annand_python_project

August 25, 2023

1 DSE5002 Python Project

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1.2 8/25/2023

1.2.1 Import Libraries

[1]:

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

1.2.2 Import Data Sets

[2]:

```
cost_of_living_data = pd.read_csv("cost_of_living.csv")
ds_salaries = pd.read_csv("ds_salaries.csv")
levels_fyi_salary_data = pd.read_csv("Levels_Fyi_Salary_Data.csv")
country_codes_data = pd.read_excel("country_codes.xlsx")
```

1.2.3 Wrangle Levels.fyi Data

[3]:

```
levels_fyi_data = pd.DataFrame(levels_fyi_salary_data.
 ↪loc[levels_fyi_salary_data['title'].str.contains("(D|d)ata"), :])
new = levels_fyi_data["location"].str.split(", ", n = -1, expand = True)
levels_fyi_data['city'] = new[0]
levels_fyi_data['state.or.province'] = new[1]
levels_fyi_data['country'] = new[2]
levels_fyi_data.rename(columns={'title': 'job_title', 'totalyearlycompensation':␣
 ↪'salary_in_usd'}, inplace=True)
levels_fyi_data.reset_index(inplace=True)
for i in range(len(levels_fyi_data)):
    if pd.isnull(levels_fyi_data.at[i, 'country']):
        levels_fyi_data.loc[i, 'country'] = "United States"
```

```
C:\Users\janna\AppData\Local\Temp\ipykernel_23848\4087661922.py:1: UserWarning:
This pattern is interpreted as a regular expression, and has match groups. To
actually get the groups, use str.extract.
```

```
  levels_fyi_data = pd.DataFrame(levels_fyi_salary_data.loc[levels_fyi_salary_da
ta['title'].str.contains("(D|d)ata"), :])
```

1.2.4 Wrangle ds_salaries Data

[4]:

```
ds_salaries.rename(columns={'company_location': 'country'}, inplace=True)
for i in range(len(ds_salaries)):
    code = ds_salaries.at[i, 'country']
    conversion = pd.DataFrame(country_codes_data.loc[country_codes_data['Alpha-2␣
 ↪code'] == code, 'Country']).iat[0,0]
    ds_salaries.loc[i, 'country'] = conversion
```

1.2.5 Wrangle cost_of_living Data

[5]:

```
cost_of_living_data.rename(columns={'City': 'location'}, inplace=True)
new = cost_of_living_data['location'].str.split(", ", n=-1, expand=True)
cost_of_living_data['city'] = new[0]
cost_of_living_data['state.or.province'] = new[1]
cost_of_living_data['country'] = new[2]
for i in range(len(cost_of_living_data)):
    if pd.isnull(cost_of_living_data.at[i, 'country']):
        cost_of_living_data.loc[i, 'country'] = cost_of_living_data.at[i, 'state.
 ↪or.province']
```

1.2.6 Adjust country_codes data

[6]:

```
us_code_index = country_codes_data.index[country_codes_data['Alpha-2 code'] ==␣
 ↪"US"].tolist()
country_codes_data.loc[us_code_index[0], 'Country'] = "United States"
```

1.2.7 Merge and subset salary data

[7]:

```
all_salaries_df = pd.merge(levels_fyi_data,
                           ds_salaries,
                           how='outer')
cleaned_salary = all_salaries_df.loc[:,
                                     ['job_title', 'salary_in_usd', 'city',␣
 ↪'state.or.province', 'country']]
```

1.2.8 Determine ratings by city

[8]:

```
city_median_df = pd.DataFrame(cleaned_salary.groupby(by="city")['salary_in_usd'].
 ↪median())
city_median_df.reset_index(inplace=True)

city_rankings_df = pd.merge(city_median_df,
                            cost_of_living_data,
                            how='outer')
city_rankings_df = city_rankings_df.assign(cost_rating = lambda x:␣
 ↪city_rankings_df['salary_in_usd'] / city_rankings_df['Cost of Living Index'],
                                          rent_rating = lambda x:␣
 ↪city_rankings_df['salary_in_usd'] / city_rankings_df['Rent Index'],
                                          living_rent_rating = lambda x:␣
 ↪city_rankings_df['salary_in_usd'] / city_rankings_df['Cost of Living Plus Rent␣
 ↪Index'],
                                          groceries_rating = lambda x:␣
 ↪city_rankings_df['salary_in_usd'] / city_rankings_df['Groceries Index'],
                                          restaurant_rating = lambda x:␣
 ↪city_rankings_df['salary_in_usd'] / city_rankings_df['Restaurant Price Index'],
                                          purchase_rating = lambda x:␣
 ↪city_rankings_df['salary_in_usd'] / city_rankings_df['Local Purchasing Power␣
 ↪Index'])
```

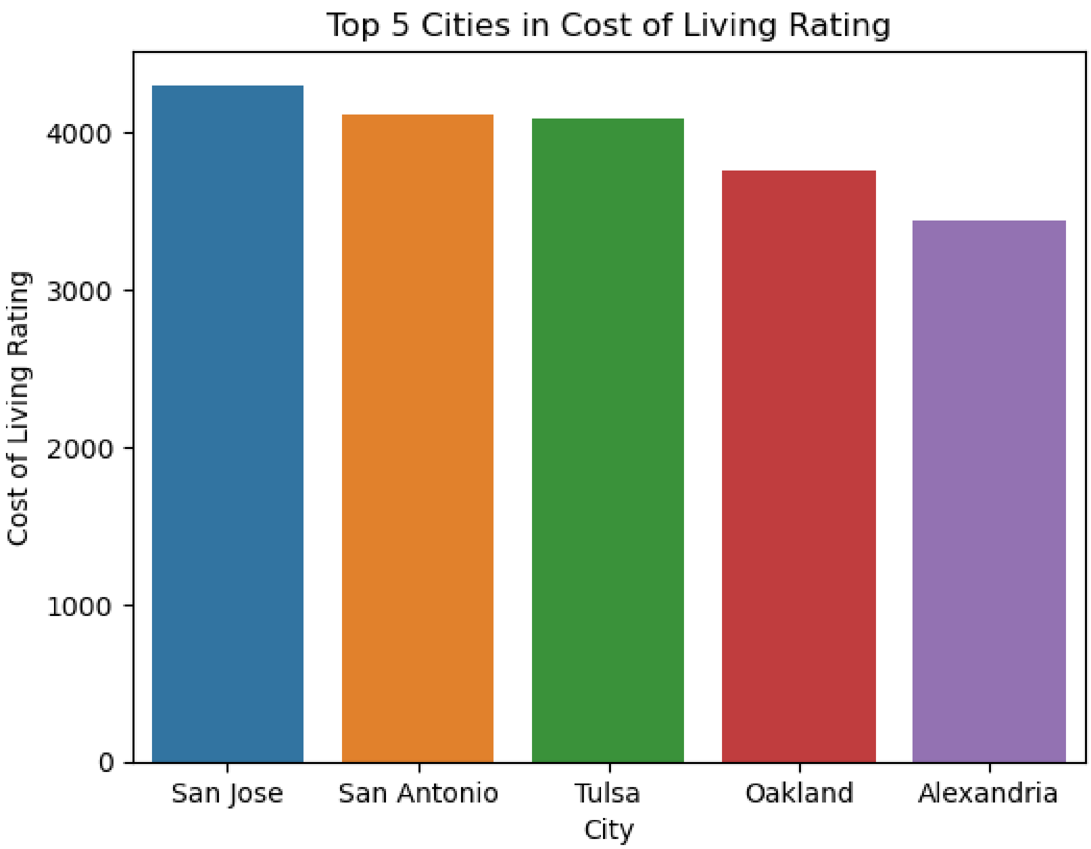
1.2.9 Visualizations for City Data

[9]:

```
cost = city_rankings_df.sort_values(by=['cost_rating'], ascending=False).
 ↪reset_index().loc[0:4, ['city', 'cost_rating']]
sns.barplot(data=cost, x='city', y='cost_rating')
plt.xlabel("City")
plt.ylabel("Cost of Living Rating")
plt.title("Top 5 Cities in Cost of Living Rating")
```

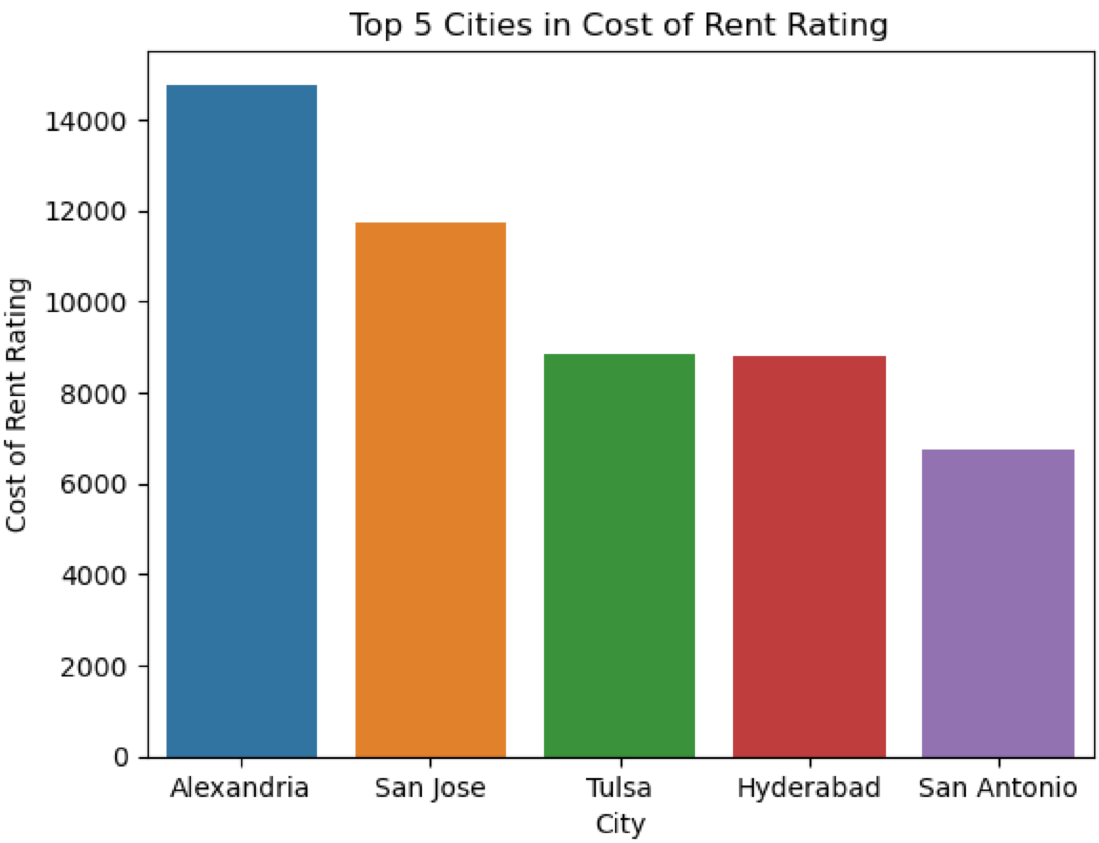
[9]:

```
Text(0.5, 1.0, 'Top 5 Cities in Cost of Living Rating')
```



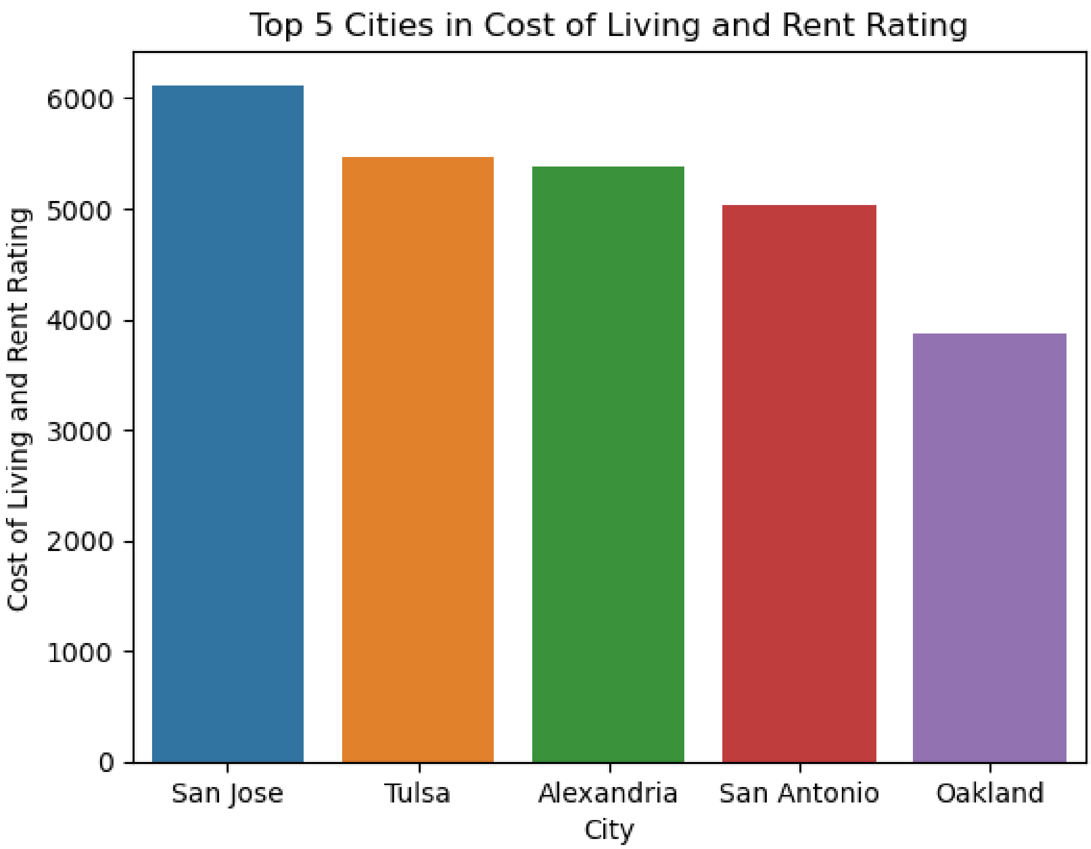
```
[10]: rent = city_rankings_df.sort_values(by=['rent_rating'], ascending=False).
       ↪reset_index().loc[0:4, ['city', 'rent_rating']]
      sns.barplot(data=rent, x='city', y='rent_rating')
      plt.xlabel("City")
      plt.ylabel("Cost of Rent Rating")
      plt.title("Top 5 Cities in Cost of Rent Rating")
```

```
[10]: Text(0.5, 1.0, 'Top 5 Cities in Cost of Rent Rating')
```



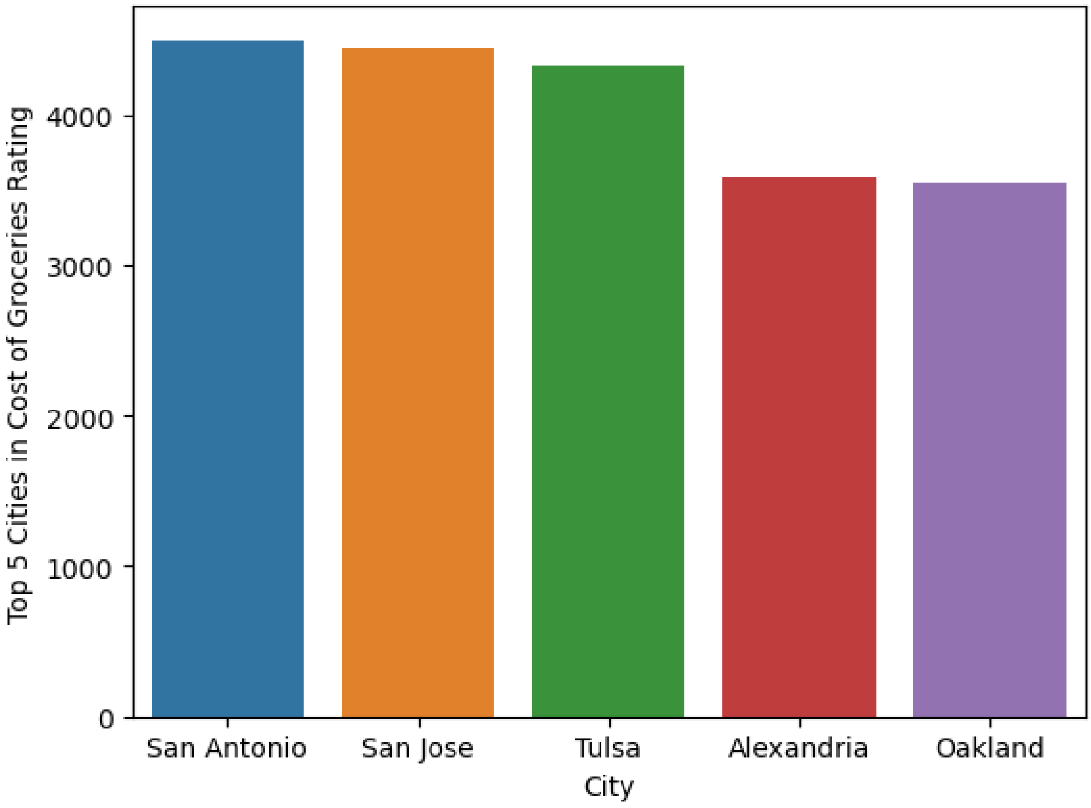
```
[11]: living_rent = city_rankings_df.sort_values(by=['living_rent_rating'],␣
       ↪ascending=False).reset_index().loc[0:4, ['city', 'living_rent_rating']]
      sns.barplot(data=living_rent, x='city', y='living_rent_rating')
      plt.xlabel("City")
      plt.ylabel("Cost of Living and Rent Rating")
      plt.title("Top 5 Cities in Cost of Living and Rent Rating")
```

```
[11]: Text(0.5, 1.0, 'Top 5 Cities in Cost of Living and Rent Rating')
```



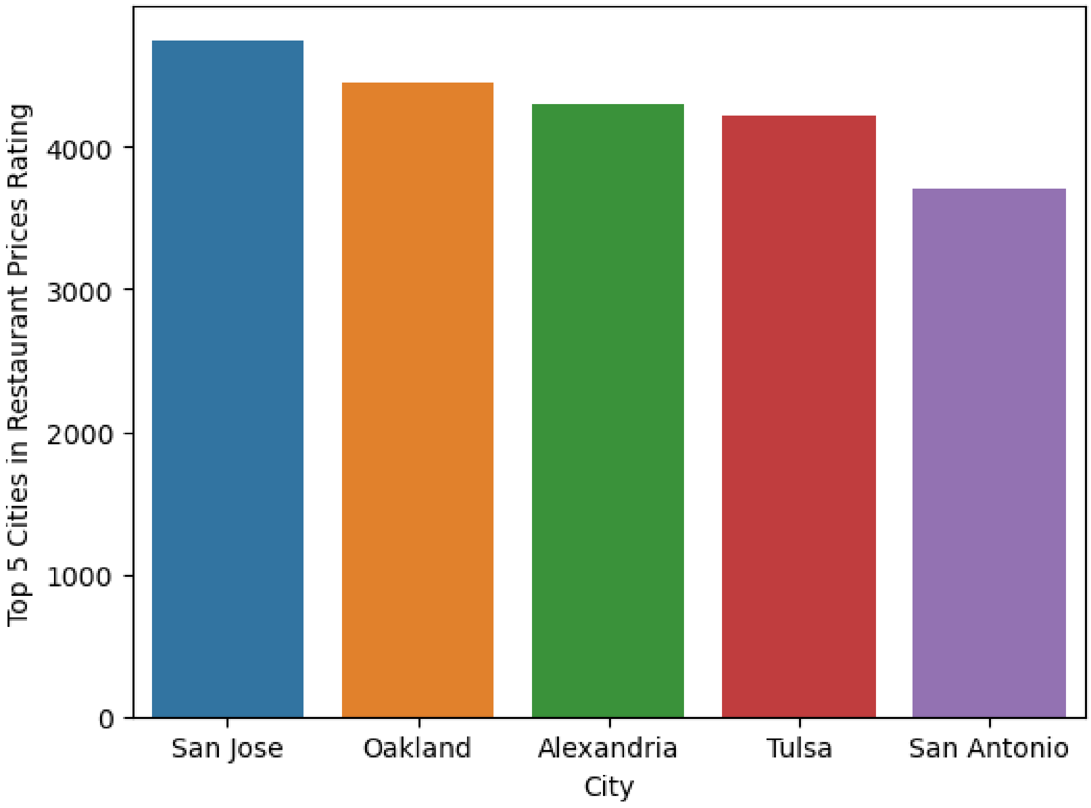
```
[12]: groceries = city_rankings_df.sort_values(by=['groceries_rating'],␣
       ↪ascending=False).reset_index().loc[0:4, ['city', 'groceries_rating']]
      sns.barplot(data=groceries, x='city', y='groceries_rating')
      plt.xlabel("City")
      plt.ylabel("Cost of Groceries Rating")
      plt.ylabel("Top 5 Cities in Cost of Groceries Rating")
```

```
[12]: Text(0, 0.5, 'Top 5 Cities in Cost of Groceries Rating')
```



