113 - - [15/May/2024 13:10:37] "POST /predict_location HTTP/1.1" 200 -
```

In [ ]:

In [ ]: