Project Name: Zomato restaurant data analysis

(Zomato Dataset)

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1.Importing required libraries

In [1]:
```python
# importing necessary library
import pandas as pd
import sklearn
from sklearn import tree
from sklearn.tree import DecisionTreeClassifier
import joblib

from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

2. Collecting / Load the Dataset

In [6]:
```python
# uploading csv fie
df=pd.read_csv("C:/Users/HP/Desktop/.ipynb_checkpoints/Zomato data .csv")
```

In [7]:
```python
# print top 5 rows in the dataset
df.head()
```

Out[7]:

	name	online_order	book_table	rate	votes	approx_cost(for two people)	listed_in(type)
0	Jalsa	Yes	Yes	4.1/5	775	800	Buffet
1	Spice Elephant	Yes	No	4.1/5	787	800	Buffet
2	San Churro Cafe	Yes	No	3.8/5	918	800	Buffet
3	Addhuri Udupi Bhojana	No	No	3.7/5	88	300	Buffet
4	Grand Village	No	No	3.8/5	166	600	Buffet

In [8]:
```python
# print last 5 rows in the dataset
df.tail()
```

Out[8]:

	name	online_order	book_table	rate	votes	approx_cost(for two people)	listed_in(type)
143	Melting Melodies	No	No	3.3/5	0	100	Dining
144	New Indraprasta	No	No	3.3/5	0	150	Dining
145	Anna Kuteera	Yes	No	4.0/5	771	450	Dining
146	Darbar	No	No	3.0/5	98	800	Dining
147	Vijayalakshmi	Yes	No	3.9/5	47	200	Dining

In [9]:
```python
# show total number of rows and column
df.shape
```

Out[9]: (148, 7)

In [10]:
```python
# show the number of each column
df.columns
```

Out[10]:
```
Index(['name', 'online_order', 'book_table', 'rate', 'votes',
       'approx_cost(for two people)', 'listed_in(type)'],
      dtype='object')
```

In [11]:
```python
# show the data types of each object
df.dtypes
```

Out[11]:
```
name                           object
online_order                   object
book_table                     object
rate                           object
votes                           int64
approx_cost(for two people)     int64
listed_in(type)                object
dtype: object
```

3. Preprocessing the data

In [12]:
```python
# change column name
df.rename(columns={'name':'Restaurant_name'},inplace=True)
```

In [13]:
```python
# count number of null values
df.isnull().sum()
```

Out[13]:
```
Restaurant_name                0
online_order                   0
book_table                     0
rate                           0
votes                          0
approx_cost(for two people)    0
listed_in(type)                0
dtype: int64
```

In [14]:
```python
# show datatypes of each column
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 148 entries, 0 to 147
Data columns (total 7 columns):
 #   Column                       Non-Null Count  Dtype
---  ------                       --------------  -----
 0   Restaurant_name              148 non-null    object
 1   online_order                 148 non-null    object
 2   book_table                   148 non-null    object
 3   rate                         148 non-null    object
 4   votes                        148 non-null    int64
 5   approx_cost(for two people)  148 non-null    int64
 6   listed_in(type)              148 non-null    object
dtypes: int64(2), object(5)
memory usage: 8.2+ KB
```

In [15]:
```python
# show the count,mean,max,min.
df.describe()
```

Out[15]:

	votes	approx_cost(for two people)
count	148.000000	148.000000
mean	264.810811	418.243243
std	653.676951	223.085098
min	0.000000	100.000000
25%	6.750000	200.000000
50%	43.500000	400.000000
75%	221.750000	600.000000
max	4884.000000	950.000000

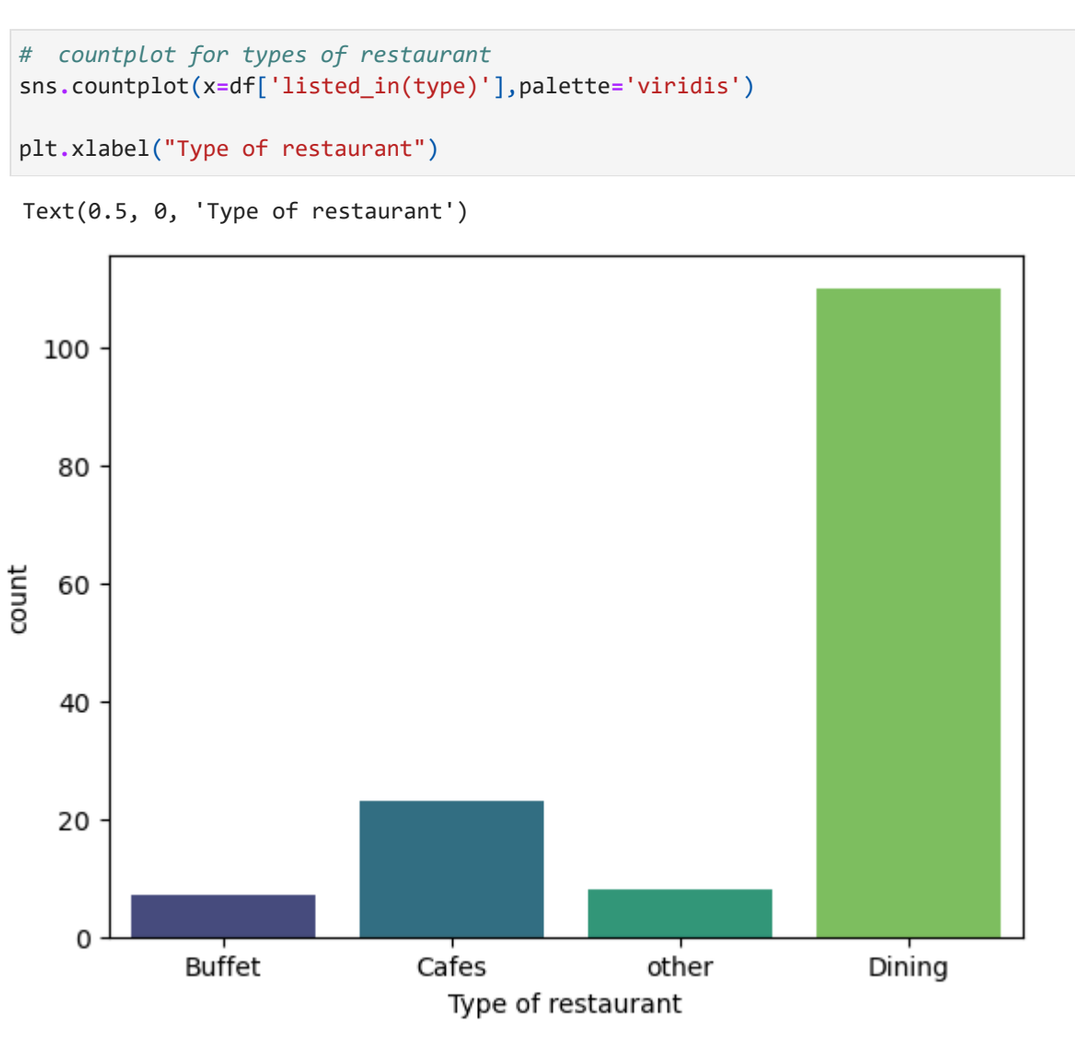
In [16]:
```python
# remove denominator from rate
def handleRate(value):
    value=str(value).split('/')
    value=value[0];
    return float(value)

df['rate']=df['rate'].apply(handleRate)
print(df.head())
```

```
        Restaurant_name online_order book_table  rate  votes  \
0                 Jalsa          Yes        Yes   4.1    775
1        Spice Elephant          Yes         No   4.1    787
2       San Churro Cafe          Yes         No   3.8    918
3  Addhuri Udupi Bhojana          No         No   3.7     88
4         Grand Village           No         No   3.8    166

   approx_cost(for two people) listed_in(type)
0                          800          Buffet
1                          800          Buffet
2                          800          Buffet
3                          300          Buffet
4                          600          Buffet
```

4. Visualization using different graph

In [17]:
```python
#  countplot for types of restaurant
sns.countplot(x=df['listed_in(type)'],palette='viridis')

plt.xlabel("Type of restaurant")
```

Out[17]: Text(0.5, 0, 'Type of restaurant')

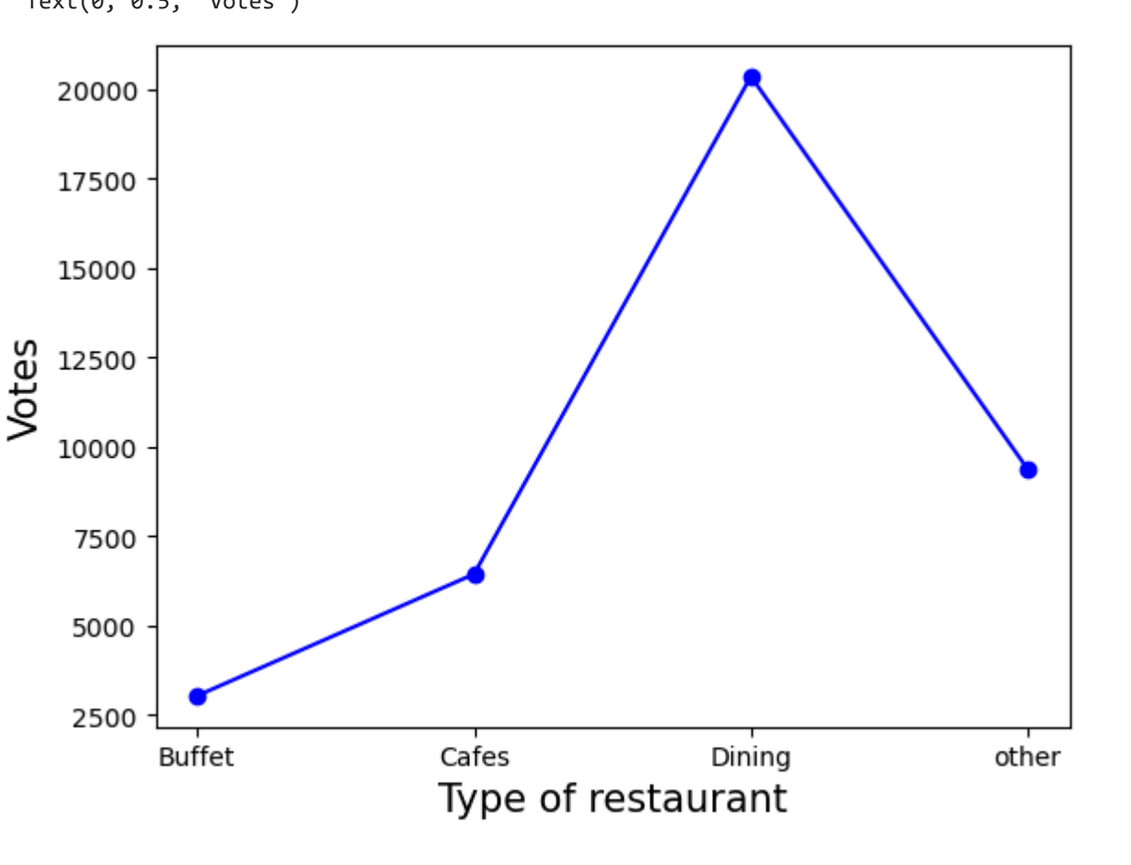


Conclusion:

The majority of restaurant falls into the dining category.

In [18]:
```python
# line plot for types of restaurant with votes
grouped_data = df.groupby('listed_in(type)')['votes'].sum()
result = pd.DataFrame({'votes': grouped_data})
plt.plot(result, c="blue", marker="o")
plt.xlabel("Type of restaurant", c="black", size=15)
plt.ylabel("Votes", c="black", size=15)
```

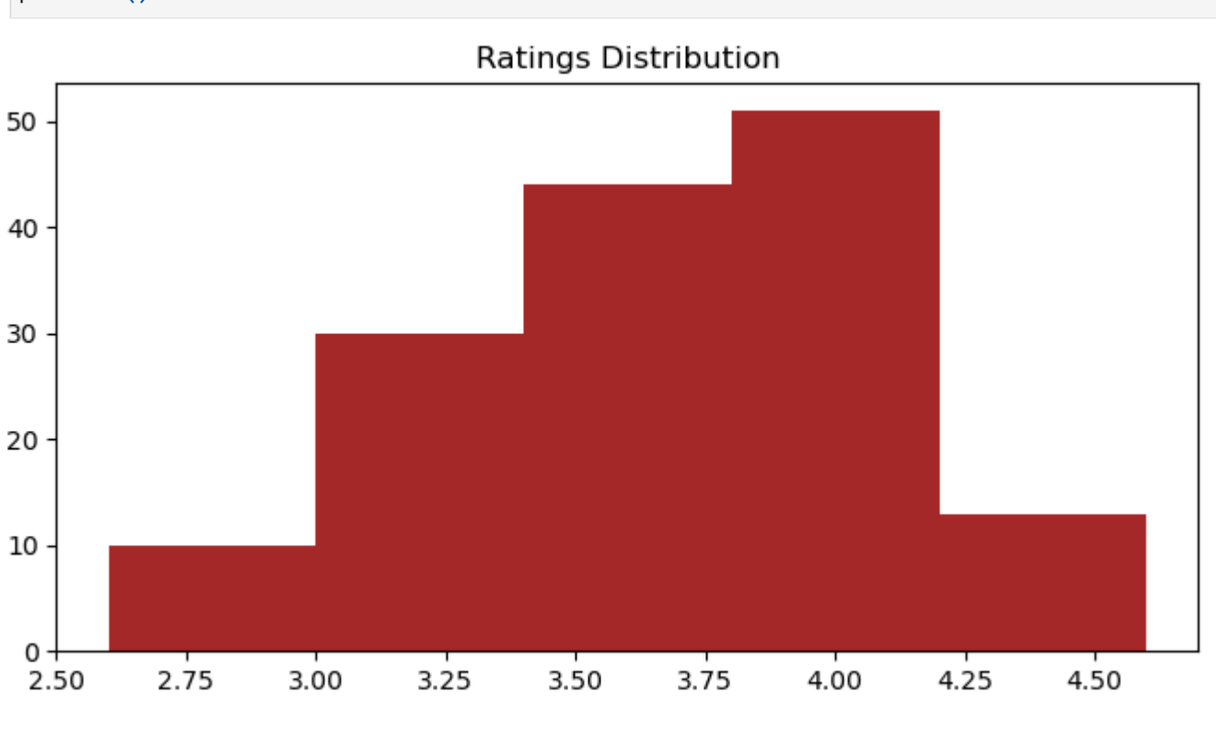
Out[18]: Text(0, 0.5, 'Votes')



Conclusion:

Dining restaurant are preffered by a large number of individuals

In [19]:
```python
# hist graph to show rating distribution
plt.figure(figsize=(8,4))
plt.hist(df['rate'],bins=5,color='brown')
plt.title("Ratings Distribution")


plt.show()
```



Conclusion

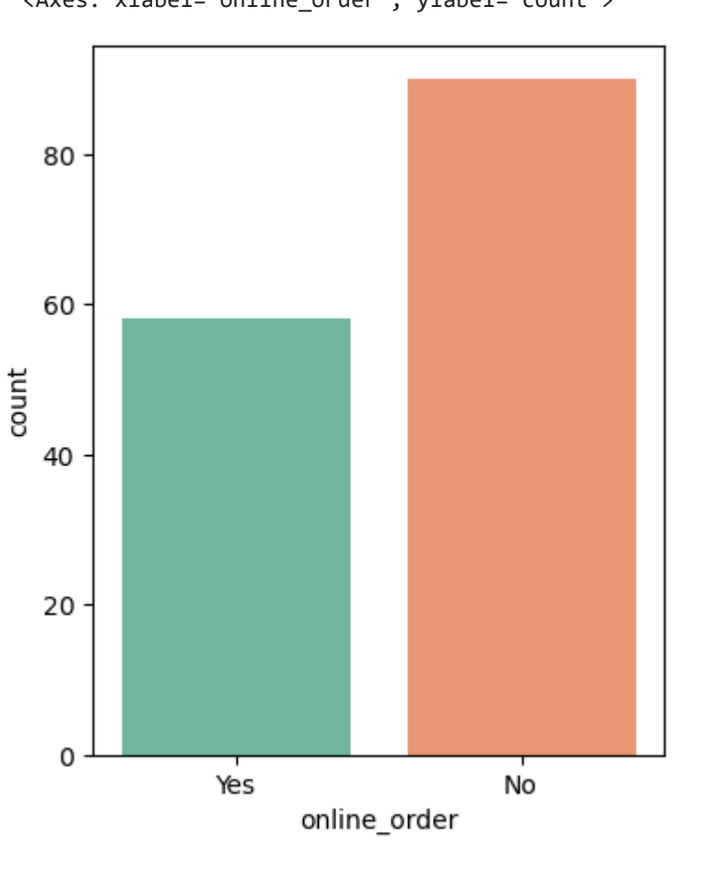
The majority of restaurnt rating range from 3.5 to 4

In [20]:
```python
# check which restaurant get maximum votes
max_votes = df['votes'].max()
restaurant_with_max_votes = df.loc[df['votes'] == max_votes,'Restaurant_name']

print("Restaurant(s) with the maximum votes:")
print(restaurant_with_max_votes)
```

```
Restaurant(s) with the maximum votes:
38    Empire Restaurant
Name: Restaurant_name, dtype: object
```

In [21]:
```python
# countplot for online_order
plt.figure(figsize=(4,5))
sns.countplot(x=df['online_order'],palette='Set2')
```

Out[21]: <Axes: xlabel='online_order', ylabel='count'>

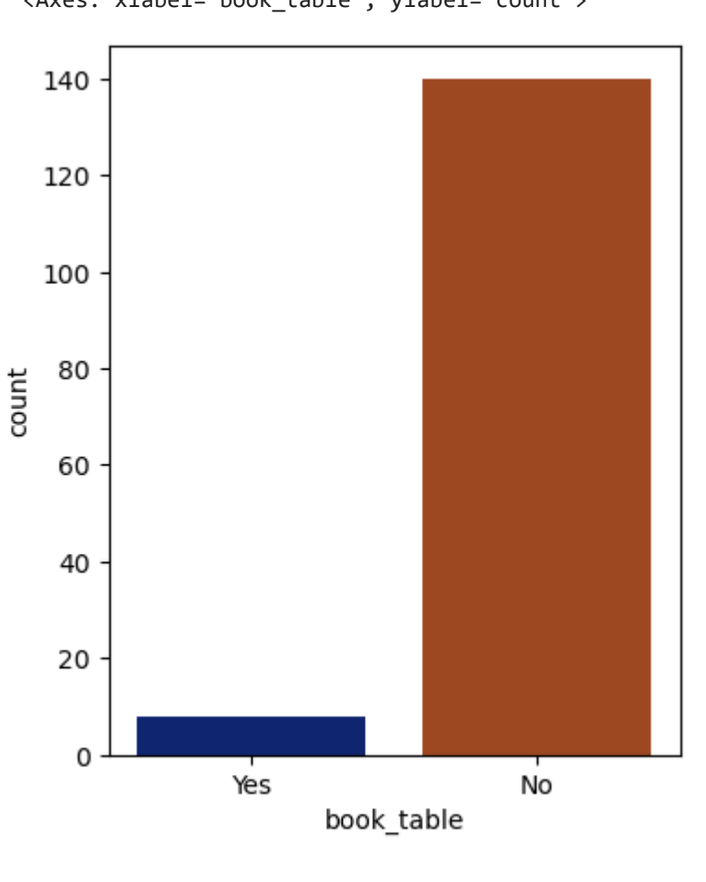


Conclusion

This suggest that a majority of the Restaurant do not accept online orders.

In [22]:
```python
# count plt for how many book_table
plt.figure(figsize=(4,5))
sns.countplot(x=df['book_table'],palette='dark')
```

Out[22]: <Axes: xlabel='book_table', ylabel='count'>

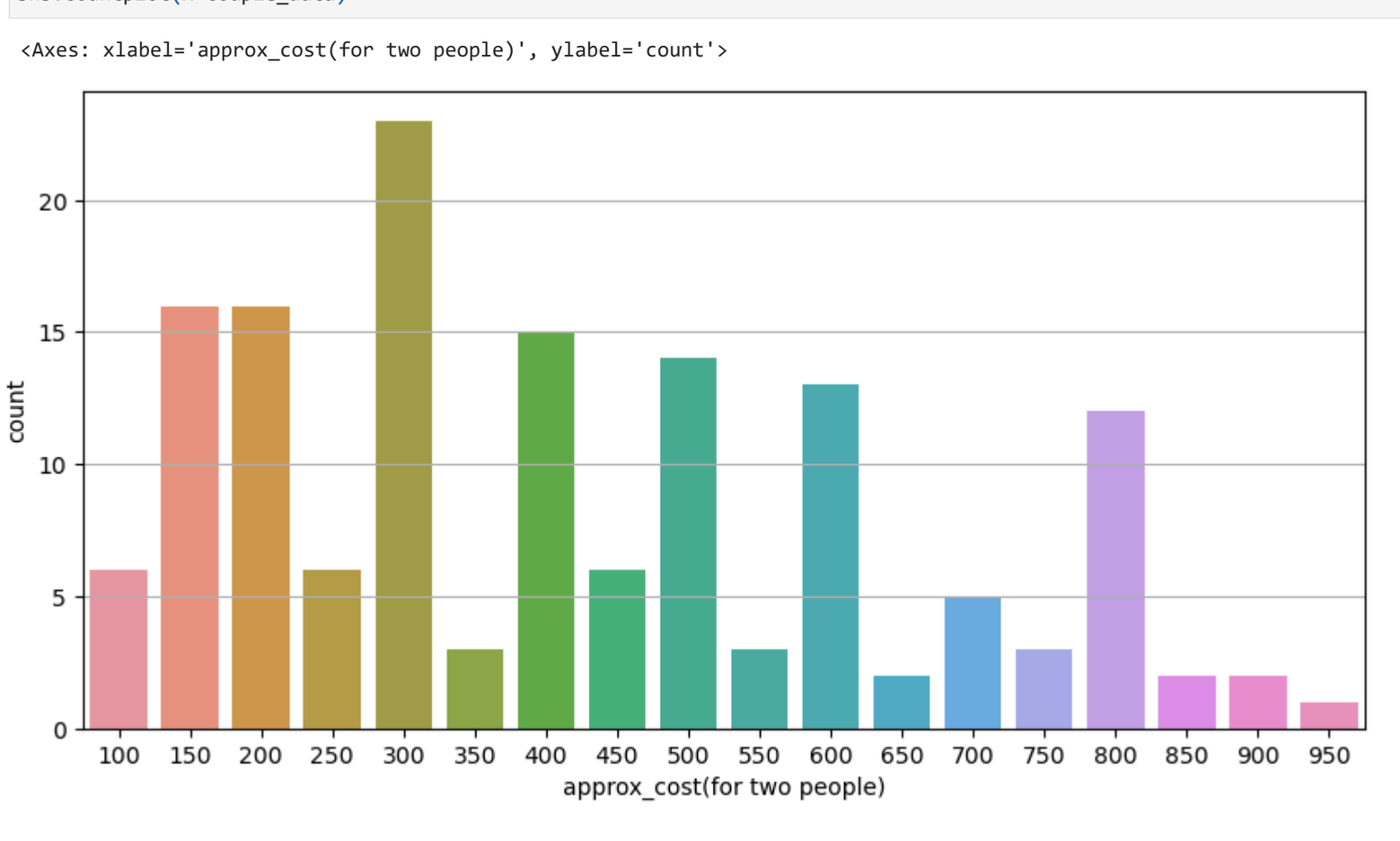


Conclusion

This show that majority of the customers do not book table

In [23]:
```python
#countplot for counting appros_cost(for two people)
plt.figure(figsize=(10,5))
couple_data=df['approx_cost(for two people)']
plt.grid()

sns.countplot(x=couple_data)
```

Out[23]: <Axes: xlabel='approx_cost(for two people)', ylabel='count'>

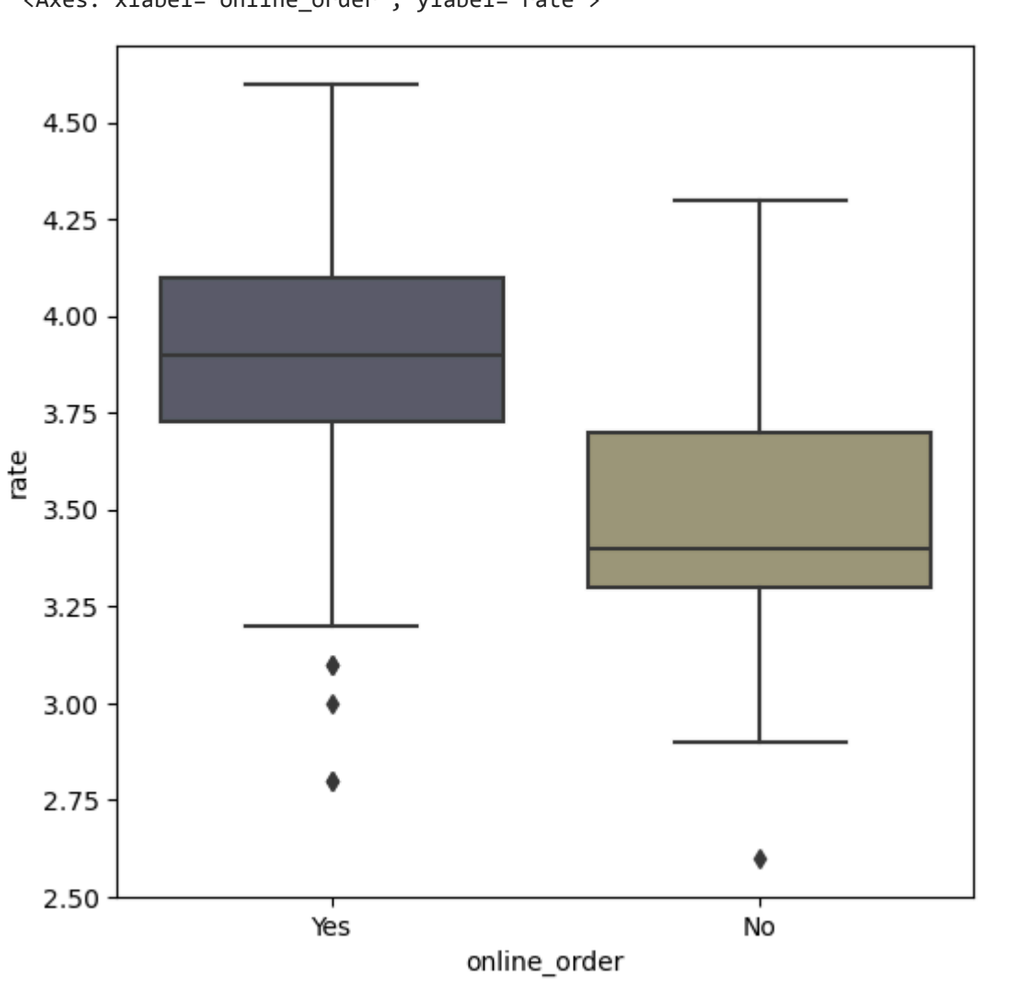


Conclusion

This show that the majority of the people prefer restaurant with an approx cost of 300 rupees.

In [24]:
```python
# boxplot between online_order and rate
plt.figure(figsize = (6,6))
sns.boxplot(x = 'online_order', y = 'rate', data = df,palette = 'cividis')
```

Out[24]: <Axes: xlabel='online_order', ylabel='rate'>

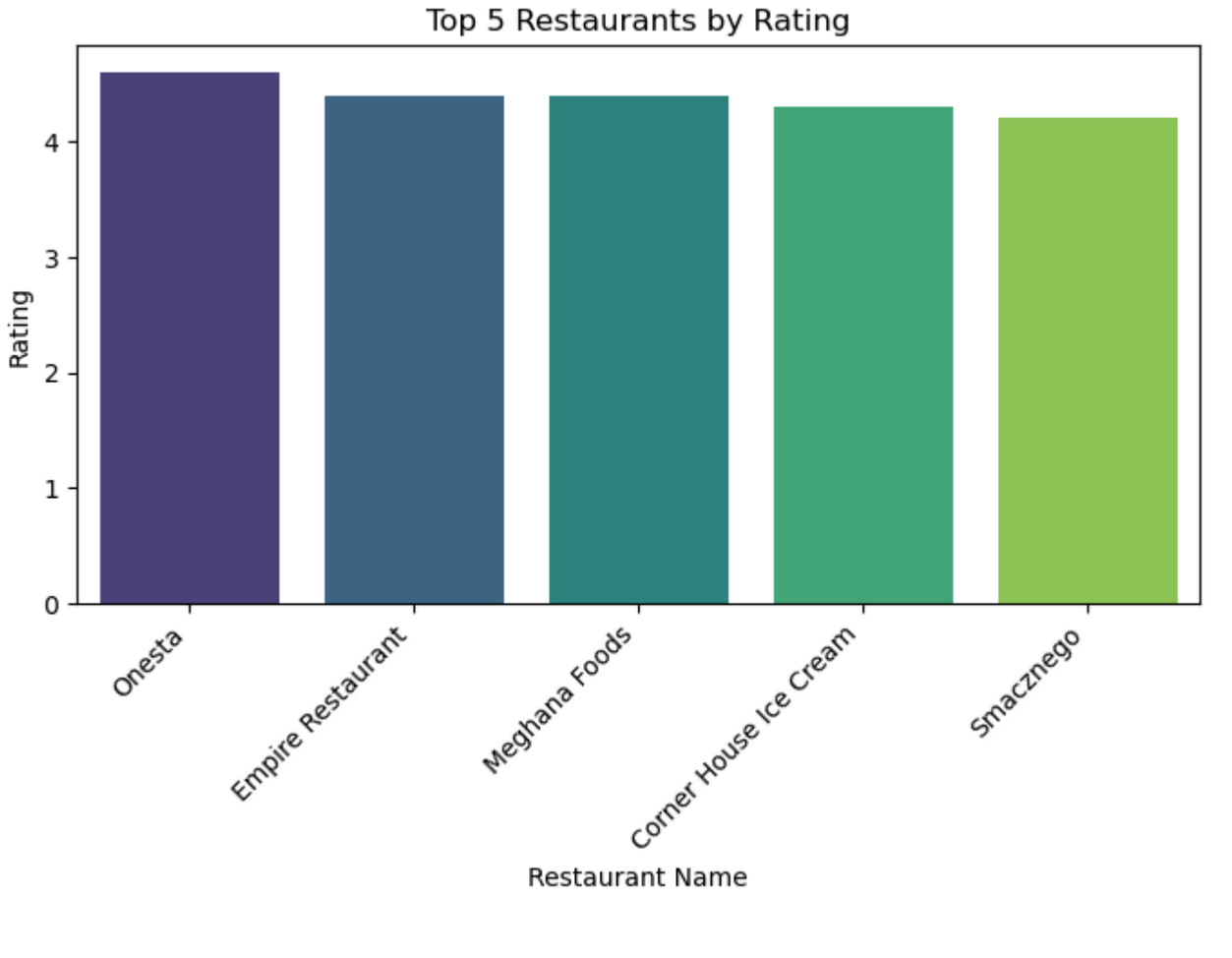


In [25]:
```python
## Conclusion
#### Offline orders received lower rating as compared to online.
```

In [26]:
```python
# Sort the DataFrame based on a relevant column (e.g., rating or votes) to find the top five restaurants
top_restaurants = df.nlargest(6, 'rate')  # Assuming 'rating' is the column representing restaurant ratings

# Print the top five restaurants

print("Top 5 Restaurants:")
print(top_restaurants[['Restaurant_name', 'rate']])

# Visualize the top five restaurants using Seaborn
plt.figure(figsize=(8, 4))
sns.barplot(x='Restaurant_name', y='rate', data=top_restaurants,palette='viridis')
plt.title('Top 5 Restaurants by Rating')
plt.xlabel('Restaurant Name')
plt.ylabel('Rating')
plt.xticks(rotation=45, ha='right')
```

```
Top 5 Restaurants:
          Restaurant_name  rate
7                  Onesta   4.6
44                 Onesta   4.6
38      Empire Restaurant   4.4
86           Meghana Foods  4.4
52  Corner House Ice Cream  4.3
9               Smacznego   4.2
```

Out[26]:
```
(array([0, 1, 2, 3, 4]),
 [Text(0, 0, 'Onesta'),
  Text(1, 0, 'Empire Restaurant'),
  Text(2, 0, 'Meghana Foods'),
  Text(3, 0, 'Corner House Ice Cream'),
  Text(4, 0, 'Smacznego')])
```

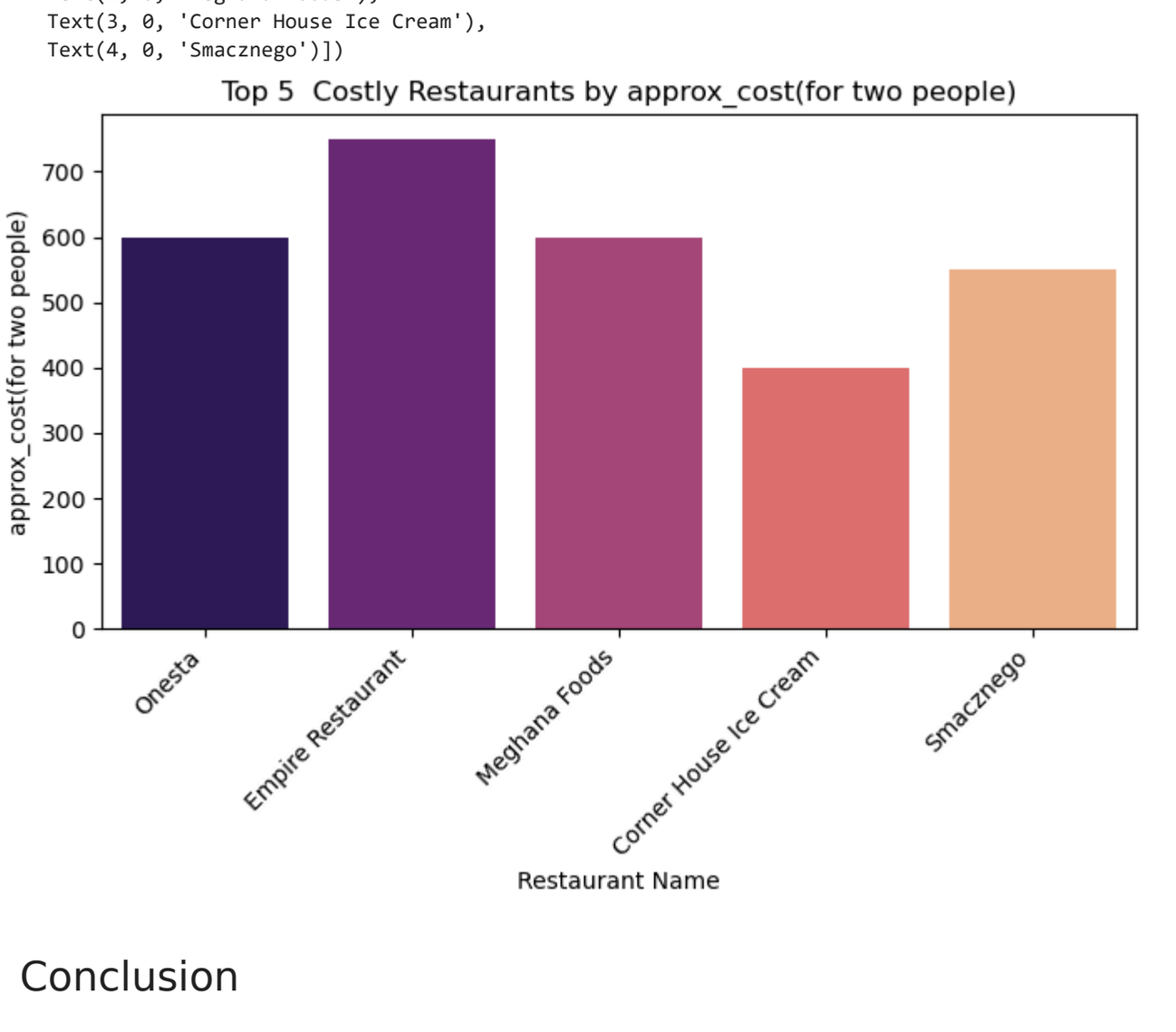


Conclusion

Onesta is the restaurant which gets highest rating and top 5 restaurant by rating are Onesta,Empire restaurant,Meghana foods ,Corner house ice cream and smacznego

In [27]:
```python
# barplot for Top 5  Costly Restaurants by approx_cost(for two people)
costly_restaurant = df.nlargest(6, 'approx_cost(for two people)')
plt.figure(figsize=(8, 4))
sns.barplot(x='Restaurant_name', y='approx_cost(for two people)', data=top_restaurants,palette = 'magma')
plt.title('Top 5  Costly Restaurants by approx_cost(for two people)')
plt.xlabel('Restaurant Name')
plt.ylabel('approx_cost(for two people)')
plt.xticks(rotation=45, ha='right')
```

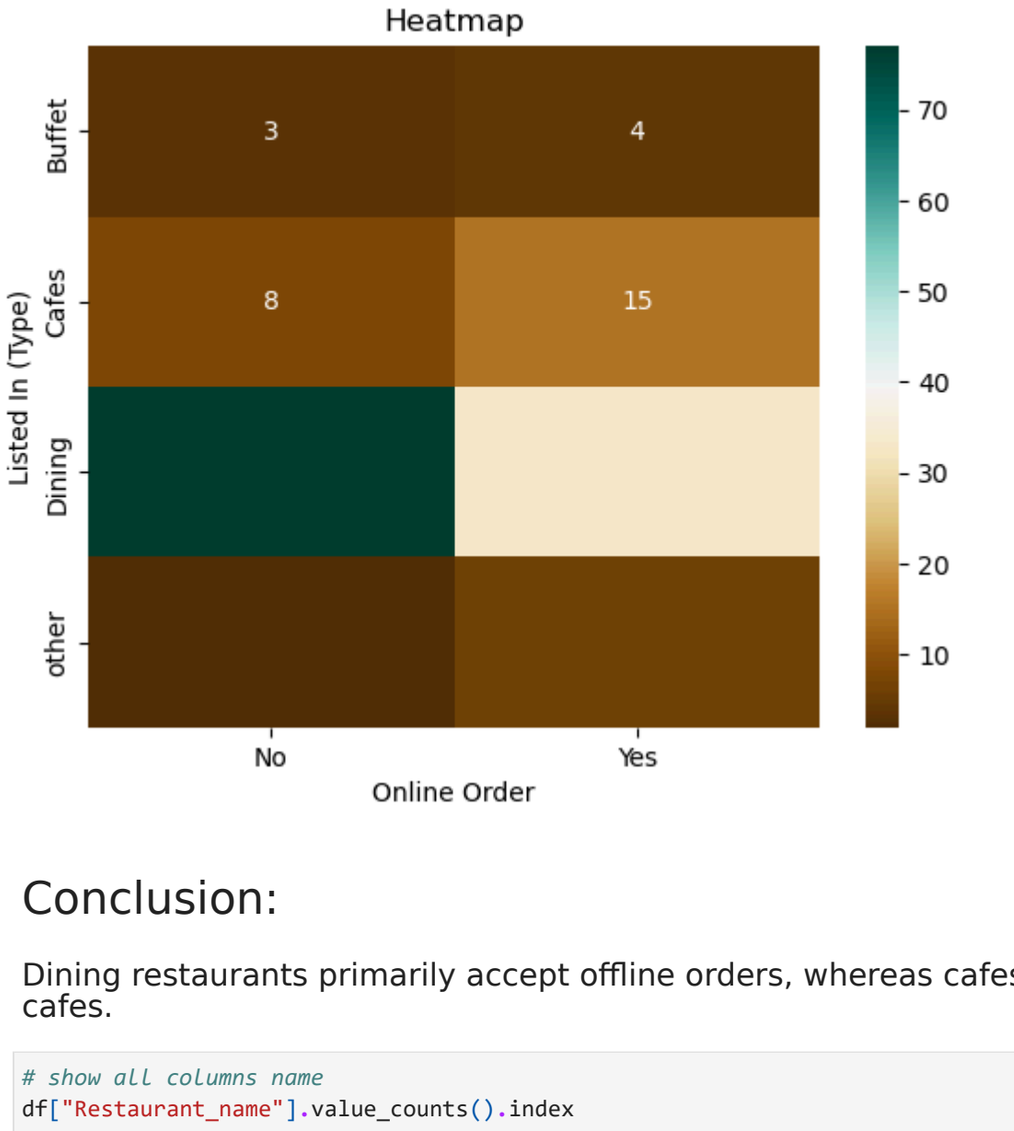
Out[27]:
```
(array([0, 1, 2, 3, 4]),
 [Text(0, 0, 'Onesta'),
  Text(1, 0, 'Empire Restaurant'),
  Text(2, 0, 'Meghana Foods'),
  Text(3, 0, 'Corner House Ice Cream'),
  Text(4, 0, 'Smacznego')])
```



Conclusion

Above, we see that the most costly restaurant is Empire restaurant and top 5 restaurant are onesta,Empire restaurant,meghna foods,corner house ice cream and Smacznego

In [28]:
```python
# heat map for online_order and listed (in type)
pivot_table = df.pivot_table(index='listed_in(type)', columns='online_order', aggfunc='size', fill_value=0)
sns.heatmap(pivot_table, annot=True, cmap="BrBG", fmt='d',annot_kws={"color": 'white'})
plt.title("Heatmap")
plt.xlabel("Online Order")
plt.ylabel("Listed In (Type)")
plt.show()
```



Conclusion:

Dining restaurants primarily accept offline orders, whereas cafes primarily receive online orders. This suggests that clients prefer to place orders in person at restaurants, but prefer online ordering at cafes.

In [29]:
```python
# show all columns name
df["Restaurant_name"].value_counts().index
```

Out[29]:
```
Index(['San Churro Cafe', 'CAFE NOVA', 'Onesta', 'Jalsa',
       'Kotian Karavali Restaurant', 'Kaggis', 'Ayda Persian Kitchen',
       'Chatar Patar', 'Polar Bear', 'Kidambi's Kitchen',
       ...
       'Shree Cool Point', 'Petoo', 'Tasty Bytes', 'Beijing Bites', 'Recipe',
       'Kitchen Garden', 'Hotboxit', 'Domino's Pizza', 'McDonald's',
       'Vijayalakshmi'],
      dtype='object', name='Restaurant_name', length=145)
```

5. Decision tree classifier

In [30]:
```python
# Recommend restaurant name according to customers input.
# x = df.drop(columns=['Restaurant_name', 'online_order', 'votes', 'listed_in(type)', 'book_table'])
# y = df['Restaurant_name']  # Replace 'target_variable' with the actual target variable you want to predict
# model = DecisionTreeClassifier()
# model.fit(x,y)
# predictions = model.predict([[4.5,1200],[4.8,789]])
#predictions
```

```
C:\Users\HP\anaconda3\Lib\site-packages\sklearn\base.py:439: UserWarning: X does not have valid feature names, but DecisionTreeClassifier was fitted with feature names
  warnings.warn(
```

Out[30]: array(['Peppy Peppers', 'Onesta'], dtype=object)

6.Train the model and check accuracy

In [31]:
```python
# check accuracy level of our model
# Drop unnecessary columns
#x = df.drop(columns=['Restaurant_name', 'online_order', 'votes', 'listed_in(type)', 'book_table'])

# Extract the target variable
# = df['Restaurant_name']

# Split the data into training and testing sets
#x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.1)

# Initialize the model
#model = DecisionTreeClassifier()

# Fit the model
#model.fit(x_train, y_train)

# Predict on the test set
#predictions = model.predict(x_test)

# Calculate accuracy
# score = accuracy_score(y_test, predictions)
#print("Accuracy:", score)
```

```
Accuracy: 0.06666666666666667
```

7. Save the traing file with the name data.joblib

In [32]:
```python
#x = df.drop(columns=['Restaurant_name', 'online_order', 'votes', 'listed_in(type)', 'book_table'])

# Extract the target variable
#y = df['Restaurant_name']
#model = DecisionTreeClassifier()
#model.fit(x,y)
#joblib.dump(model,'data.joblib')
```

Out[32]: ['data.joblib']

8. Recommend restaurant according to Customer Demands.

In [3]:
```python
model=joblib.load('data.joblib')
predictions=model.predict([[3.6,400]])
predictions
```

```
C:\Users\HP\anaconda3\Lib\site-packages\sklearn\base.py:439: UserWarning: X does not have valid feature names, but DecisionTreeClassifier was fitted with feature names
  warnings.warn(
```

Out[3]: array(['Sunsadm'], dtype=object)

In [ ]: