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December 14, 2023

Task-01

Create a bar chart or histogram to visualize the distribution of a categorical or continuous variable, such as the distribution of ages or genders in a population.

Sample Dataset :- https://data.worldbank.org/indicator/SP.POP.TOTL

Import Libraries

[1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

[2]:
```
from google.colab import files
raw = files.upload()
```

```
<IPython.core.display.HTML object>
```

```
Saving world-bank-data.csv to world-bank-data.csv
```

[3]:
```
data = pd.read_csv("world-bank-data.csv")
```

[4]:
```
#shallow copy
df = data.copy()
```

EDA

[5]:
```
df.shape
```

[5]:
```
(266, 67)
```

[6]:
```
df.head()
```

[6]:
```
                  Country Name Country Code     Indicator Name Indicator Code  \
0                        Aruba          ABW  Population, total    SP.POP.TOTL
1  Africa Eastern and Southern          AFE  Population, total    SP.POP.TOTL
2                  Afghanistan          AFG  Population, total    SP.POP.TOTL
3   Africa Western and Central          AFW  Population, total    SP.POP.TOTL
4                       Angola          AGO  Population, total    SP.POP.TOTL
```

```
          1960         1961         1962         1963         1964  \
0      54608.0      55811.0      56682.0      57475.0      58178.0
1  130692579.0  134169237.0  137835590.0  141630546.0  145605995.0
2    8622466.0    8790140.0    8969047.0    9157465.0    9355514.0
3   97256290.0   99314028.0  101445032.0  103667517.0  105959979.0
4    5357195.0    5441333.0    5521400.0    5599827.0    5673199.0

          1965  …         2013         2014         2015         2016  \
0      58782.0  …     102880.0     103594.0     104257.0     104874.0
1  149742351.0  …  567892149.0  583651101.0  600008424.0  616377605.0
2    9565147.0  …   31541209.0   32716210.0   33753499.0   34636207.0
3  108336203.0  …  387204553.0  397855507.0  408690375.0  419778384.0
4    5736582.0  …   26147002.0   27128337.0   28127721.0   29154746.0

          2017         2018         2019         2020         2021  \
0     105439.0     105962.0     106442.0     106585.0     106537.0
1  632746570.0  649757148.0  667242986.0  685112979.0  702977106.0
2   35643418.0   36686784.0   37769499.0   38972230.0   40099462.0
3  431138704.0  442646825.0  454306063.0  466189102.0  478185907.0
4   30208628.0   31273533.0   32353588.0   33428486.0   34503774.0

          2022
0     106445.0
1  720839314.0
2   41128771.0
3  490330870.0
4   35588987.0

[5 rows x 67 columns]
```

[7]:
```
df.tail()
```

[7]:
```
    Country Name Country Code     Indicator Name Indicator Code        1960  \
261       Kosovo          XKX  Population, total    SP.POP.TOTL    947000.0
262  Yemen, Rep.          YEM  Population, total    SP.POP.TOTL   5542459.0
263 South Africa          ZAF  Population, total    SP.POP.TOTL  16520441.0
264       Zambia          ZMB  Population, total    SP.POP.TOTL   3119430.0
265     Zimbabwe          ZWE  Population, total    SP.POP.TOTL   3806310.0

           1961        1962        1963        1964        1965  …  \
261    966000.0    994000.0   1022000.0   1050000.0   1078000.0  …
262   5646668.0   5753386.0   5860197.0   5973803.0   6097298.0  …
263  16989464.0  17503133.0  18042215.0  18603097.0  19187194.0  …
264   3219451.0   3323427.0   3431381.0   3542764.0   3658024.0  …
265   3925952.0   4049778.0   4177931.0   4310332.0   4447149.0  …

           2013        2014        2015        2016        2017        2018  \
261   1818117.0   1812771.0   1788196.0   1777557.0   1791003.0   1797085.0
262  26984002.0  27753304.0  28516545.0  29274002.0  30034389.0  30790513.0
263  53873616.0  54729551.0  55876504.0  56422274.0  56641209.0  57339635.0
264  15234976.0  15737793.0  16248230.0  16767761.0  17298054.0  17835893.0
265  13555422.0  13855753.0  14154937.0  14452704.0  14751101.0  15052184.0

           2019        2020        2021        2022
261   1788878.0   1790133.0   1786038.0   1761985.0
262  31546691.0  32284046.0  32981641.0  33696614.0
263  58087055.0  58801927.0  59392255.0  59893885.0
264  18380477.0  18927715.0  19473125.0  20017675.0
265  15354608.0  15669666.0  15993524.0  16320537.0

[5 rows x 67 columns]
```

