EDA World Population Data

In this Project, we are going to perform EDA on World Population Data using Pandas, Seaborn & Matplotlib libraries

In [152…
```
## Importing the libraries
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [153…
```
## Loadig the CSV file
df = pd.read_csv("world_population_data.csv")
```

In [154…
```
df.shape ## the data has 234 rows & 17 columns
```

Out[154…
```
(234, 17)
```

In [155…
```
df.columns ##17 column names
```

Out[155…
```
Index(['rank', 'cca3', 'country', 'continent', '2023 population',
       '2022 population', '2020 population', '2015 population',
       '2010 population', '2000 population', '1990 population',
       '1980 population', '1970 population', 'area (km²)', 'density (km²)',
       'growth rate', 'world percentage'],
      dtype='object')
```

In [156…
```
df.head()
```

Out[156…

	rank	cca3	country	continent	2023 population	2022 population	2020 population	2015 population	2010 population	2000 population	1990 population	popu
0	1	IND	India	Asia	1428627663	1417173173	1396387127	1322866505	1240613620	1059633675	870452165	6968
1	2	CHN	China	Asia	1425671352	1425887337	1424929781	1393715448	1348191368	1264099069	1153704252	9823
2	3	USA	United States	North America	339996563	338289857	335942003	324607776	311182845	282398554	248083732	2231
3	4	IDN	Indonesia	Asia	277534122	275501339	271857970	259091970	244016173	214072421	182159874	1481
4	5	PAK	Pakistan	Asia	240485658	235824862	227196741	210969298	194454498	154369924	115414069	806

In [157…
```
## checking whether the data has null values
df.isna().sum().sum() ## data has no null values
```

Out[157…
```
np.int64(0)
```

In [158…
```
## checking whether the data has duplicate values
df.duplicated().sum().sum() ## data has no duplicate values
```

Out[158…
```
np.int64(0)
```

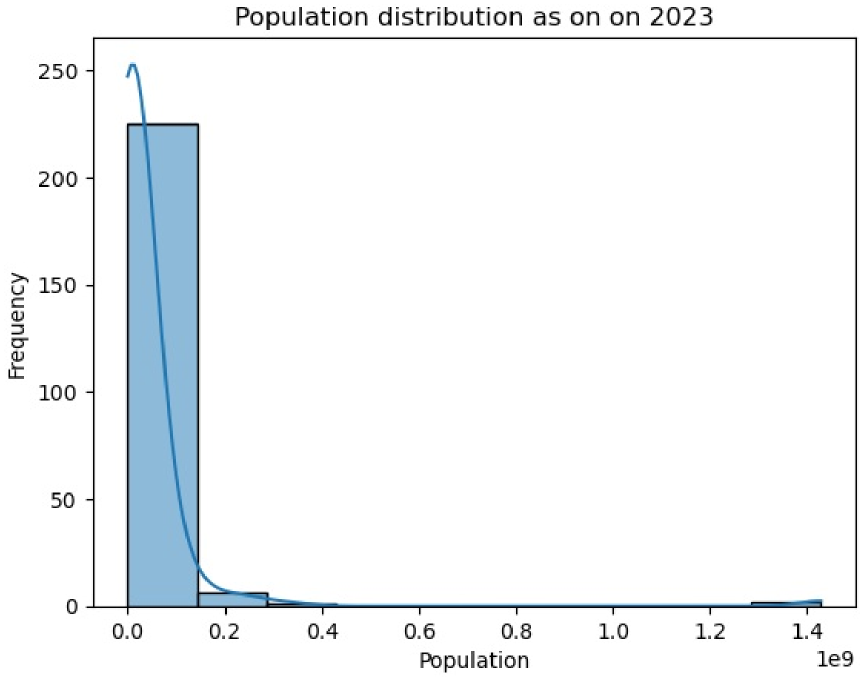
In [159…
```
# Remove the % in growth rate column and convert to float
df["growth rate"] = df["growth rate"].str.replace("%", "", regex=False).astype(float)
```

In [160…
```
## Total world wide population
df["2023 population"].sum()
```

Out[160…
```
np.int64(8043615390)
```

In [161…
```
## creatig an histogram for 2023 population
sns.histplot(df["2023 population"],bins = 10,kde=True)
plt.title("Population distribution as on on 2023")
plt.xlabel("Population")
plt.ylabel("Frequency")
```

Out[161…
```
Text(0, 0.5, 'Frequency')
```

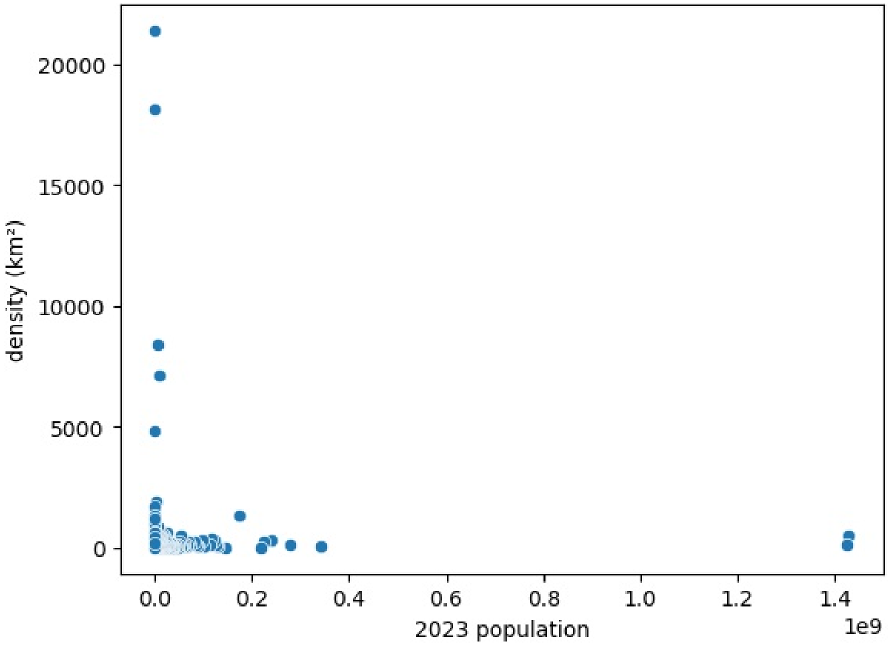


In [162…

```
## Creating Scatter plot of density vs population
sns.scatterplot(x="2023 population",y="density (km²)",data=df)
```

Out[162…

```
<Axes: xlabel='2023 population', ylabel='density (km²)'>
```

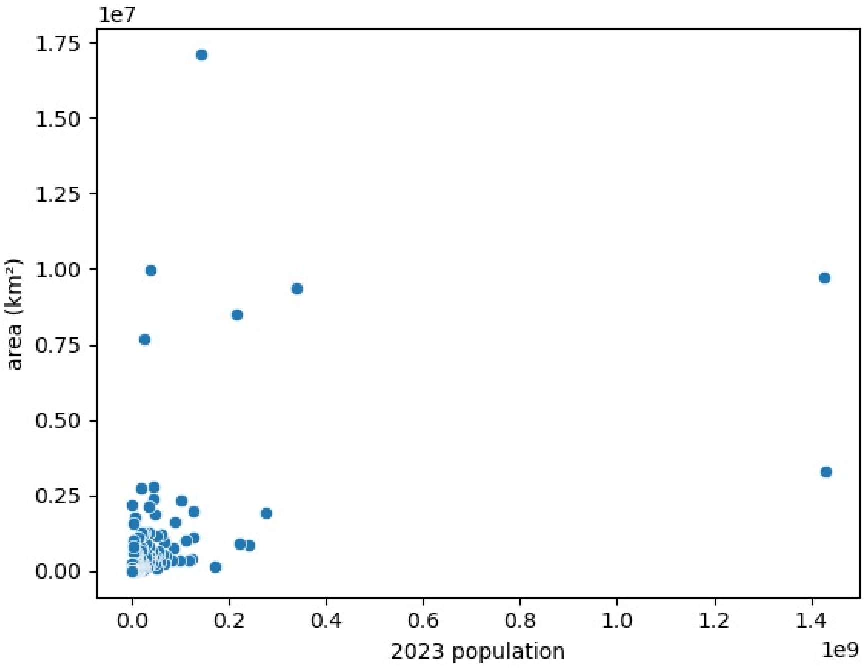


In [163…

```
## Creating Scatter plot of Area vs population
sns.scatterplot(x="2023 population",y="area (km²)",data=df)
```

Out[163…

```
<Axes: xlabel='2023 population', ylabel='area (km²)'>
```



Continent wise Analysis

In [164…

```
## Number of countries by continent
country_count = df.groupby("continent")["cca3"].count().reset_index()
country_count.columns = ["continent","No_of_countries"]
country_count
```

Out[164…

	continent	No_of_countries
0	Africa	57
1	Asia	50
2	Europe	50
3	North America	40
4	Oceania	23
5	South America	14

In [165…

```
## Caculating Population by continents
Continent1 = df.groupby("continent")["2023 population"].sum()
Continent1 = Continent1.reset_index().sort_values("2023 population",ascending=False)
Continent1
```

Out[165…

	continent	2023 population
1	Asia	4751819588
0	Africa	1460476458
2	Europe	741869197
3	North America	604155369
5	South America	439719009
4	Oceania	45575769

In [166…

```
## Continent wise country count & population
Continent1.merge(country_count,how="inner",on="continent")
```

Out[166…

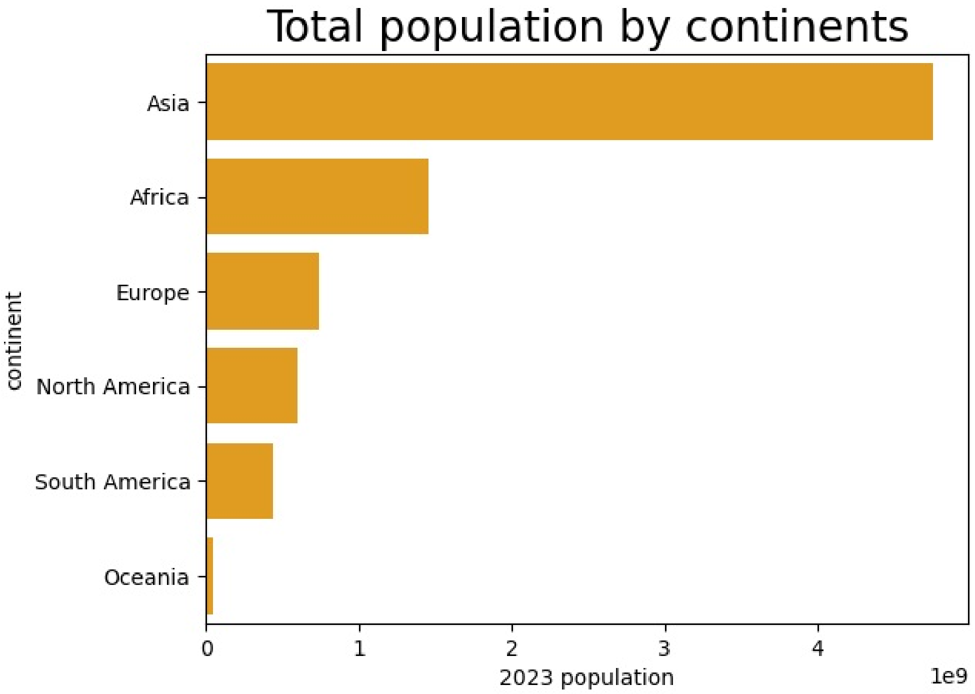
	continent	2023 population	No_of_countries
0	Asia	4751819588	50
1	Africa	1460476458	57
2	Europe	741869197	50
3	North America	604155369	40
4	South America	439719009	14
5	Oceania	45575769	23

In [167…

```
##plotting bargraph
sns.barplot(x="2023 population",y="continent",data=Continent1,color="Orange")
plt.title("Total population by continents",fontsize = 20)
```

Out[167…

```
Text(0.5, 1.0, 'Total population by continents')
```



In [168…

```
## Caculating Area by continents
Continent2 = df.groupby("continent")["area (km²)"].sum()
Continent2 = Continent2.reset_index().sort_values("area (km²)",ascending=False)
Continent2
```

Out[168…

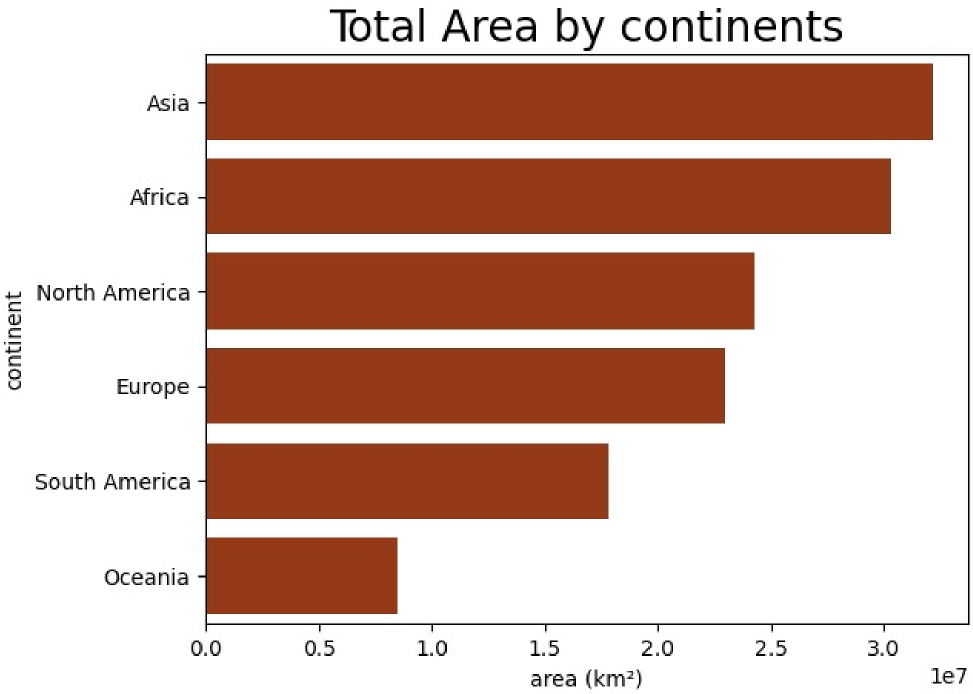
	continent	area (km²)
1	Asia	32138143.90
0	Africa	30317963.00
3	North America	24244178.00
2	Europe	23010411.26
5	South America	17833382.00
4	Oceania	8515218.00

In [169…

```
##plotting bargraph
sns.barplot(x="area (km²)",y="continent",data=Continent2,color="#AA3003")
plt.title("Total Area by continents",fontsize = 20)
```

Out[169…

```
Text(0.5, 1.0, 'Total Area by continents')
```



In [170…

```
## calculating avg density & growth rate by continent
Continent3 = df.groupby("continent")[["density (km²)","growth rate"]].mean()
Continent3 = Continent3.reset_index().sort_values("density (km²)",ascending=False)
Continent3
```

Out[170…

	continent	density (km²)	growth rate
1	Asia	1005.460000	0.948000
2	Europe	669.540000	0.179000
3	North America	274.300000	0.455750
4	Oceania	133.217391	0.859565
0	Africa	131.666667	2.126491
5	South America	22.071429	0.877143

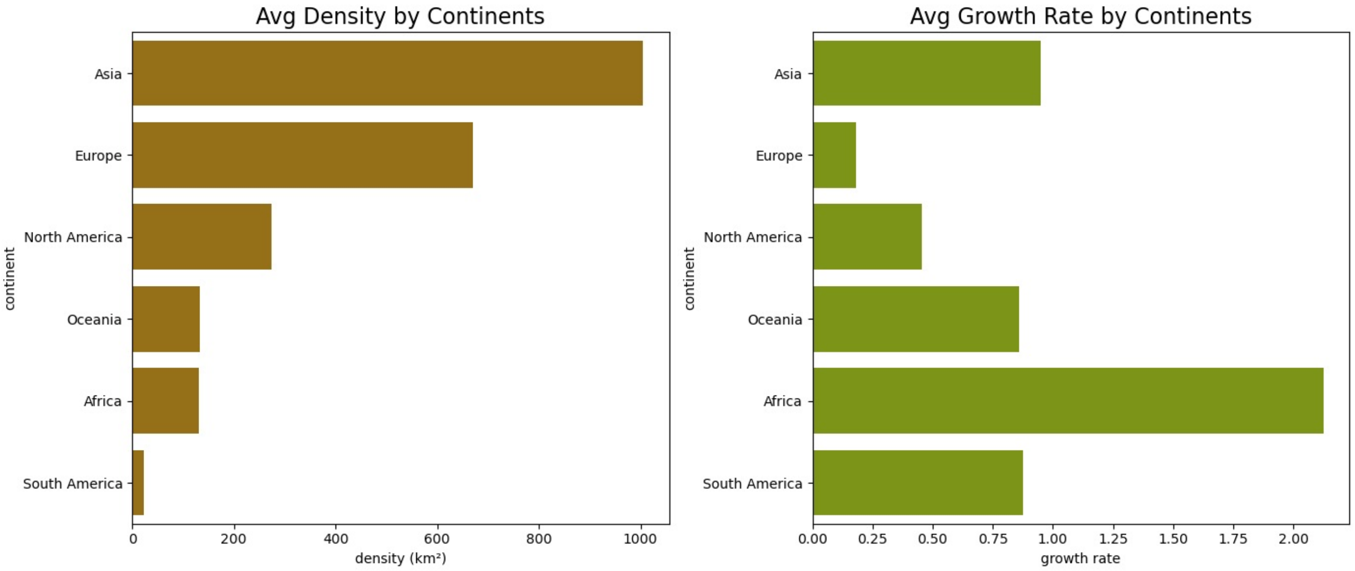
In [171…

```
## plotting the graphs
fig, axes = plt.subplots(1, 2, figsize=(14, 6))  # 1 row, 2 columns

# First subplot: Density
sns.barplot(x="density (km²)", y="continent", data=Continent3, color="#AA7803", ax=axes[0])
axes[0].set_title("Avg Density by Continents", fontsize=16)

# Second subplot: Growth rate
sns.barplot(x="growth rate", y="continent", data=Continent3, color="#89AA03", ax=axes[1])
axes[1].set_title("Avg Growth Rate by Continents", fontsize=16)

plt.tight_layout()  # Adjust spacing
plt.show()
```

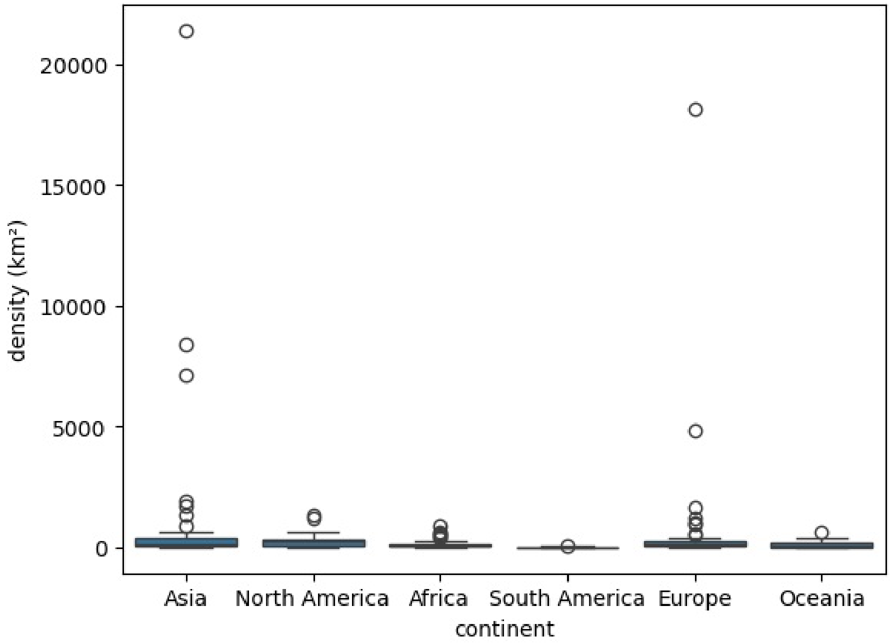


In [172…

```
## Box plot of density by countries with outliers
sns.boxplot(data=df,x="continent",y="density (km²)")
```

Out[172…

```
<Axes: xlabel='continent', ylabel='density (km²)'>
```



In [173…

```
## Box plot of density by countries without outliers
sns.boxplot(data=df,x="continent",y="density (km²)",showfliers = False,palette="muted")
```

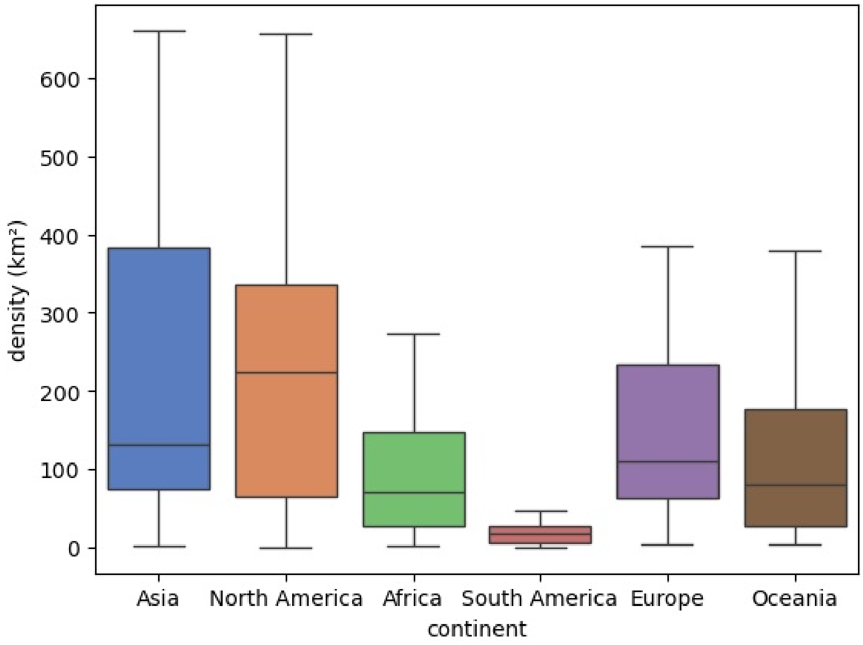
```
C:\Users\balus\AppData\Local\Temp\ipykernel_11320\1739945442.py:2: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be removed in v0.14.0. Assign the `x` variable
to `hue` and set `legend=False` for the same effect.