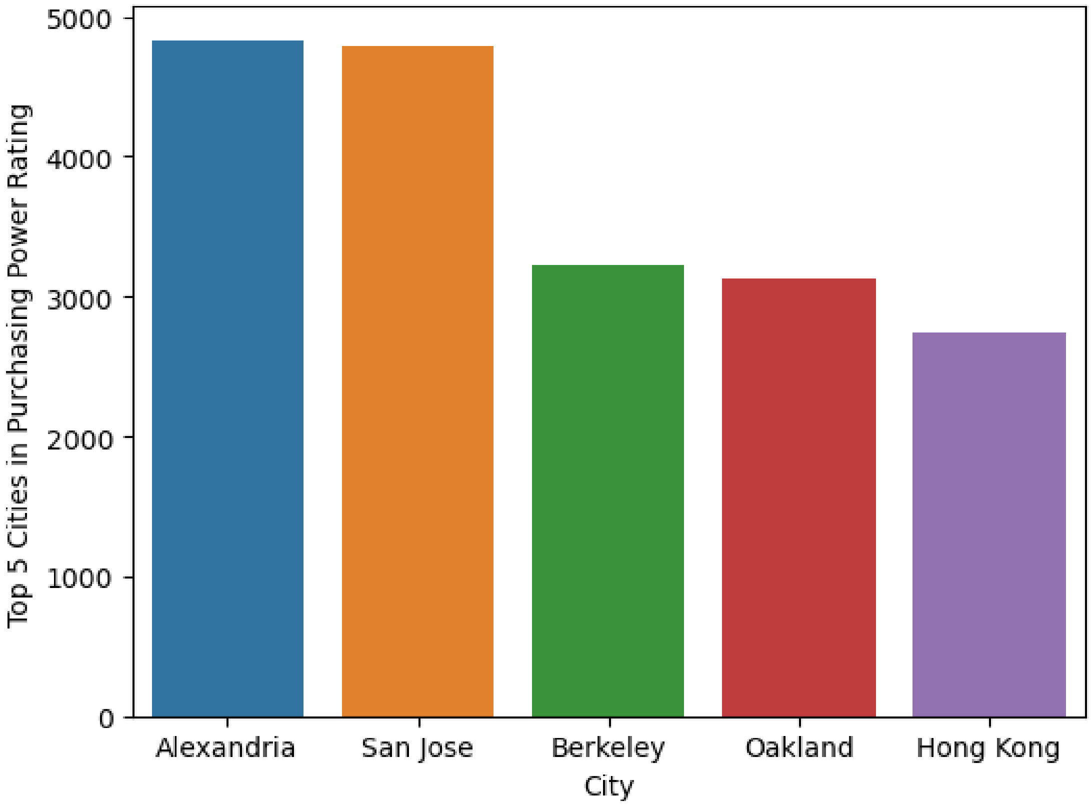
```
[13]: restaurant = city_rankings_df.sort_values(by=['restaurant_rating'],␣
       ↪ascending=False).reset_index().loc[0:4, ['city', 'restaurant_rating']]
      sns.barplot(data=restaurant, x='city', y='restaurant_rating')
      plt.xlabel("City")
      plt.ylabel("Restuarant Prices Rating")
      plt.ylabel("Top 5 Cities in Restaurant Prices Rating")
```

```
[13]: Text(0, 0.5, 'Top 5 Cities in Restaurant Prices Rating')
```



```
[14]: purchase = city_rankings_df.sort_values(by=['purchase_rating'], ascending=False).
       ↪reset_index().loc[0:4, ['city', 'purchase_rating']]
      sns.barplot(data=purchase, x='city', y='purchase_rating')
      plt.xlabel("City")
      plt.ylabel("Purchasing Power Rating")
      plt.ylabel("Top 5 Cities in Purchasing Power Rating")
```

```
[14]: Text(0, 0.5, 'Top 5 Cities in Purchasing Power Rating')
```



1.2.10 Top 5 Cities by Index

[15]:
```python
print("Top 5 Cities in Cost of Living:")
print(cost)
print("--------------------------------")
print("Top 5 Cities in Cost of Rent:")
print(rent)
print("--------------------------------")
print("Top 5 Cities in Cost of Rent and Living:")
print(living_rent)
print("--------------------------------")
print("Top 5 Citits in Cost of Groceries:")
print(groceries)
print("--------------------------------")
print("Top 5 Cities in Restaurant Prices:")
print(restaurant)
print("--------------------------------")
print("Top 5 Citites in Purchase Power:")
print(purchase)
print("--------------------------------")
```

```
Top 5 Cities in Cost of Living:
          city  cost_rating
0     San Jose  4302.203568
1  San Antonio  4114.075731
2        Tulsa  4089.815557
3      Oakland  3766.275691
4   Alexandria  3447.062962
--------------------------------
Top 5 Cities in Cost of Rent:
          city   rent_rating
0   Alexandria  14759.036145
1     San Jose  11734.401832
2        Tulsa   8817.427386
3    Hyderabad   8809.891808
4  San Antonio   6728.507970
--------------------------------
Top 5 Cities in Cost of Rent and Living:
          city  living_rent_rating
0     San Jose         6117.576843
1        Tulsa         5462.724936
2   Alexandria         5378.704720
3  San Antonio         5030.279351
4      Oakland         3866.548829
--------------------------------
Top 5 Citits in Cost of Groceries:
          city  groceries_rating
0  San Antonio       4497.816594
1     San Jose       4442.999567
2        Tulsa       4330.106979
3   Alexandria       3585.803147
4      Oakland       3554.743043
--------------------------------
Top 5 Cities in Restaurant Prices:
          city  restaurant_rating
0     San Jose        4749.768304
1      Oakland        4446.703087
2   Alexandria        4302.019315
3        Tulsa        4216.269841
4  San Antonio        3707.703384
--------------------------------
Top 5 Citites in Purchase Power:
         city  purchase_rating
0  Alexandria      4832.347140
1    San Jose      4783.014466
2    Berkeley      3229.190954
3     Oakland      3132.551687
4   Hong Kong      2738.059020
--------------------------------
```

1.2.11 Determine ratings by country

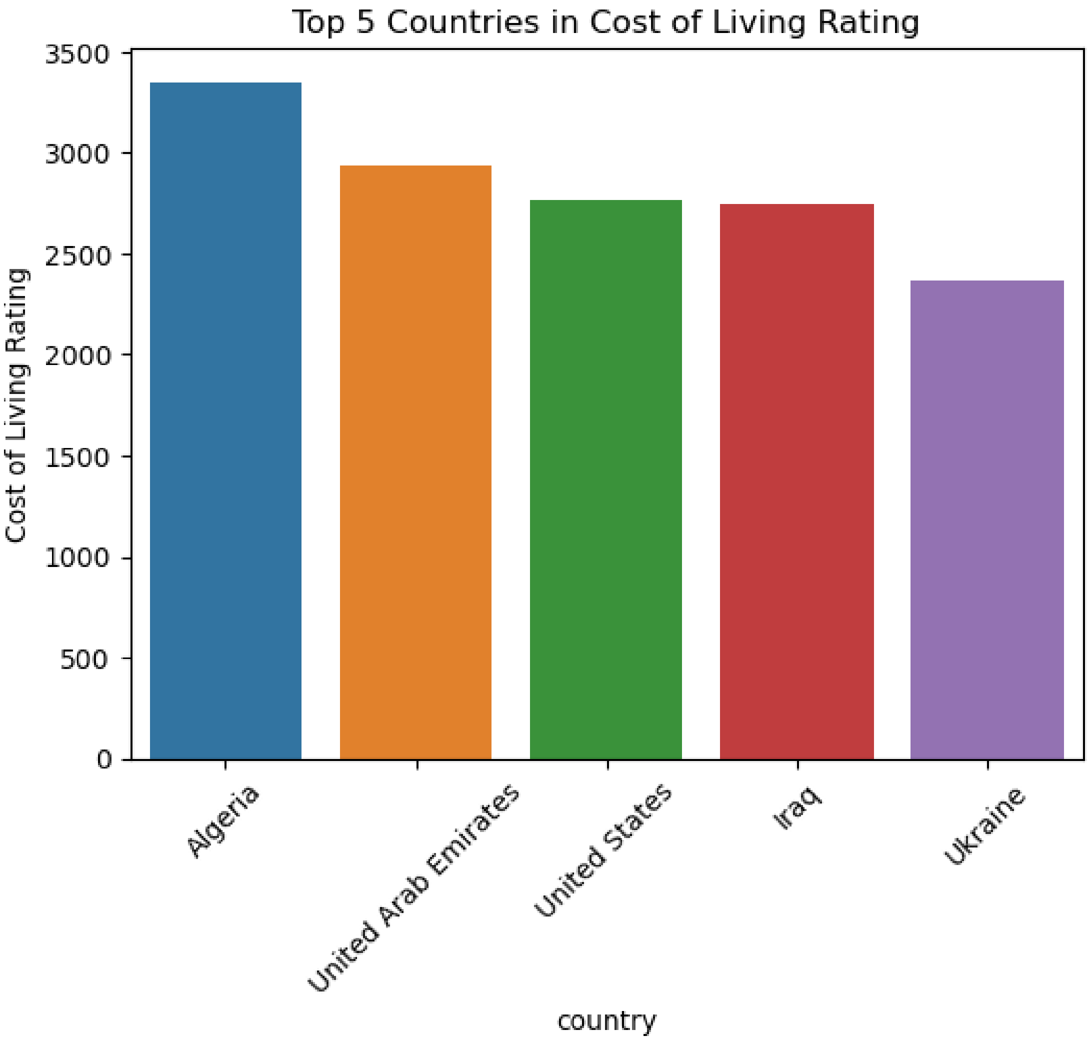
[16]:
```
country_median_df = pd.DataFrame(cleaned_salary.
 ↪groupby(by="country")['salary_in_usd'].median())
country_median_df.reset_index(inplace=True)
cost_country_group = pd.DataFrame(cost_of_living_data.groupby(by="country").
 ↪agg('median'))
cost_country_group.reset_index(inplace=True)

country_rankings_df = pd.merge(country_median_df,
                            cost_country_group,
                            how='outer')
country_rankings_df = country_rankings_df.assign(cost_rating = lambda x:␣
 ↪country_rankings_df['salary_in_usd'] / country_rankings_df['Cost of Living␣
 ↪Index'],
                                          rent_rating = lambda x:␣
 ↪country_rankings_df['salary_in_usd'] / country_rankings_df['Rent Index'],
                                          living_rent_rating = lambda x:␣
 ↪country_rankings_df['salary_in_usd'] / country_rankings_df['Cost of Living␣
 ↪Plus Rent Index'],
                                          groceries_rating = lambda x:␣
 ↪country_rankings_df['salary_in_usd'] / country_rankings_df['Groceries Index'],
                                          restaurant_rating = lambda x:␣
 ↪country_rankings_df['salary_in_usd'] / country_rankings_df['Restaurant Price␣
 ↪Index'],
                                          purchase_rating = lambda x:␣
 ↪country_rankings_df['salary_in_usd'] / country_rankings_df['Local Purchasing␣
 ↪Power Index'])
```

```
C:\Users\janna\AppData\Local\Temp\ipykernel_23848\1076841768.py:3:
FutureWarning: The default value of numeric_only in DataFrameGroupBy.median is
deprecated. In a future version, numeric_only will default to False. Either
specify numeric_only or select only columns which should be valid for the
function.
  cost_country_group =
pd.DataFrame(cost_of_living_data.groupby(by="country").agg('median'))
```

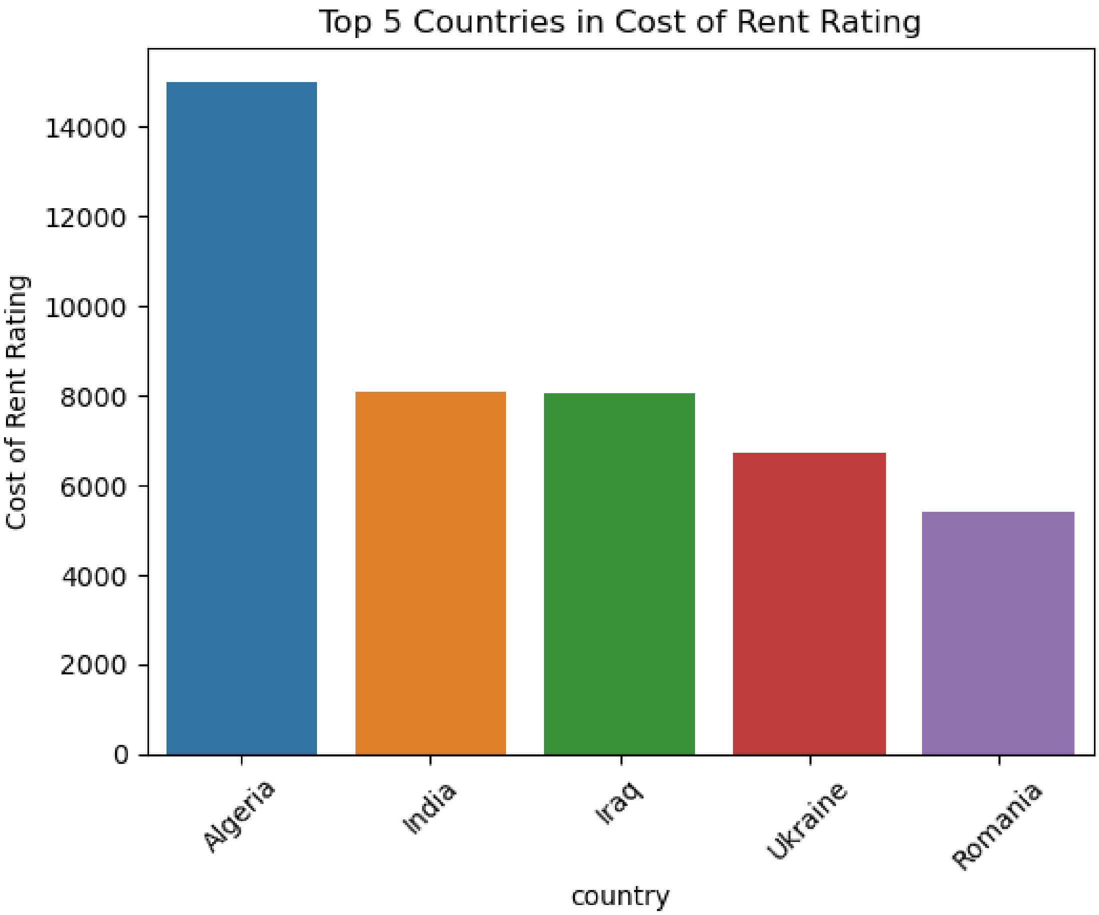
[17]:
```
cost = country_rankings_df.sort_values(by=['cost_rating'], ascending=False).
 ↪reset_index().loc[0:4, ['country', 'cost_rating']]
sns.barplot(data=cost, x='country', y='cost_rating')
plt.xlabel("country")
plt.xticks(rotation=45)
plt.ylabel("Cost of Living Rating")
plt.title("Top 5 Countries in Cost of Living Rating")
```