[8]:
```
df.columns
```

[8]:
```
Index(['Country Name', 'Country Code', 'Indicator Name', 'Indicator Code',
       '1960', '1961', '1962', '1963', '1964', '1965', '1966', '1967', '1968',
       '1969', '1970', '1971', '1972', '1973', '1974', '1975', '1976', '1977',
       '1978', '1979', '1980', '1981', '1982', '1983', '1984', '1985', '1986',
       '1987', '1988', '1989', '1990', '1991', '1992', '1993', '1994', '1995',
       '1996', '1997', '1998', '1999', '2000', '2001', '2002', '2003', '2004',
       '2005', '2006', '2007', '2008', '2009', '2010', '2011', '2012', '2013',
       '2014', '2015', '2016', '2017', '2018', '2019', '2020', '2021', '2022'],
      dtype='object')
```

[9]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 266 entries, 0 to 265
Data columns (total 67 columns):
 #   Column          Non-Null Count  Dtype
---  ------          --------------  -----
 0   Country Name    266 non-null    object
 1   Country Code    266 non-null    object
 2   Indicator Name  266 non-null    object
 3   Indicator Code  266 non-null    object
 4   1960            264 non-null    float64
 5   1961            264 non-null    float64
 6   1962            264 non-null    float64
 7   1963            264 non-null    float64
 8   1964            264 non-null    float64
 9   1965            264 non-null    float64
 10  1966            264 non-null    float64
 11  1967            264 non-null    float64
 12  1968            264 non-null    float64
 13  1969            264 non-null    float64
 14  1970            264 non-null    float64
 15  1971            264 non-null    float64
 16  1972            264 non-null    float64
 17  1973            264 non-null    float64
 18  1974            264 non-null    float64
 19  1975            264 non-null    float64
 20  1976            264 non-null    float64
 21  1977            264 non-null    float64
 22  1978            264 non-null    float64
 23  1979            264 non-null    float64
 24  1980            264 non-null    float64
 25  1981            264 non-null    float64
 26  1982            264 non-null    float64
 27  1983            264 non-null    float64
 28  1984            264 non-null    float64
 29  1985            264 non-null    float64
 30  1986            264 non-null    float64
 31  1987            264 non-null    float64
 32  1988            264 non-null    float64
 33  1989            264 non-null    float64
 34  1990            265 non-null    float64
 35  1991            265 non-null    float64
 36  1992            265 non-null    float64
 37  1993            265 non-null    float64
 38  1994            265 non-null    float64
 39  1995            265 non-null    float64
 40  1996            265 non-null    float64
 41  1997            265 non-null    float64
 42  1998            265 non-null    float64
 43  1999            265 non-null    float64
 44  2000            265 non-null    float64
 45  2001            265 non-null    float64
 46  2002            265 non-null    float64
 47  2003            265 non-null    float64
 48  2004            265 non-null    float64
 49  2005            265 non-null    float64
 50  2006            265 non-null    float64
 51  2007            265 non-null    float64
 52  2008            265 non-null    float64
 53  2009            265 non-null    float64
 54  2010            265 non-null    float64
 55  2011            265 non-null    float64
 56  2012            265 non-null    float64
 57  2013            265 non-null    float64
 58  2014            265 non-null    float64
 59  2015            265 non-null    float64
 60  2016            265 non-null    float64
 61   2017            265 non-null    float64
 62   2018            265 non-null    float64
 63   2019            265 non-null    float64
 64   2020            265 non-null    float64
 65   2021            265 non-null    float64
 66   2022            265 non-null    float64
dtypes: float64(63), object(4)
memory usage: 139.4+ KB
```

[10]:
```
# specific rows of a DataFrame ( "integer location" Method)
df.iloc[100:200]
```

[10]:
```
                     Country Name Country Code     Indicator Name  \
100                         Haiti          HTI  Population, total
101                       Hungary          HUN  Population, total
102                     IBRD only          IBD  Population, total
103                 IDA & IBRD total          IBT  Population, total
104                     IDA total          IDA  Population, total
..                            …          …                …
195                      Paraguay          PRY  Population, total
196            West Bank and Gaza          PSE  Population, total
197   Pacific island small states          PSS  Population, total
198     Post-demographic dividend          PST  Population, total
199              French Polynesia          PYF  Population, total