  sns.boxplot(data=df,x="continent",y="density (km²)",showfliers = False,palette="muted")
```

Out[173…

```
<Axes: xlabel='continent', ylabel='density (km²)'>
```



In [174…

```
df.columns
```

Out[174…

```
Index(['rank', 'cca3', 'country', 'continent', '2023 population',
       '2022 population', '2020 population', '2015 population',
       '2010 population', '2000 population', '1990 population',
       '1980 population', '1970 population', 'area (km²)', 'density (km²)',
       'growth rate', 'world percentage'],
      dtype='object')
```

Country wise Analysis

In [175…

```
## Top 5 countries by 2023 population
Top_5_by_popluation = df.sort_values("2023 population",ascending=False).\
head()[["country","continent","2023 population"]]
Top_5_by_popluation
```

Out[175…

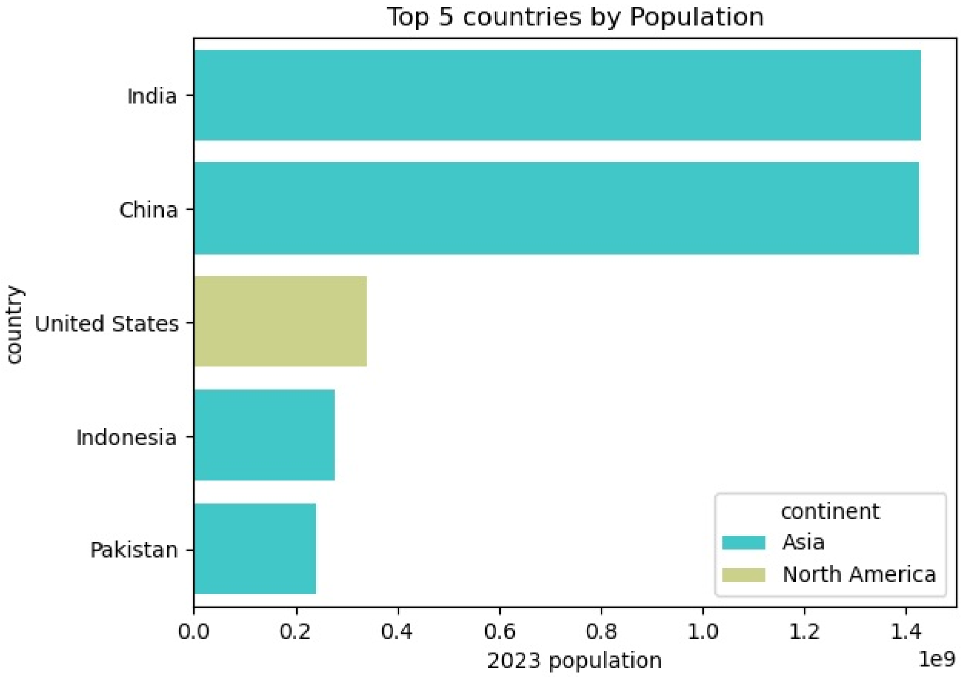
	country	continent	2023 population
0	India	Asia	1428627663
1	China	Asia	1425671352
2	United States	North America	339996563
3	Indonesia	Asia	277534122
4	Pakistan	Asia	240485658

In [176…

```
sns.barplot(y="country",x="2023 population",data=Top_5_by_popluation,
hue="continent",palette="rainbow")
plt.title("Top 5 countries by Population")
```

Out[176…

```
Text(0.5, 1.0, 'Top 5 countries by Population')
```



In [177…

```
## Top 5 countries by 2023 Area
Top_5_by_Area = \
df.sort_values("area (km²)",ascending=False).head()[["country","continent","area (km²)"]]
Top_5_by_Area
```

Out[177…

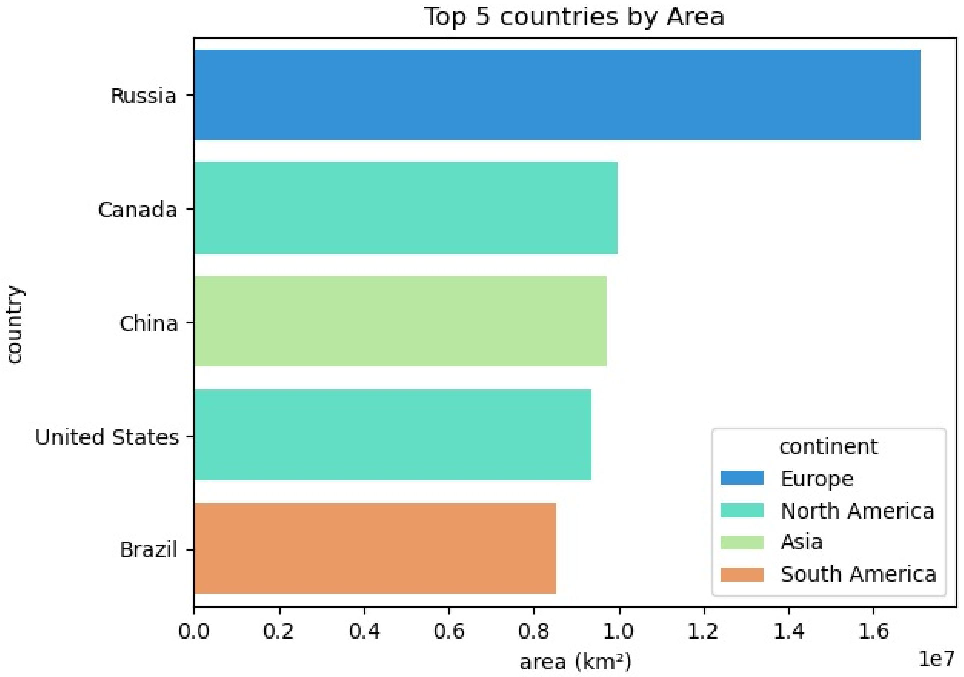
	country	continent	area (km²)
8	Russia	Europe	17098242.0
37	Canada	North America	9984670.0
1	China	Asia	9706961.0
2	United States	North America	9372610.0
6	Brazil	South America	8515767.0

In [178…

```
sns.barplot(y="country",x="area (km²)",data=Top_5_by_Area,palette="rainbow",hue="continent")
plt.title("Top 5 countries by Area")
```

Out[178…

```
Text(0.5, 1.0, 'Top 5 countries by Area')
```



In [179…

```
## Top 5 countries by 2023 Density
Top_5_by_Density = \
df.sort_values("density (km²)",ascending=False).head()[["country","continent","density (km²)"]]
```

```
Top_5_by_Density
```

Out[179…

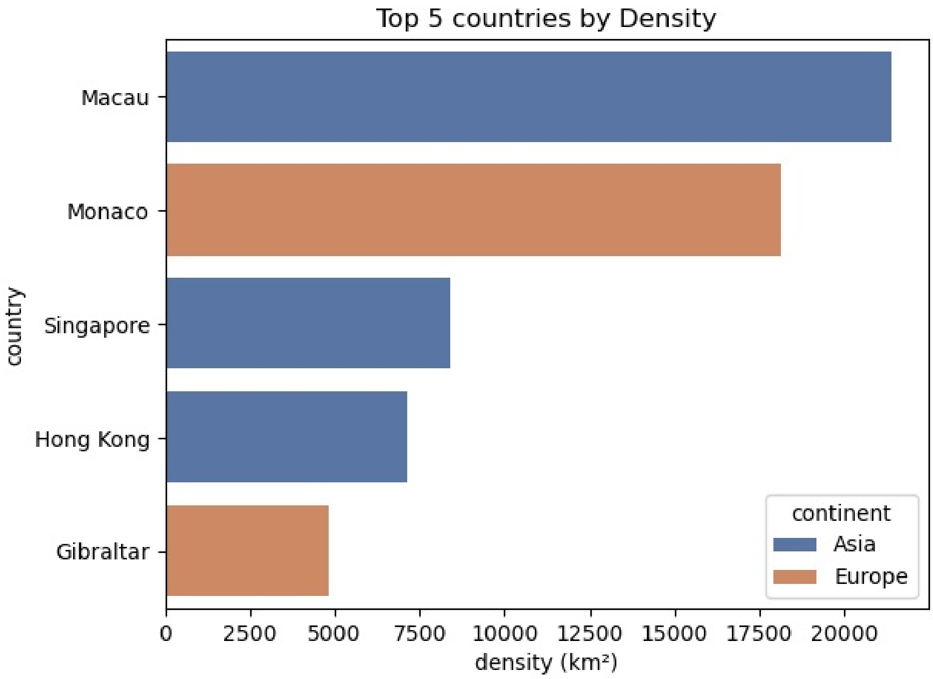
	country	continent	density (km²)
166	Macau	Asia	21403
216	Monaco	Europe	18149
113	Singapore	Asia	8377
103	Hong Kong	Asia	7135
218	Gibraltar	Europe	4807

In [180…

```
sns.barplot(y="country",x="density (km²)",data=Top_5_by_Density,hue="continent",palette="deep")
plt.title("Top 5 countries by Density")
```

Out[180…

```
Text(0.5, 1.0, 'Top 5 countries by Density')
```



In [181…

```
## Top 5 countries by 2023 Growth_rate
Top_5_by_Growth_rate = \
df.sort_values("growth rate",ascending=False).head()[["country","continent","growth rate"]]
Top_5_by_Growth_rate
```

Out[181…

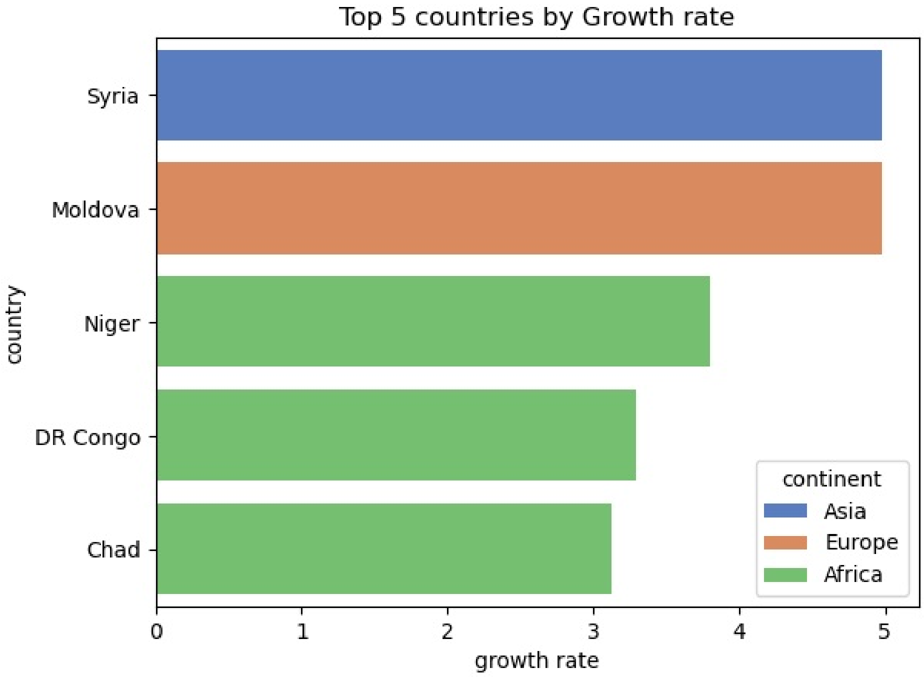
	country	continent	growth rate
59	Syria	Asia	4.98
133	Moldova	Europe	4.98
53	Niger	Africa	3.80
14	DR Congo	Africa	3.29
66	Chad	Africa	3.13

In [182…