[17]:
```
Text(0.5, 1.0, 'Top 5 Countries in Cost of Living Rating')
```



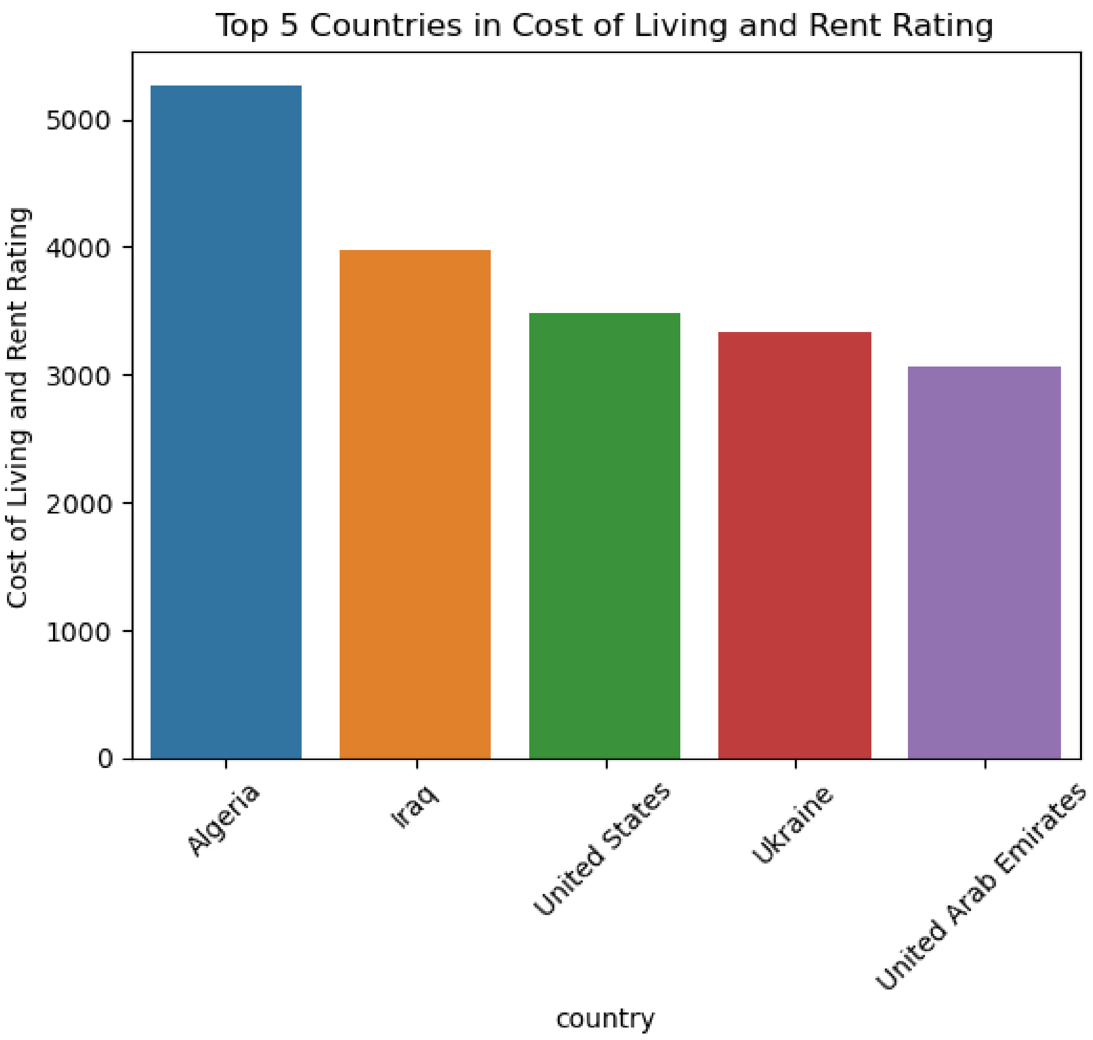
```
[18]: rent = country_rankings_df.sort_values(by=['rent_rating'], ascending=False).
       ↪reset_index().loc[0:4, ['country', 'rent_rating']]
      sns.barplot(data=rent, x='country', y='rent_rating')
      plt.xlabel("country")
      plt.xticks(rotation=45)
      plt.ylabel("Cost of Rent Rating")
      plt.title("Top 5 Countries in Cost of Rent Rating")
```

```
[18]: Text(0.5, 1.0, 'Top 5 Countries in Cost of Rent Rating')
```