    Indicator Code          1960          1961          1962          1963  \
100    SP.POP.TOTL  3.901139e+06  3.974934e+06  4.049504e+06  4.122260e+06
101    SP.POP.TOTL  9.983967e+06  1.002932e+07  1.006173e+07  1.008795e+07
102    SP.POP.TOTL  1.904347e+09  1.926043e+09  1.960606e+09  2.007061e+09
103    SP.POP.TOTL  2.297972e+09  2.329504e+09  2.374276e+09  2.431314e+09
104    SP.POP.TOTL  3.936256e+08  4.034613e+08  4.136700e+08  4.242533e+08
..             …           …           …           …           …
195    SP.POP.TOTL  1.894829e+06  1.941208e+06  1.989376e+06  2.039390e+06
196    SP.POP.TOTL           NaN           NaN           NaN           NaN
197    SP.POP.TOTL  9.055370e+05  9.325200e+05  9.602580e+05  9.887670e+05
198    SP.POP.TOTL  7.555751e+08  7.646789e+08  7.739717e+08  7.830631e+08
199    SP.POP.TOTL  8.485100e+04  8.692100e+04  8.920800e+04  9.196300e+04

             1964          1965  …          2013          2014  \
100  4.196349e+06  4.274348e+06  …  1.026121e+07  1.041274e+07
101  1.011984e+07  1.014794e+07  …  9.893082e+06  9.866468e+06
102  2.053555e+09  2.100537e+09  …  4.568406e+09  4.617515e+09
103  2.488809e+09  2.547220e+09  …  6.079930e+09  6.161220e+09
104  4.352541e+08  4.466833e+08  …  1.511524e+09  1.543705e+09
..           …           … …           …           …
195  2.090840e+06  2.143153e+06  …  6.005652e+06  6.090721e+06
196           NaN           NaN  …  4.076708e+06  4.173398e+06
```

```
197  1.017629e+06  1.046929e+06  …  2.379069e+06  2.405308e+06
198  7.920609e+08  8.008346e+08  …  1.087231e+09  1.092180e+09
199  9.519200e+04  9.867400e+04  …  2.880320e+05  2.898730e+05

             2015          2016          2017          2018          2019  \
100  1.056376e+07  1.071385e+07  1.086354e+07  1.101242e+07  1.116044e+07
101  9.843028e+06  9.814023e+06  9.787966e+06  9.775564e+06  9.771141e+06
102  4.665081e+09  4.710746e+09  4.755029e+09  4.795958e+09  4.833831e+09
103  6.241659e+09  6.321547e+09  6.401430e+09  6.479098e+09  6.554881e+09
104  1.576578e+09  1.610801e+09  1.646401e+09  1.683140e+09  1.721049e+09
..            …             …             …             …             …
195  6.177950e+06  6.266615e+06  6.355404e+06  6.443328e+06  6.530026e+06
196  4.270092e+06  4.367088e+06  4.454805e+06  4.569087e+06  4.685306e+06
197  2.431426e+06  2.457814e+06  2.484263e+06  2.510226e+06  2.536070e+06
198  1.097061e+09  1.102020e+09  1.106215e+09  1.110127e+09  1.113311e+09
199  2.917870e+05  2.935410e+05  2.954500e+05  2.976060e+05  2.997170e+05

             2020          2021          2022
100  1.130680e+07  1.144757e+07  1.158500e+07
101  9.750149e+06  9.709891e+06  9.683505e+06
102  4.867842e+09  4.895307e+09  4.914355e+09
103  6.628068e+09  6.695340e+09  6.754327e+09
104  1.760226e+09  1.800033e+09  1.839971e+09
..            …             …             …
195  6.618695e+06  6.703799e+06  6.780744e+06
196  4.803269e+06  4.922749e+06  5.043612e+06
197  2.566819e+06  2.602173e+06  2.639019e+06
198  1.117424e+09  1.116545e+09  1.113419e+09
199  3.019200e+05  3.040320e+05  3.062790e+05

[100 rows x 67 columns]
```

```
[11]: df.describe().T
```

```
[11]:       count          mean           std      min         25%         50%  \
      1960  264.0  1.172712e+08  3.695439e+08   2646.0   513221.25   3757485.5
      1961  264.0  1.188807e+08  3.740897e+08   2888.0   523134.50   3887144.0
      1962  264.0  1.210511e+08  3.808061e+08   3171.0   533759.50   4023895.5
      1963  264.0  1.237333e+08  3.895039e+08   3481.0   544928.75   4139356.5
      1964  264.0  1.264378e+08  3.982439e+08   3811.0   556663.00   4224612.5
      …       …             …             …        …           …           …
      2018  265.0  3.120276e+08  9.746880e+08  10865.0  1797085.00  10395329.0
      2019  265.0  3.157110e+08  9.851690e+08  10956.0  1788878.00  10447666.0
      2020  265.0  3.192936e+08  9.952294e+08  11069.0  1790133.00  10606227.0
      2021  265.0  3.225180e+08  1.004211e+09  11204.0  1786038.00  10505772.0
      2022  265.0  3.254839e+08  1.012174e+09  11312.0  1761985.00  10526073.0
```

```
                75%           max
1960  26706062.75  3.031474e+09
1961  27486939.00  3.072422e+09
1962  28302886.00  3.126850e+09
1963  29147077.00  3.193429e+09
1964  30016841.75  3.260442e+09
…             …             …
2018  60421760.00  7.661777e+09
2019  59872579.00  7.742682e+09
2020  61704518.00  7.820964e+09
2021  63588334.00  7.888161e+09
2022  65497748.00  7.951150e+09

[63 rows x 8 columns]
```

DATA CLEANING

[12]:
```
pd.set_option('display.max_rows', None)
```

[13]:
```
# To check for duplicate values in a DataFrame
df.duplicated().sum()
```

[13]:
```
0
```

[14]:
```
df.isnull().sum().sort_values(ascending=False)
```

[14]:
```
1989                  2
1973                  2
1988                  2
1987                  2
1986                  2
1985                  2
1984                  2
1983                  2
1982                  2
1981                  2
1979                  2
1978                  2
1977                  2
1976                  2
1975                  2
1974                  2
1980                  2
1972                  2
1965                  2
1971                  2
1960                  2
```

```
1961              2
1962              2
1964              2
1963              2
1966              2
1967              2
1968              2
1969              2
1970              2
2006              1
2013              1
2007              1
2008              1
2009              1
2010              1
2011              1
2012              1
2021              1
2014              1
2015              1
2016              1
2017              1
2018              1
2019              1
2020              1
2004              1
2005              1
2022              1
2003              1
1995              1
1990              1
1991              1
1992              1
1993              1
2002              1
1994              1
1996              1
1997              1
1998              1
1999              1
2000              1
2001              1
Country Code      0
Indicator Code    0
Indicator Name    0
Country Name      0
dtype: int64
```

```
[15]: # Missing value percentage calculator
      df.isnull().sum()/df.shape[0]*100
```

```
[15]: Country Name      0.00000
      Country Code      0.00000
      Indicator Name    0.00000
      Indicator Code    0.00000
      1960              0.75188
      1961              0.75188
      1962              0.75188
      1963              0.75188
      1964              0.75188
      1965              0.75188
      1966              0.75188
      1967              0.75188
      1968              0.75188
      1969              0.75188
      1970              0.75188
      1971              0.75188
      1972              0.75188
      1973              0.75188
      1974              0.75188
      1975              0.75188
      1976              0.75188
      1977              0.75188
      1978              0.75188
      1979              0.75188
      1980              0.75188
      1981              0.75188
      1982              0.75188
      1983              0.75188
      1984              0.75188
      1985              0.75188
      1986              0.75188
      1987              0.75188
      1988              0.75188
      1989              0.75188
      1990              0.37594
      1991              0.37594
      1992              0.37594
      1993              0.37594
      1994              0.37594
      1995              0.37594
      1996              0.37594
      1997              0.37594
      1998              0.37594
      1999              0.37594
```

```
2000             0.37594
2001             0.37594
2002             0.37594
2003             0.37594
2004             0.37594
2005             0.37594
2006             0.37594
2007             0.37594
2008             0.37594
2009             0.37594
2010             0.37594
2011             0.37594
2012             0.37594
2013             0.37594
2014             0.37594
2015             0.37594
2016             0.37594
2017             0.37594
2018             0.37594
2019             0.37594
2020             0.37594
2021             0.37594
2022             0.37594
dtype: float64
```

[16]:
```
df.fillna(df.median(), inplace=True)
```