```
sns.barplot(y="country",x="growth rate",data=Top_5_by_Growth_rate,
hue="continent",palette="muted")
plt.title("Top 5 countries by Growth rate")
```

Out[182…

```
Text(0.5, 1.0, 'Top 5 countries by Growth rate')
```



In [183…

```
df.columns
```

Out[183…

```
Index(['rank', 'cca3', 'country', 'continent', '2023 population',
       '2022 population', '2020 population', '2015 population',
       '2010 population', '2000 population', '1990 population',
       '1980 population', '1970 population', 'area (km²)', 'density (km²)',
       'growth rate', 'world percentage'],
      dtype='object')
```

In [184…

```
## Bottom 5 countries by 2023 population
Bottom_5_by_popluation = df.sort_values("2023 population",ascending=True).\
head()[["country","continent","2023 population"]]
Bottom_5_by_popluation
```

Out[184…

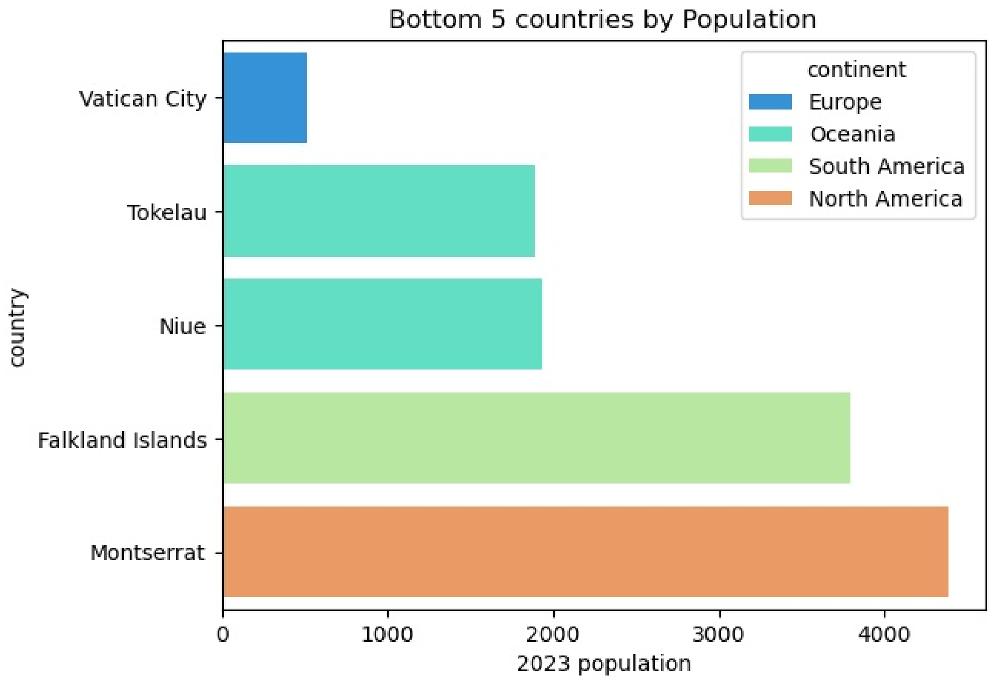
	country	continent	2023 population
233	Vatican City	Europe	518
232	Tokelau	Oceania	1893
231	Niue	Oceania	1935
230	Falkland Islands	South America	3791
229	Montserrat	North America	4386

In [185…

```
sns.barplot(y="country",x="2023 population",data=Bottom_5_by_popluation,
hue="continent",palette="rainbow")
plt.title("Bottom 5 countries by Population")
```

Out[185…