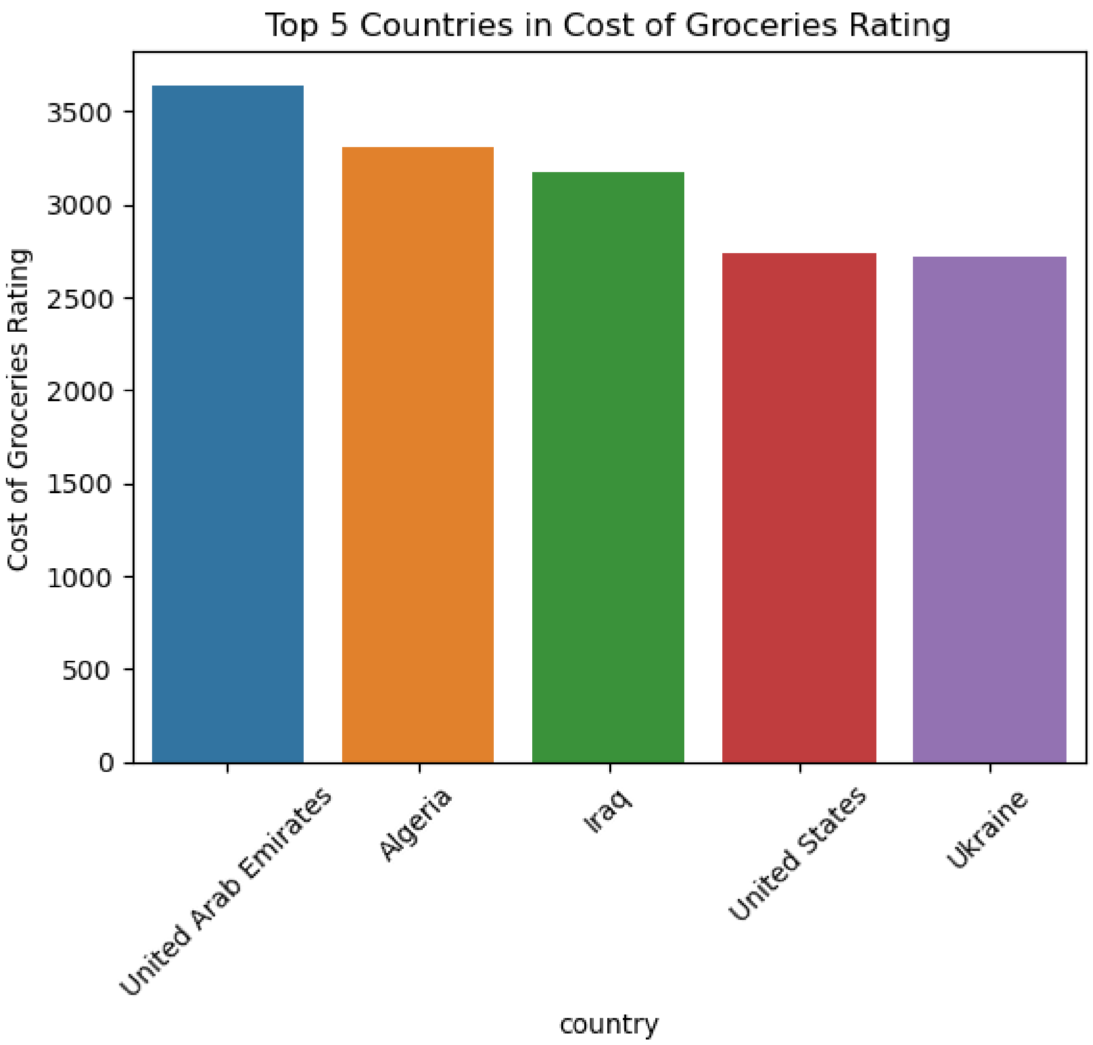
[19]:
```
living_rent = country_rankings_df.sort_values(by=['living_rent_rating'],␣
 ↪ascending=False).reset_index().loc[0:4, ['country', 'living_rent_rating']]
sns.barplot(data=living_rent, x='country', y='living_rent_rating')
plt.xlabel("country")
plt.xticks(rotation=45)
plt.ylabel("Cost of Living and Rent Rating")
plt.title("Top 5 Countries in Cost of Living and Rent Rating")
```

[19]:
```
Text(0.5, 1.0, 'Top 5 Countries in Cost of Living and Rent Rating')
```



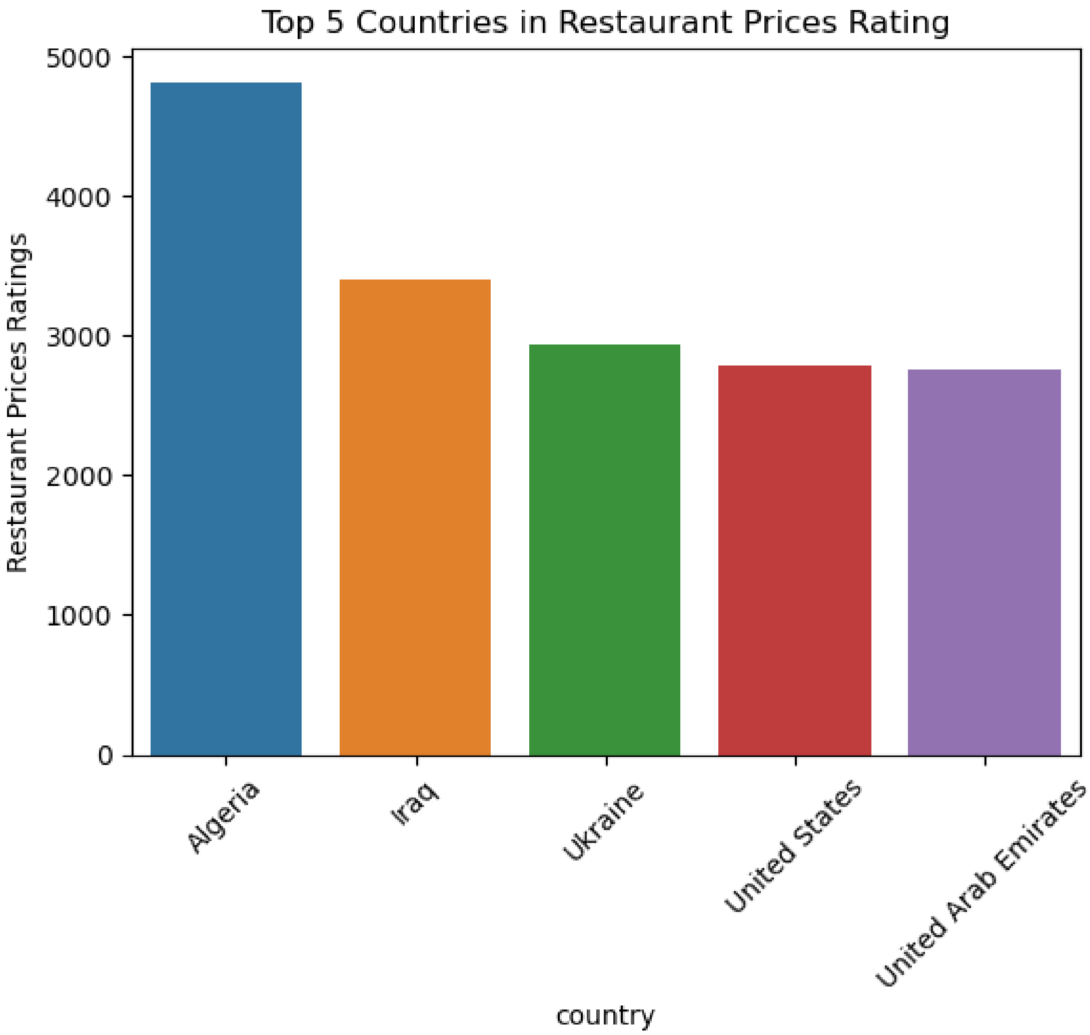
```
[20]: groceries = country_rankings_df.sort_values(by=['groceries_rating'],␣
       ↪ascending=False).reset_index().loc[0:4, ['country', 'groceries_rating']]
      sns.barplot(data=groceries, x='country', y='groceries_rating')
      plt.xlabel("country")
      plt.xticks(rotation=45)
      plt.ylabel("Cost of Groceries Rating")
      plt.title("Top 5 Countries in Cost of Groceries Rating")
```

```
[20]: Text(0.5, 1.0, 'Top 5 Countries in Cost of Groceries Rating')
```