```
<ipython-input-16-e2cd313b306c>:1: FutureWarning: The default value of
numeric_only in DataFrame.median is deprecated. In a future version, it will
default to False. In addition, specifying 'numeric_only=None' is deprecated.
Select only valid columns or specify the value of numeric_only to silence this
warning.
  df.fillna(df.median(), inplace=True)
```

[17]:
```
df.isnull().sum().any()
```

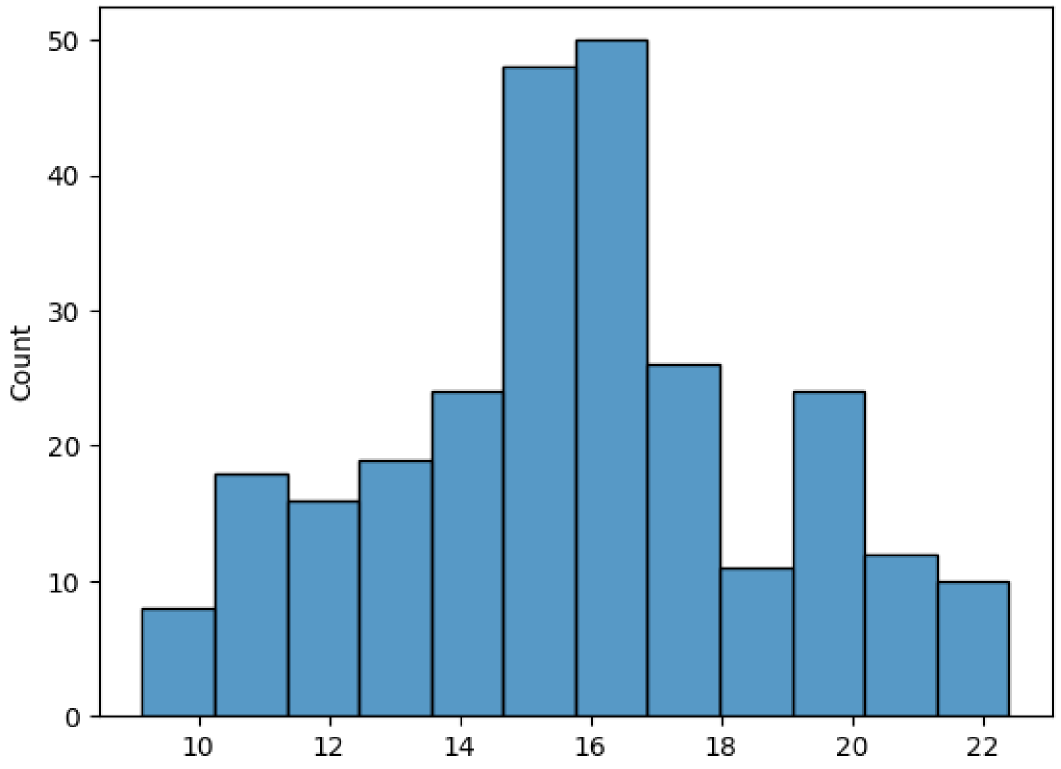
[17]:
```
False
```

Data Visualization-BoxPlot

[18]:
```
sns.histplot(np.log(df.median(axis=1)))
```

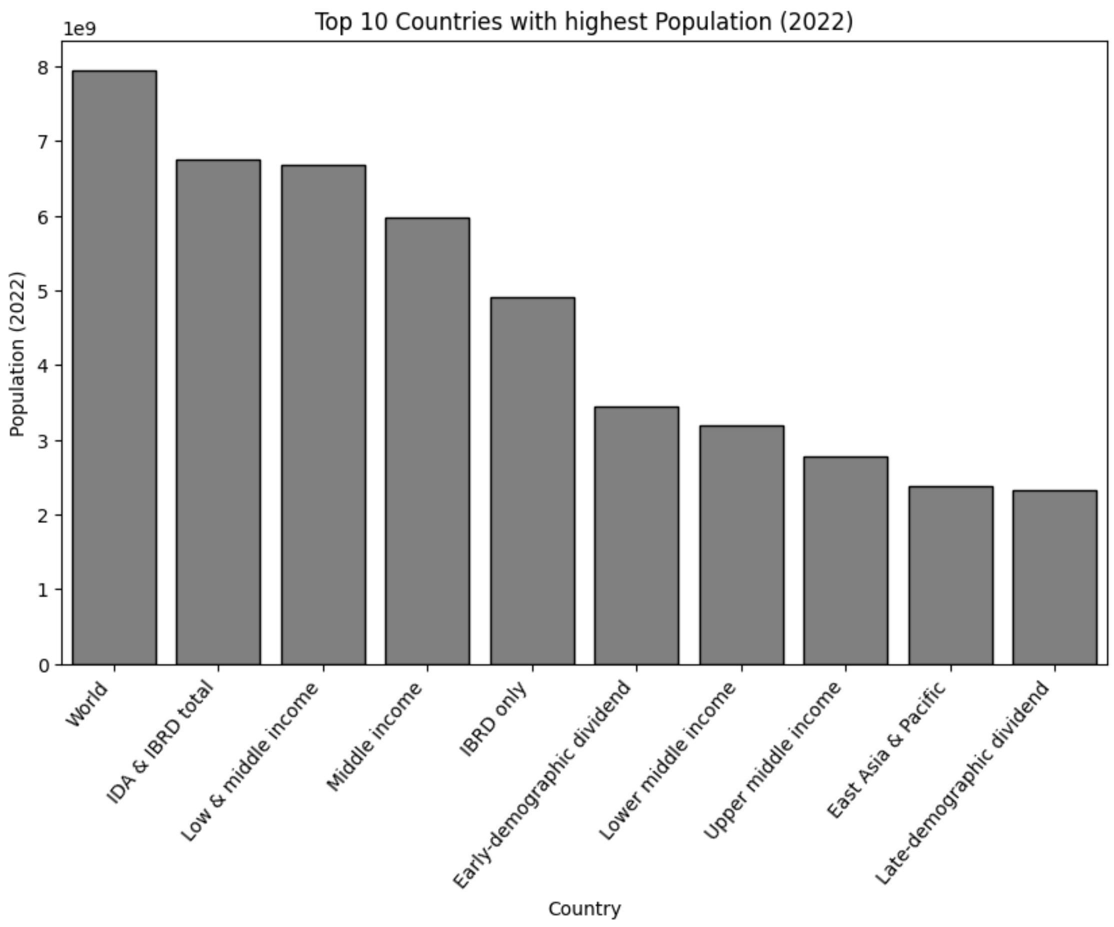
```
<ipython-input-18-1d11febd3f1e>:1: FutureWarning: Dropping of nuisance columns
in DataFrame reductions (with 'numeric_only=None') is deprecated; in a future
version this will raise TypeError.  Select only valid columns before calling the
reduction.
  sns.histplot(np.log(df.median(axis=1)))
```

