

world-population-analysis

February 2, 2024

0.1 EDA in Pandas

```
[59]: import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

Reading Dataset

```
[60]: df = pd.read_csv("E:\PYTHON\Exploratory Data Analysis\Dataset\world_population.
↪csv")
```

```
<>:1: SyntaxWarning: invalid escape sequence '\P'
<>:1: SyntaxWarning: invalid escape sequence '\P'
C:\Users\Admin\AppData\Local\Temp\ipykernel_14956\123921293.py:1: SyntaxWarning:
invalid escape sequence '\P'
    df = pd.read_csv("E:\PYTHON\Exploratory Data
Analysis\Dataset\world_population.csv")
```

```
[61]: df
```

```
[61]:
```

	Rank	CCA3	Country	Capital	Continent	\
0	36	AFG	Afghanistan	Kabul	Asia	
1	138	ALB	Albania	Tirana	Europe	
2	34	DZA	Algeria	Algiers	Africa	
3	213	ASM	American Samoa	Pago Pago	Oceania	
4	203	AND	Andorra	Andorra la Vella	Europe	
..	
229	226	WLF	Wallis and Futuna	Mata-Utu	Oceania	
230	172	ESH	Western Sahara	El Aaiún	Africa	
231	46	YEM	Yemen	Sanaa	Asia	
232	63	ZMB	Zambia	Lusaka	Africa	
233	74	ZWE	Zimbabwe	Harare	Africa	

	2022 Population	2020 Population	2015 Population	2010 Population	\
0	41128771.00	38972230.00	33753499.00	28189672.00	
1	2842321.00	2866849.00	2882481.00	2913399.00	
2	44903225.00	43451666.00	39543154.00	35856344.00	
3	44273.00	46189.00	51368.00	54849.00	

4	79824.00	77700.00	71746.00	71519.00
..
229	11572.00	11655.00	12182.00	13142.00
230	575986.00	556048.00	491824.00	413296.00
231	33696614.00	32284046.00	28516545.00	24743946.00
232	20017675.00	18927715.00	NaN	13792086.00
233	16320537.00	15669666.00	14154937.00	12839771.00

	2000 Population	1990 Population	1980 Population	1970 Population	\
0	19542982.00	10694796.00	12486631.00	10752971.00	
1	3182021.00	3295066.00	2941651.00	2324731.00	
2	30774621.00	25518074.00	18739378.00	13795915.00	
3	58230.00	47818.00	32886.00	27075.00	
4	66097.00	53569.00	35611.00	19860.00	
..	
229	14723.00	13454.00	11315.00	9377.00	
230	270375.00	178529.00	116775.00	76371.00	
231	18628700.00	13375121.00	9204938.00	6843607.00	
232	9891136.00	7686401.00	5720438.00	4281671.00	
233	11834676.00	10113893.00	7049926.00	5202918.00	

	Area (km ²)	Density (per km ²)	Growth Rate	World Population Percentage
0	652230.00	63.06	1.03	0.52
1	28748.00	98.87	1.00	0.04
2	2381741.00	18.85	1.02	0.56
3	199.00	222.48	0.98	0.00
4	468.00	170.56	1.01	0.00
..
229	142.00	81.49	1.00	0.00
230	266000.00	2.17	1.02	0.01
231	527968.00	63.82	1.02	0.42
232	752612.00	26.60	1.03	0.25
233	390757.00	41.77	1.02	0.20

[234 rows x 17 columns]

Changing Scientific Notation

```
[62]: pd.set_option('display.float_format', '{:.2f}'.format)
```

```
[63]: df
```

```
[63]:
```

	Rank	CCA3	Country	Capital	Continent	\
0	36	AFG	Afghanistan	Kabul	Asia	
1	138	ALB	Albania	Tirana	Europe	
2	34	DZA	Algeria	Algiers	Africa	
3	213	ASM	American Samoa	Pago Pago	Oceania	

4	203	AND	Andorra	Andorra la Vella	Europe
..
229	226	WLF	Wallis and Futuna	Mata-Utu	Oceania
230	172	ESH	Western Sahara	El Aaiún	Africa
231	46	YEM	Yemen	Sanaa	Asia
232	63	ZMB	Zambia	Lusaka	Africa
233	74	ZWE	Zimbabwe	Harare	Africa

	2022 Population	2020 Population	2015 Population	2010 Population	\
0	41128771.00	38972230.00	33753499.00	28189672.00	
1	2842321.00	2866849.00	2882481.00	2913399.00	
2	44903225.00	43451666.00	39543154.00	35856344.00	
3	44273.00	46189.00	51368.00	54849.00	
4	79824.00	77700.00	71746.00	71519.00	
..	
229	11572.00	11655.00	12182.00	13142.00	
230	575986.00	556048.00	491824.00	413296.00	
231	33696614.00	32284046.00	28516545.00	24743946.00	
232	20017675.00	18927715.00	NaN	13792086.00	
233	16320537.00	15669666.00	14154937.00	12839771.00	

	2000 Population	1990 Population	1980 Population	1970 Population	\
0	19542982.00	10694796.00	12486631.00	10752971.00	
1	3182021.00	3295066.00	2941651.00	2324731.00	
2	30774621.00	25518074.00	18739378.00	13795915.00	
3	58230.00	47818.00	32886.00	27075.00	
4	66097.00	53569.00	35611.00	19860.00	
..	
229	14723.00	13454.00	11315.00	9377.00	
230	270375.00	178529.00	116775.00	76371.00	
231	18628700.00	13375121.00	9204938.00	6843607.00	
232	9891136.00	7686401.00	5720438.00	4281671.00	
233	11834676.00	10113893.00	7049926.00	5202918.00	

	Area (km ²)	Density (per km ²)	Growth Rate	World Population Percentage
0	652230.00	63.06	1.03	0.52
1	28748.00	98.87	1.00	0.04
2	2381741.00	18.85	1.02	0.56
3	199.00	222.48	0.98	0.00
4	468.00	170.56	1.01	0.00
..
229	142.00	81.49	1.00	0.00
230	266000.00	2.17	1.02	0.01
231	527968.00	63.82	1.02	0.42
232	752612.00	26.60	1.03	0.25
233	390757.00	41.77	1.02	0.20

[234 rows x 17 columns]

Summary of Data

```
[64]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 234 entries, 0 to 233
Data columns (total 17 columns):
 #   Column              Non-Null Count  Dtype
---  -
 0   Rank                234 non-null   int64
 1   CCA3                234 non-null   object
 2   Country             234 non-null   object
 3   Capital             234 non-null   object
 4   Continent           234 non-null   object
 5   2022 Population     230 non-null   float64
 6   2020 Population     233 non-null   float64
 7   2015 Population     230 non-null   float64
 8   2010 Population     227 non-null   float64
 9   2000 Population     227 non-null   float64
10   1990 Population     229 non-null   float64
11   1980 Population     229 non-null   float64
12   1970 Population     230 non-null   float64
13   Area (km²)          232 non-null   float64
14   Density (per km²)   230 non-null   float64
15   Growth Rate         232 non-null   float64
16   World Population Percentage 234 non-null   float64
dtypes: float64(12), int64(1), object(4)
memory usage: 31.2+ KB
```

```
[65]: df.describe()
```

```
[65]:
```

	Rank	2022 Population	2020 Population	2015 Population	\
count	234.00	230.00	233.00	230.00	
mean	117.50	34632250.88	33600710.95	32066004.16	
std	67.69	137889172.44	135873196.61	131507146.34	
min	1.00	510.00	520.00	564.00	
25%	59.25	419738.50	406471.00	394295.00	
50%	117.50	5762857.00	5456681.00	5244415.00	
75%	175.75	22653719.00	21522626.00	19730853.75	
max	234.00	1425887337.00	1424929781.00	1393715448.00	

	2010 Population	2000 Population	1990 Population	1980 Population	\
count	227.00	227.00	229.00	229.00	
mean	30270164.48	26840495.26	19330463.93	16282884.78	
std	126074183.54	113352454.57	81309624.96	69345465.54	

min	596.00	651.00	700.00	733.00
25%	382726.50	329470.00	261928.00	223752.00
50%	4889741.00	4491202.00	3785847.00	3135123.00
75%	16825852.50	15625467.00	11882762.00	9817257.00
max	1348191368.00	1264099069.00	1153704252.00	982372466.00

	1970 Population	Area (km ²)	Density (per km ²)	Growth Rate \
count	230.00	232.00	230.00	232.00
mean	15866499.13	581663.75	456.81	1.01
std	68355859.75	1769133.06	2083.74	0.01
min	752.00	1.00	0.03	0.91
25%	145880.50	2567.25	36.60	1.00
50%	2511718.00	77141.00	95.35	1.01
75%	8817329.00	414643.25	236.88	1.02
max	822534450.00	17098242.00	23172.27	1.07

	World Population Percentage
count	234.00
mean	0.43
std	1.71
min	0.00
25%	0.01
50%	0.07
75%	0.28
max	17.88

Finding NULL

```
[66]: df.isnull().sum()
```

```
[66]: Rank
      CCA3
Country
Capital
Continent
2022 Population
2020 Population
2015 Population
2010 Population
2000 Population
1990 Population
1980 Population
1970 Population
Area (km2)
Density (per km2)
Growth Rate
World Population Percentage
```

dtype: int64

Count of Unique Values

```
[67]: df.nunique()
```

```
[67]: Rank                234
      CCA3                234
      Country            234
      Capital            234
      Continent           6
      2022 Population    230
      2020 Population    233
      2015 Population    230
      2010 Population    227
      2000 Population    227
      1990 Population    229
      1980 Population    229
      1970 Population    230
      Area (km²)         231
      Density (per km²)  230
      Growth Rate        178
      World Population Percentage  70
      dtype: int64
```

Sorting on Values

```
[68]: df.sort_values(by='World Population Percentage', ascending=False).head(5)
```

```
[68]:
```

	Rank	CCA3	Country	Capital	Continent	\
41	1	CHN	China	Beijing	Asia	
92	2	IND	India	New Delhi	Asia	
221	3	USA	United States	Washington, D.C.	North America	
93	4	IDN	Indonesia	Jakarta	Asia	
156	5	PAK	Pakistan	Islamabad	Asia	

	2022 Population	2020 Population	2015 Population	2010 Population	\
41	1425887337.00	1424929781.00	1393715448.00	1348191368.00	
92	1417173173.00	1396387127.00	1322866505.00	1240613620.00	
221	338289857.00	335942003.00	324607776.00	311182845.00	
93	275501339.00	271857970.00	259091970.00	244016173.00	
156	235824862.00	227196741.00	210969298.00	194454498.00	

	2000 Population	1990 Population	1980 Population	1970 Population	\
41	1264099069.00	1153704252.00	982372466.00	822534450.00	
92	1059633675.00	NaN	NaN	557501301.00	
221	282398554.00	248083732.00	223140018.00	200328340.00	
93	214072421.00	182159874.00	148177096.00	115228394.00	

```
156      154369924.00      115414069.00      80624057.00      59290872.00
```

	Area (km ²)	Density (per km ²)	Growth Rate	World Population Percentage
41	9706961.00	146.89	1.00	17.88
92	3287590.00	431.07	1.01	17.77
221	9372610.00	36.09	1.00	4.24
93	1904569.00	144.65	1.01	3.45
156	881912.00	267.40	1.02	2.96

Correlation Between Columns

```
[70]: df.corr(numeric_only=True)
```

```
[70]:
```

	Rank	2022 Population	2020 Population \
Rank	1.00	-0.36	-0.36
2022 Population	-0.36	1.00	1.00
2020 Population	-0.36	1.00	1.00
2015 Population	-0.35	1.00	1.00
2010 Population	-0.35	1.00	1.00
2000 Population	-0.34	0.99	1.00
1990 Population	-0.33	0.99	0.99
1980 Population	-0.33	0.99	0.99
1970 Population	-0.34	0.97	0.98
Area (km ²)	-0.38	0.45	0.45
Density (per km ²)	0.13	-0.03	-0.03
Growth Rate	-0.22	-0.02	-0.03
World Population Percentage	-0.36	1.00	1.00

	2015 Population	2010 Population \
Rank	-0.35	-0.35
2022 Population	1.00	1.00
2020 Population	1.00	1.00
2015 Population	1.00	1.00
2010 Population	1.00	1.00
2000 Population	1.00	1.00
1990 Population	0.99	1.00
1980 Population	0.99	0.99
1970 Population	0.98	0.98
Area (km ²)	0.46	0.46
Density (per km ²)	-0.03	-0.03
Growth Rate	-0.03	-0.04
World Population Percentage	1.00	1.00

	2000 Population	1990 Population \
Rank	-0.34	-0.33
2022 Population	0.99	0.99
2020 Population	1.00	0.99

2015 Population	1.00	0.99
2010 Population	1.00	1.00
2000 Population	1.00	1.00
1990 Population	1.00	1.00
1980 Population	1.00	1.00
1970 Population	0.99	1.00
Area (km ²)	0.47	0.52
Density (per km ²)	-0.03	-0.03
Growth Rate	-0.05	-0.07
World Population Percentage	0.99	0.99

	1980 Population	1970 Population	Area (km ²) \
Rank	-0.33	-0.34	-0.38
2022 Population	0.99	0.97	0.45
2020 Population	0.99	0.98	0.45
2015 Population	0.99	0.98	0.46
2010 Population	0.99	0.98	0.46
2000 Population	1.00	0.99	0.47
1990 Population	1.00	1.00	0.52
1980 Population	1.00	1.00	0.53
1970 Population	1.00	1.00	0.51
Area (km ²)	0.53	0.51	1.00
Density (per km ²)	-0.03	-0.03	-0.06
Growth Rate	-0.08	-0.08	-0.01
World Population Percentage	0.99	0.97	0.45

	Density (per km ²)	Growth Rate \
Rank	0.13	-0.22
2022 Population	-0.03	-0.02
2020 Population	-0.03	-0.03
2015 Population	-0.03	-0.03
2010 Population	-0.03	-0.04
2000 Population	-0.03	-0.05
1990 Population	-0.03	-0.07
1980 Population	-0.03	-0.08
1970 Population	-0.03	-0.08
Area (km ²)	-0.06	-0.01
Density (per km ²)	1.00	-0.07
Growth Rate	-0.07	1.00
World Population Percentage	-0.03	-0.02

	World Population Percentage
Rank	-0.36
2022 Population	1.00
2020 Population	1.00
2015 Population	1.00
2010 Population	1.00

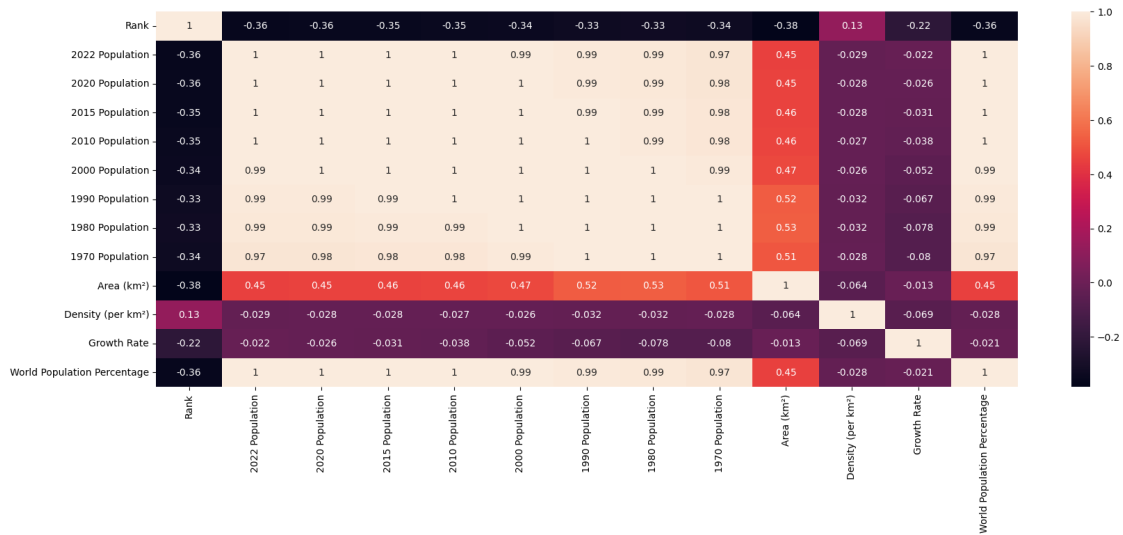
2000 Population	0.99
1990 Population	0.99
1980 Population	0.99
1970 Population	0.97
Area (km ²)	0.45
Density (per km ²)	-0.03
Growth Rate	-0.02
World Population Percentage	1.00

Heatmap Using Seaborn

```
[81]: # Create a heatmap of the correlation matrix with annotations
heatmap = sns.heatmap(df.corr(numeric_only=True), annot=True)

# Set the size of the heatmap figure
plt.rcParams['figure.figsize'] = (20, 7)

# Show the plot
plt.show()
```



Grouping Data

```
[93]: df.groupby('Continent').mean(numeric_only=True).sort_values(by='2022_
↳Population', ascending=False)
```

```
[93]:
```

	Rank	2022 Population	2020 Population	2015 Population	\
Continent					
Asia	77.56	96327387.31	94955134.37	89165003.64	
South America	97.57	31201186.29	30823574.50	29509599.71	

Africa	92.16	25455879.68	23871435.26	21419703.57
Europe	124.50	15055371.82	14915843.92	15027454.12
North America	160.93	15007403.40	14855914.82	14259596.25
Oceania	188.52	2046386.32	1910148.96	1756664.48

	2010 Population	2000 Population	1990 Population	\
Continent				
Asia	89087770.00	80580835.11	48639995.33	
South America	26789395.54	25015888.69	21224743.93	
Africa	18898197.31	14598365.95	11376964.52	
Europe	14712278.68	14817685.71	14785203.94	
North America	13568016.28	12151739.60	10531660.62	
Oceania	1613163.65	1357512.09	1162774.87	

	1980 Population	1970 Population	Area (km ²)	\
Continent				
Asia	40278333.33	43839877.83	642762.82	
South America	17270643.29	13781939.71	1301302.85	
Africa	8586031.98	6567175.27	537879.30	
Europe	14200004.52	13118479.82	460208.22	
North America	9207334.03	7885865.15	606104.45	
Oceania	996532.17	846968.26	370220.91	

	Density (per km ²)	Growth Rate	World Population Percentage
Continent			
Asia	1025.02	1.01	1.18
South America	20.97	1.01	0.39
Africa	126.41	1.02	0.31
Europe	663.32	1.00	0.19
North America	272.49	1.00	0.19
Oceania	132.54	1.01	0.02

```
[91]: df[df['Continent'].str.contains('Africa')]
```

[91]:	Rank	CCA3	Country	Capital	Continent	\
	2	34	DZA	Algeria	Algiers	Africa
	5	42	AGO	Angola	Luanda	Africa
	21	77	BEN	Benin	Porto-Novo	Africa
	26	144	BWA	Botswana	Gaborone	Africa
	31	58	BFA	Burkina Faso	Ouagadougou	Africa
	32	78	BDI	Burundi	Bujumbura	Africa
	34	53	CMR	Cameroon	Yaounde	Africa
	36	171	CPV	Cape Verde	Praia	Africa
	38	117	CAF	Central African Republic	Bangui	Africa
	39	69	TCD	Chad	N'Djamena	Africa
	43	163	COM	Comoros	Moroni	Africa
	52	160	DJI	Djibouti	Djibouti	Africa

55	15	COD	DR Congo	Kinshasa	Africa
57	14	EGY	Egypt	Cairo	Africa
59	152	GNQ	Equatorial Guinea	Malabo	Africa
60	132	ERI	Eritrea	Asmara	Africa
62	159	SWZ	Eswatini	Mbabane	Africa
63	12	ETH	Ethiopia	Addis Ababa	Africa
71	146	GAB	Gabon	Libreville	Africa
72	142	GMB	Gambia	Banjul	Africa
75	47	GHA	Ghana	Accra	Africa
84	75	GIN	Guinea	Conakry	Africa
85	149	GNB	Guinea-Bissau	Bissau	Africa
100	52	CIV	Ivory Coast	Yamoussoukro	Africa
106	27	KEN	Kenya	Nairobi	Africa
113	147	LSO	Lesotho	Maseru	Africa
114	121	LBR	Liberia	Monrovia	Africa
115	107	LBY	Libya	Tripoli	Africa
120	50	MDG	Madagascar	Antananarivo	Africa
121	62	MWI	Malawi	Lilongwe	Africa
124	59	MLI	Mali	Bamako	Africa
128	126	MRT	Mauritania	Nouakchott	Africa
129	157	MUS	Mauritius	Port Louis	Africa
130	182	MYT	Mayotte	Mamoudzou	Africa
138	40	MAR	Morocco	Rabat	Africa
139	48	MOZ	Mozambique	Maputo	Africa
141	145	NAM	Namibia	Windhoek	Africa
148	54	NER	Niger	Niamey	Africa
149	6	NGA	Nigeria	Abuja	Africa
168	114	COG	Republic of the Congo	Brazzaville	Africa
169	161	REU	Reunion	Saint-Denis	Africa
172	76	RWA	Rwanda	Kigali	Africa
181	187	STP	Sao Tome and Principe	São Tomé	Africa
183	72	SEN	Senegal	Dakar	Africa
185	196	SYC	Seychelles	Victoria	Africa
186	102	SLE	Sierra Leone	Freetown	Africa
192	70	SOM	Somalia	Mogadishu	Africa
193	24	ZAF	South Africa	Pretoria	Africa
195	86	SSD	South Sudan	Juba	Africa
198	32	SDN	Sudan	Khartoum	Africa
205	22	TZA	Tanzania	Dodoma	Africa
208	100	TGO	Togo	Lomé	Africa
212	79	TUN	Tunisia	Tunis	Africa
217	31	UGA	Uganda	Kampala	Africa
230	172	ESH	Western Sahara	El Aaiún	Africa
232	63	ZMB	Zambia	Lusaka	Africa
233	74	ZWE	Zimbabwe	Harare	Africa

2022 Population 2020 Population 2015 Population 2010 Population \

2	44903225.00	43451666.00	39543154.00	35856344.00
5	35588987.00	33428485.00	28127721.00	23364185.00
21	13352864.00	12643123.00	10932783.00	9445710.00
26	2630296.00	2546402.00	2305171.00	2091664.00
31	22673762.00	21522626.00	18718019.00	16116845.00
32	12889576.00	12220227.00	10727148.00	9126605.00
34	27914536.00	26491087.00	23012646.00	19878036.00
36	593149.00	582640.00	552166.00	521212.00
38	5579144.00	5343020.00	4819333.00	4660067.00
39	17723315.00	16644701.00	14140274.00	11894727.00
43	836774.00	806166.00	730216.00	656024.00
52	1120849.00	1090156.00	1006259.00	919199.00
55	99010212.00	92853164.00	78656904.00	66391257.00
57	110990103.00	107465134.00	97723799.00	87252413.00
59	1674908.00	1596049.00	NaN	1094524.00
60	3684032.00	3555868.00	3340006.00	3147727.00
62	NaN	1180655.00	1133936.00	1099920.00
63	123379924.00	117190911.00	102471895.00	89237791.00
71	2388992.00	2292573.00	2028517.00	1711105.00
72	2705992.00	2573995.00	2253133.00	NaN
75	33475870.00	32180401.00	28870939.00	25574719.00
84	13859341.00	13205153.00	11625998.00	10270728.00
85	2105566.00	2015828.00	1788919.00	1567220.00
100	28160542.00	26811790.00	23596741.00	21120042.00
106	54027487.00	51985780.00	46851488.00	41517895.00
113	2305825.00	2254100.00	2118521.00	2022747.00
114	5302681.00	5087584.00	4612329.00	4019956.00
115	6812341.00	6653942.00	6192235.00	6491988.00
120	29611714.00	28225177.00	24850912.00	21731053.00
121	20405317.00	19377061.00	16938942.00	14718422.00
124	22593590.00	21224040.00	18112907.00	15529181.00
128	4736139.00	4498604.00	3946220.00	3419461.00
129	1299469.00	1297828.00	1293153.00	1283330.00
130	326101.00	305587.00	249545.00	211786.00
138	37457971.00	36688772.00	34680458.00	32464865.00
139	32969517.00	31178239.00	NaN	NaN
141	2567012.00	2489098.00	2282704.00	2099271.00
148	26207977.00	24333639.00	20128124.00	16647543.00
149	218541212.00	208327405.00	183995785.00	160952853.00
168	5970424.00	5702174.00	5064386.00	4437884.00
169	974052.00	957822.00	922495.00	890130.00
172	13776698.00	13146362.00	11642959.00	10309031.00
181	227380.00	218641.00	201124.00	182138.00
183	17316449.00	16436119.00	14356181.00	12530121.00
185	107118.00	105530.00	99240.00	92409.00
186	8605718.00	8233969.00	7314773.00	6436698.00
192	17597511.00	16537016.00	13763906.00	12026649.00

193	59893885.00	58801927.00	55876504.00	51784921.00
195	10913164.00	10606227.00	11194299.00	NaN
198	46874204.00	44440486.00	38171178.00	33739933.00
205	65497748.00	61704518.00	52542823.00	45110527.00
208	8848699.00	8442580.00	7473229.00	6571855.00
212	12356117.00	12161723.00	11557779.00	10895063.00
217	47249585.00	44404611.00	37477356.00	32341728.00
230	575986.00	556048.00	491824.00	413296.00
232	20017675.00	18927715.00	NaN	13792086.00
233	16320537.00	15669666.00	14154937.00	12839771.00

	2000 Population	1990 Population	1980 Population	1970 Population	\
2	30774621.00	25518074.00	18739378.00	13795915.00	
5	16394062.00	11828638.00	8330047.00	6029700.00	
21	6998023.00	5133419.00	3833939.00	3023443.00	
26	1726985.00	1341474.00	938578.00	592244.00	
31	11882888.00	9131361.00	6932967.00	5611666.00	
32	6307659.00	5483793.00	4312834.00	3497834.00	
34	15091594.00	11430520.00	8519891.00	6452787.00	
36	458251.00	364563.00	317234.00	287262.00	
38	3759170.00	2809221.00	2415276.00	2067356.00	
39	8259137.00	5827069.00	4408230.00	3667394.00	
43	536758.00	431119.00	328328.00	242351.00	
52	742033.00	577173.00	324121.00	144379.00	
55	48616317.00	35987541.00	26708686.00	20151733.00	
57	71371371.00	57214630.00	43748556.00	34781986.00	
59	684977.00	465549.00	282509.00	316955.00	
60	2392880.00	2149960.00	1657982.00	1272748.00	
62	1030496.00	854011.00	598564.00	442865.00	
63	67031867.00	47878073.00	34945469.00	28308246.00	
71	1272935.00	983028.00	749078.00	597192.00	
72	NaN	NaN	NaN	NaN	
75	19665502.00	15446982.00	11865246.00	8861895.00	
84	8336967.00	6354145.00	4972609.00	4222374.00	
85	1230849.00	973551.00	831462.00	591663.00	
100	16799670.00	11910540.00	8303809.00	5477086.00	
106	30851606.00	23162269.00	16187124.00	11473087.00	
113	1998630.00	1798997.00	1407672.00	1023481.00	
114	2895224.00	2209731.00	1932169.00	1463563.00	
115	5154790.00	4236983.00	2962720.00	1909177.00	
120	16216431.00	11882762.00	8948162.00	6639751.00	
121	11229387.00	9539665.00	6267369.00	4625141.00	
124	11239101.00	8945026.00	7372581.00	6153587.00	
128	2695003.00	2006027.00	1506694.00	1122198.00	
129	1215930.00	1090290.00	954865.00	830115.00	
130	159215.00	92659.00	52233.00	35383.00	
138	28554415.00	24570814.00	19678444.00	15274351.00	

139	17768505.00	13303459.00	11413587.00	8411676.00
141	1819141.00	1369011.00	975994.00	754467.00
148	11622665.00	8370647.00	6173177.00	4669708.00
149	122851984.00	95214257.00	72951439.00	55569264.00
168	3134030.00	2385435.00	1829256.00	1396989.00
169	785424.00	658992.00	551674.00	473925.00
172	8109989.00	7319962.00	5247532.00	3896367.00
181	143714.00	120343.00	97210.00	77583.00
183	9704287.00	7536001.00	5703869.00	4367744.00
185	80060.00	71057.00	65290.00	54379.00
186	4584067.00	4325388.00	3367477.00	2778557.00
192	8721465.00	6999096.00	5892224.00	NaN
193	46813266.00	39877570.00	29463549.00	22368306.00
195	6114440.00	4750817.00	4192011.00	3342410.00
198	26298773.00	21090886.00	16673586.00	11305206.00
205	34463704.00	26206012.00	19297659.00	13618192.00
208	5008035.00	3875947.00	2838110.00	2197383.00
212	9893316.00	8440023.00	6578156.00	5047404.00
217	24020697.00	17586630.00	13284026.00	10317212.00
230	270375.00	178529.00	116775.00	76371.00
232	9891136.00	7686401.00	5720438.00	4281671.00
233	11834676.00	10113893.00	7049926.00	5202918.00

	Area (km ²)	Density (per km ²)	Growth Rate	World Population Percentage
2	2381741.00	18.85	1.02	0.56
5	1246700.00	28.55	1.03	0.45
21	112622.00	118.56	1.03	0.17
26	582000.00	4.52	1.02	0.03
31	272967.00	83.06	1.03	0.28
32	27834.00	463.09	1.03	0.16
34	475442.00	58.71	1.03	0.35
36	4033.00	147.07	1.01	0.01
38	622984.00	8.96	1.02	0.07
39	1284000.00	13.80	1.03	0.22
43	1862.00	449.40	1.02	0.01
52	23200.00	48.31	1.01	0.01
55	2344858.00	42.22	1.03	1.24
57	1002450.00	110.72	1.02	1.39
59	28051.00	59.71	1.02	0.02
60	117600.00	31.33	1.02	0.05
62	17364.00	69.20	1.01	0.02
63	1104300.00	111.73	1.03	1.55
71	267668.00	8.93	1.02	0.03
72	10689.00	253.16	1.02	0.03
75	238533.00	140.34	1.02	0.42
84	245857.00	56.37	1.02	0.17
85	36125.00	58.29	1.02	0.03

100	322463.00	NaN	NaN	0.35
106	580367.00	93.09	1.02	0.68
113	30355.00	75.96	1.01	0.03
114	111369.00	47.61	1.02	0.07
115	1759540.00	3.87	1.01	0.09
120	587041.00	50.44	1.02	0.37
121	118484.00	172.22	1.03	0.26
124	1240192.00	18.22	1.03	0.28
128	1030700.00	4.60	1.03	0.06
129	2040.00	636.99	1.00	0.02
130	374.00	871.93	1.03	0.00
138	446550.00	83.88	1.01	0.47
139	801590.00	41.13	1.03	0.41
141	825615.00	3.11	1.01	0.03
148	1267000.00	20.69	1.04	0.33
149	923768.00	236.58	1.02	2.74
168	342000.00	17.46	1.02	0.07
169	2511.00	387.91	1.01	0.01
172	26338.00	523.07	1.02	0.17
181	964.00	235.87	1.02	0.00
183	NaN	NaN	1.03	0.22
185	452.00	236.99	1.01	0.00
186	71740.00	119.96	1.02	0.11
192	637657.00	27.60	1.03	0.22
193	1221037.00	49.05	1.01	0.75
195	619745.00	17.61	1.02	0.14
198	1886068.00	24.85	1.03	0.59
205	945087.00	69.30	1.03	0.82
208	56785.00	155.83	1.02	0.11
212	163610.00	75.52	1.01	0.15
217	241550.00	195.61	1.03	0.59
230	266000.00	2.17	1.02	0.01
232	752612.00	26.60	1.03	0.25
233	390757.00	41.77	1.02	0.20

```
[133]: # #Straight order
# df2 = df.groupby('Continent')[['2022 Population',
#     '2020 Population', '2015 Population', '2010 Population',
#     '2000 Population', '1990 Population', '1980 Population',
#     '1970 Population']].mean(numeric_only=True).sort_values(by='2022_
#     ↪Population', ascending=False)

#Reverse Order
df2 = df.groupby('Continent')[['1970 Population',
    '1980 Population', '1990 Population', '2000 Population',
    '2010 Population', '2015 Population', '2020 Population',
```

```

    '2022 Population']]).mean(numeric_only=True).sort_values(by='2022_
↳Population', ascending=False)

# #Another Simple method
# df2 = df.groupby('Continent')[df.columns[5:13]].mean(numeric_only=True).
↳sort_values(by='2022 Population', ascending=False)

#Reverse method
# df2 = df.groupby('Continent')[df.columns[-12:-4]].mean(numeric_only=True).
↳sort_values(by='2022 Population', ascending=False)

df2

```

```

[133]:
1970 Population  1980 Population  1990 Population  \
Continent
Asia            43839877.83      40278333.33      48639995.33
South America   13781939.71      17270643.29      21224743.93
Africa          6567175.27       8586031.98      11376964.52
Europe          13118479.82      14200004.52      14785203.94
North America   7885865.15       9207334.03      10531660.62
Oceania          846968.26       996532.17       1162774.87

2000 Population  2010 Population  2015 Population  \
Continent
Asia            80580835.11      89087770.00      89165003.64
South America   25015888.69      26789395.54      29509599.71
Africa          14598365.95      18898197.31      21419703.57
Europe          14817685.71      14712278.68      15027454.12
North America   12151739.60      13568016.28      14259596.25
Oceania          1357512.09      1613163.65      1756664.48

2020 Population  2022 Population
Continent
Asia            94955134.37      96327387.31
South America   30823574.50      31201186.29
Africa          23871435.26      25455879.68
Europe          14915843.92      15055371.82
North America   14855914.82      15007403.40
Oceania          1910148.96      2046386.32

```

```

[134]: df.columns

```

```

[134]: Index(['Rank', 'CCA3', 'Country', 'Capital', 'Continent', '2022 Population',
            '2020 Population', '2015 Population', '2010 Population',
            '2000 Population', '1990 Population', '1980 Population',
            '1970 Population', 'Area (km²)', 'Density (per km²)', 'Growth Rate',
            'World Population Percentage'],

```



```
dtype='object')
```

Visualized Groupin Data

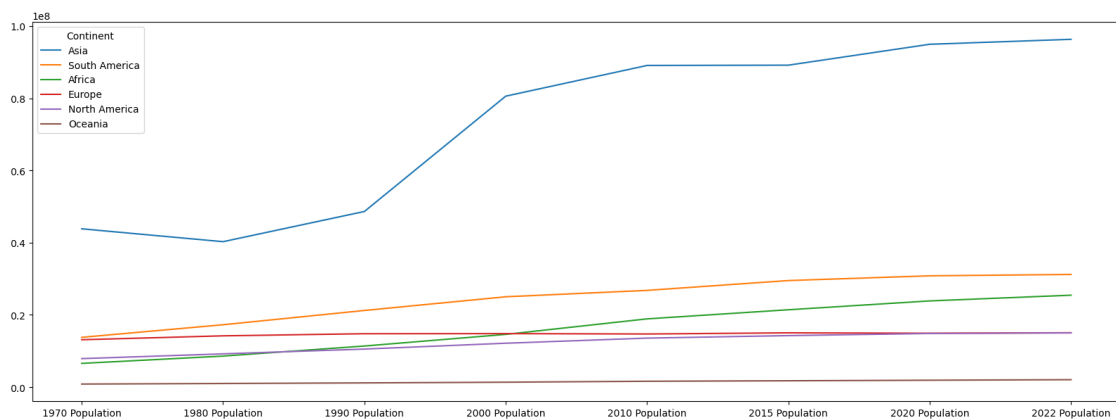
```
[135]: df3 = df2.transpose()  
df3
```

```
[135]: Continent      Asia  South America    Africa    Europe  \  
1970 Population 43839877.83    13781939.71  6567175.27 13118479.82  
1980 Population 40278333.33    17270643.29  8586031.98 14200004.52  
1990 Population 48639995.33    21224743.93 11376964.52 14785203.94  
2000 Population 80580835.11    25015888.69 14598365.95 14817685.71  
2010 Population 89087770.00    26789395.54 18898197.31 14712278.68  
2015 Population 89165003.64    29509599.71 21419703.57 15027454.12  
2020 Population 94955134.37    30823574.50 23871435.26 14915843.92  
2022 Population 96327387.31    31201186.29 25455879.68 15055371.82
```

```
Continent      North America    Oceania  
1970 Population    7885865.15  846968.26  
1980 Population    9207334.03  996532.17  
1990 Population   10531660.62 1162774.87  
2000 Population   12151739.60 1357512.09  
2010 Population   13568016.28 1613163.65  
2015 Population   14259596.25 1756664.48  
2020 Population   14855914.82 1910148.96  
2022 Population   15007403.40 2046386.32
```

```
[136]: df3.plot()
```

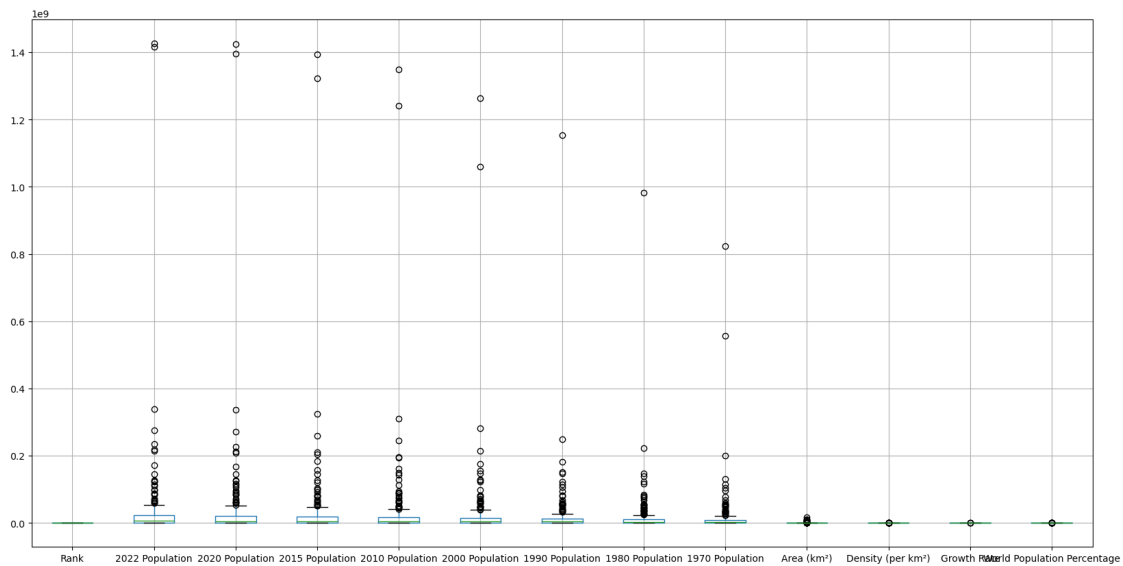
```
[136]: <Axes: >
```



Boxplot for outliers

```
[138]: df.boxplot(figsize=(20,10))
```

```
[138]: <Axes: >
```



Datatypes of Columns

```
[142]: df.select_dtypes(include='float')
```

```
[142]:
```

	2022 Population	2020 Population	2015 Population	2010 Population	\
0	41128771.00	38972230.00	33753499.00	28189672.00	
1	2842321.00	2866849.00	2882481.00	2913399.00	
2	44903225.00	43451666.00	39543154.00	35856344.00	
3	44273.00	46189.00	51368.00	54849.00	
4	79824.00	77700.00	71746.00	71519.00	
..	
229	11572.00	11655.00	12182.00	13142.00	
230	575986.00	556048.00	491824.00	413296.00	
231	33696614.00	32284046.00	28516545.00	24743946.00	
232	20017675.00	18927715.00	NaN	13792086.00	
233	16320537.00	15669666.00	14154937.00	12839771.00	
	2000 Population	1990 Population	1980 Population	1970 Population	\
0	19542982.00	10694796.00	12486631.00	10752971.00	
1	3182021.00	3295066.00	2941651.00	2324731.00	
2	30774621.00	25518074.00	18739378.00	13795915.00	
3	58230.00	47818.00	32886.00	27075.00	
4	66097.00	53569.00	35611.00	19860.00	
..	
229	14723.00	13454.00	11315.00	9377.00	

230	270375.00	178529.00	116775.00	76371.00
231	18628700.00	13375121.00	9204938.00	6843607.00
232	9891136.00	7686401.00	5720438.00	4281671.00
233	11834676.00	10113893.00	7049926.00	5202918.00

	Area (km ²)	Density (per km ²)	Growth Rate	World Population Percentage
0	652230.00	63.06	1.03	0.52
1	28748.00	98.87	1.00	0.04
2	2381741.00	18.85	1.02	0.56
3	199.00	222.48	0.98	0.00
4	468.00	170.56	1.01	0.00
..
229	142.00	81.49	1.00	0.00
230	266000.00	2.17	1.02	0.01
231	527968.00	63.82	1.02	0.42
232	752612.00	26.60	1.03	0.25
233	390757.00	41.77	1.02	0.20

[234 rows x 12 columns]