```
Text(0.5, 1.0, 'Bottom 5 countries by Population')
```



In [186…

```
## Bottom 5 countries by 2023 Area
Bottom_5_by_Area = \
df.sort_values("area (km²)",ascending=True).head()[["country","continent","area (km²)"]]
Bottom_5_by_Area
```

Out[186…

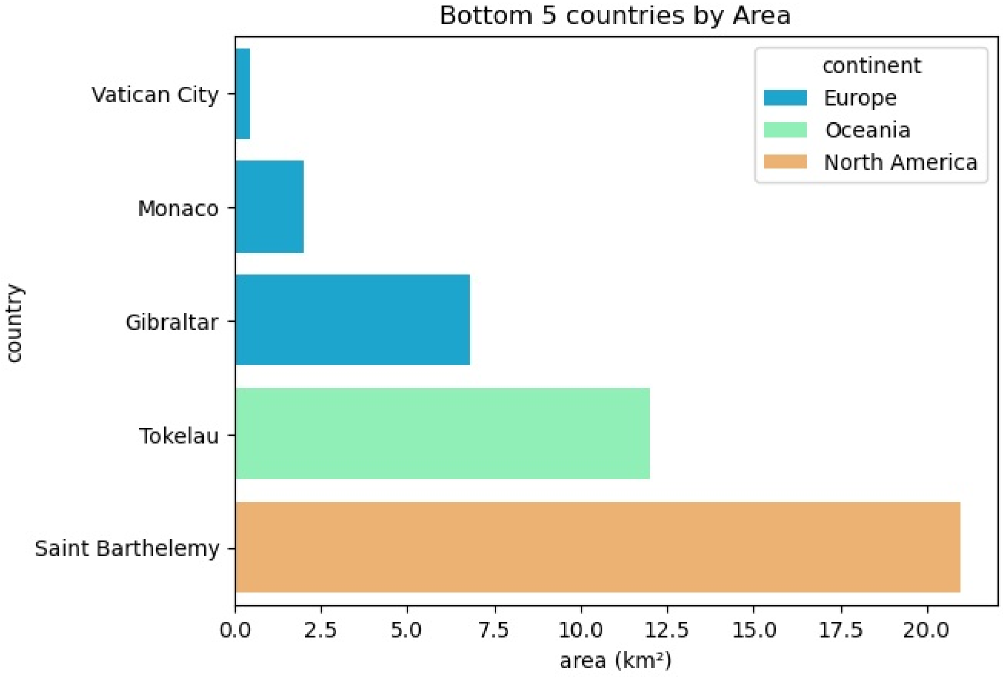
	country	continent	area (km^2)
233	Vatican City	Europe	0.44
216	Monaco	Europe	2.02
218	Gibraltar	Europe	6.80
232	Tokelau	Oceania	12.00
227	Saint Barthelemy	North America	21.00

In [187…

```
sns.barplot(y="country",x="area (km²)",data=Bottom_5_by_Area,palette="rainbow",hue="continent")
plt.title("Bottom 5 countries by Area")
```

Out[187…

```
Text(0.5, 1.0, 'Bottom 5 countries by Area')
```



In [188…

```
## Bottom 5 countries by 2023 Density
Bottom_5_by_Density = \
df.sort_values("density (km²)",ascending=True).head()[["country","continent","density (km²)"]]
Bottom_5_by_Density
```

Out[188…

	country	continent	density (km²)
207	Greenland	North America	0
230	Falkland Islands	South America	0
171	Western Sahara	Africa	2
132	Mongolia	Asia	2
54	Australia	Oceania	3

In [189…

```
## Bottom 5 countries by 2023 Growth_rate
Bottom_5_by_Growth_rate = \
df.sort_values("growth rate",ascending=True).head()[["country","continent","growth rate"]]
Bottom_5_by_Growth_rate
```

Out[189…

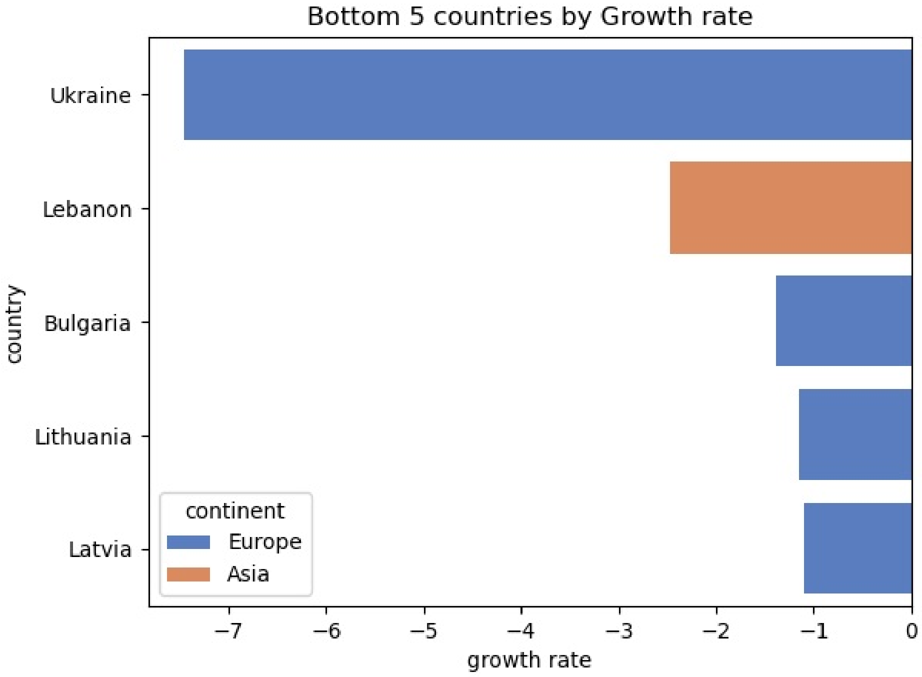
	country	continent	growth rate
40	Ukraine	Europe	-7.45
121	Lebanon	Asia	-2.47
109	Bulgaria	Europe	-1.39
141	Lithuania	Europe	-1.15
150	Latvia	Europe	-1.10

In [190…

```
sns.barplot(y="country",x="growth rate",data=Bottom_5_by_Growth_rate,
hue="continent",palette="muted")
plt.title("Bottom 5 countries by Growth rate")
```

Out[190…

```
Text(0.5, 1.0, 'Bottom 5 countries by Growth rate')
```



Thank you