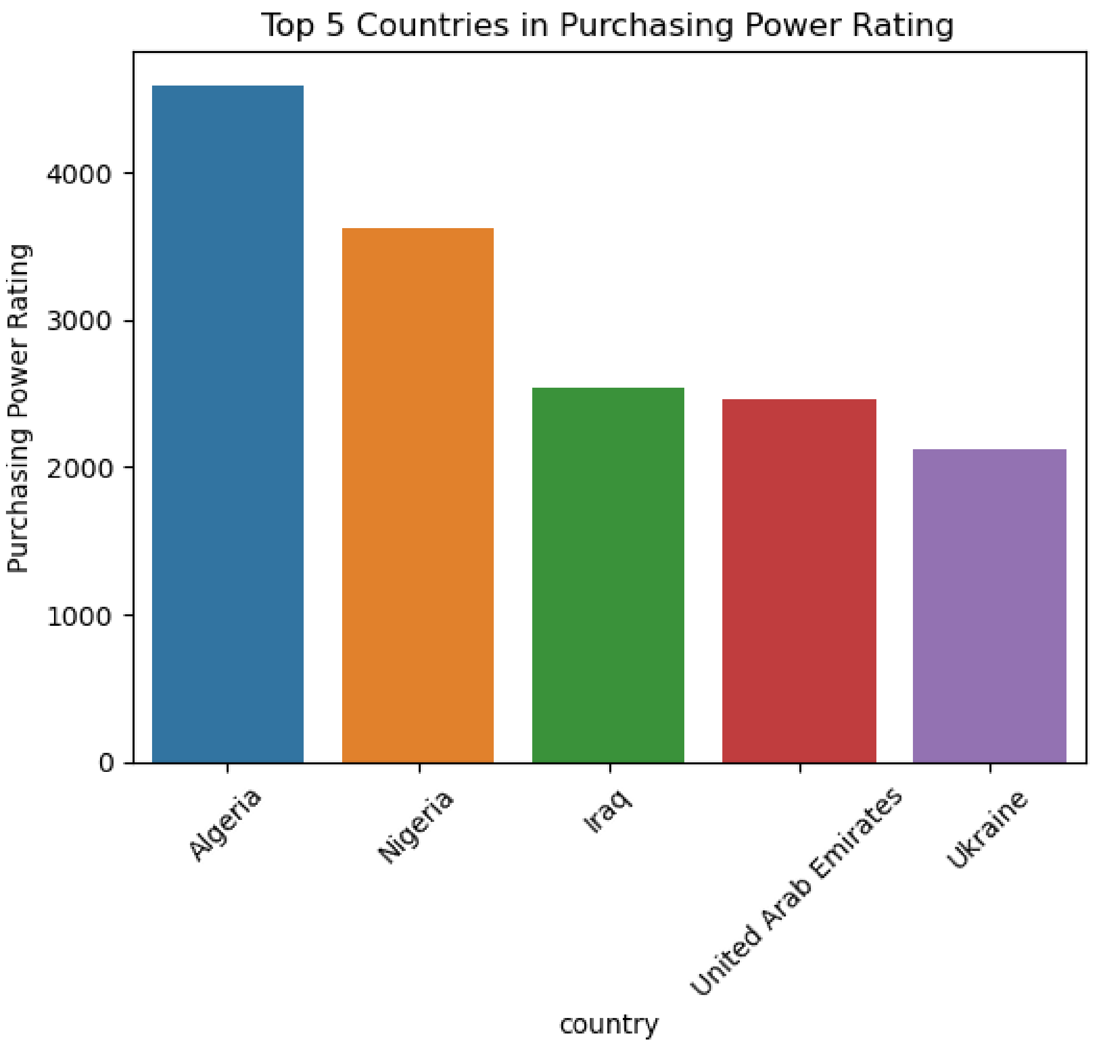
[21]:
```
restaurant = country_rankings_df.sort_values(by=['restaurant_rating'],␣
 ↪ascending=False).reset_index().loc[0:4, ['country', 'restaurant_rating']]
sns.barplot(data=restaurant, x='country', y='restaurant_rating')
plt.xlabel("country")
plt.xticks(rotation=45)
plt.ylabel("Restaurant Prices Ratings")
plt.title("Top 5 Countries in Restaurant Prices Rating")
```

[21]:
```
Text(0.5, 1.0, 'Top 5 Countries in Restaurant Prices Rating')
```



```
[22]: purchase = country_rankings_df.sort_values(by=['purchase_rating'],␣
       ↪ascending=False).reset_index().loc[0:4, ['country', 'purchase_rating']]
      sns.barplot(data=purchase, x='country', y='purchase_rating')
      plt.xlabel("country")
      plt.xticks(rotation=45)
      plt.ylabel("Purchasing Power Rating")
      plt.title("Top 5 Countries in Purchasing Power Rating")
```

```
[22]: Text(0.5, 1.0, 'Top 5 Countries in Purchasing Power Rating')
```



1.2.12 Top 5 Countries by Index

[23]:

```
print("Top 5 Countries in Cost of Living:")
print(cost)
print("---------------------------------")
print("Top 5 Countries in Cost of Rent:")
print(rent)
print("---------------------------------")
print("Top 5 Countries in Cost of Rent and Living:")
print(living_rent)
print("---------------------------------")
print("Top 5 Countries in Cost of Groceries:")
print(groceries)
print("---------------------------------")
```

```python
print("Top 5 Countries in Restaurant Prices:")
print(restaurant)
print("--------------------------------")
print("Top 5 Countries in Purchase Power:")
print(purchase)
print("--------------------------------")
```

```
Top 5 Countries in Cost of Living:
                country  cost_rating
0               Algeria  3351.206434
1  United Arab Emirates  2941.975197
2         United States  2766.908888
3                  Iraq  2745.744097
4               Ukraine  2363.755745
--------------------------------
Top 5 Countries in Cost of Rent:
   country   rent_rating
0  Algeria  14992.503748
1    India   8088.922156
2     Iraq   8032.128514
3  Ukraine   6703.910615
4  Romania   5390.835580
--------------------------------
Top 5 Countries in Cost of Rent and Living:
                country  living_rent_rating
0               Algeria         5268.703899
1                  Iraq         3970.617431
2         United States         3481.624758
3               Ukraine         3330.249769
4  United Arab Emirates         3060.551841
--------------------------------
Top 5 Countries in Cost of Groceries:
                country  groceries_rating
0  United Arab Emirates       3641.456583
1               Algeria       3305.785124
2                  Iraq       3173.595684
3         United States       2734.806630
4               Ukraine       2719.033233
--------------------------------
Top 5 Countries in Restaurant Prices:
                country  restaurant_rating
0               Algeria        4810.004810
1                  Iraq        3397.893306
2               Ukraine        2925.639984
3         United States        2784.026997
4  United Arab Emirates        2752.837540
--------------------------------
Top 5 Countries in Purchase Power:
```

```
                country  purchase_rating
0               Algeria      4591.368228
1               Nigeria      3614.457831
2                  Iraq      2534.533012
3  United Arab Emirates      2463.427575
4               Ukraine      2118.893467
-------------------------------
```

```
[ ]:
```