```
[18]: <Axes: ylabel='Count'>
```

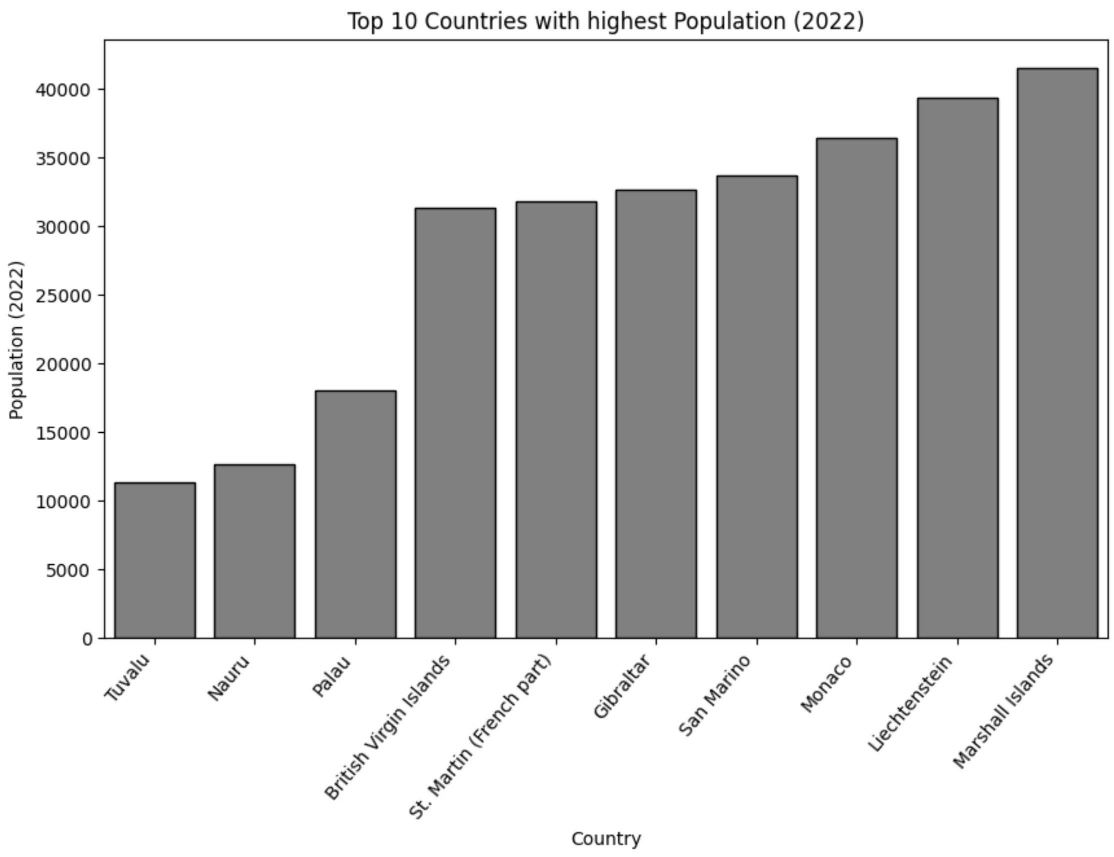


```
[19]: # Visualization - Function to plot top/bottom countries
      def plot_top_countries(df, column, ascending=True,color='grey',title=''):
        df_sort = df.sort_values(column, ascending=ascending).head(10)
        plt.figure(figsize=(10, 6))
        sns.barplot(x=df_sort['Country Name'],y=df_sort[column],␣
       ↪color=color,edgecolor='black')
        plt.xlabel('Country')
        plt.ylabel(f'Population ({column})')
        plt.title(title)
        plt.xticks(rotation=50, ha='right')
```

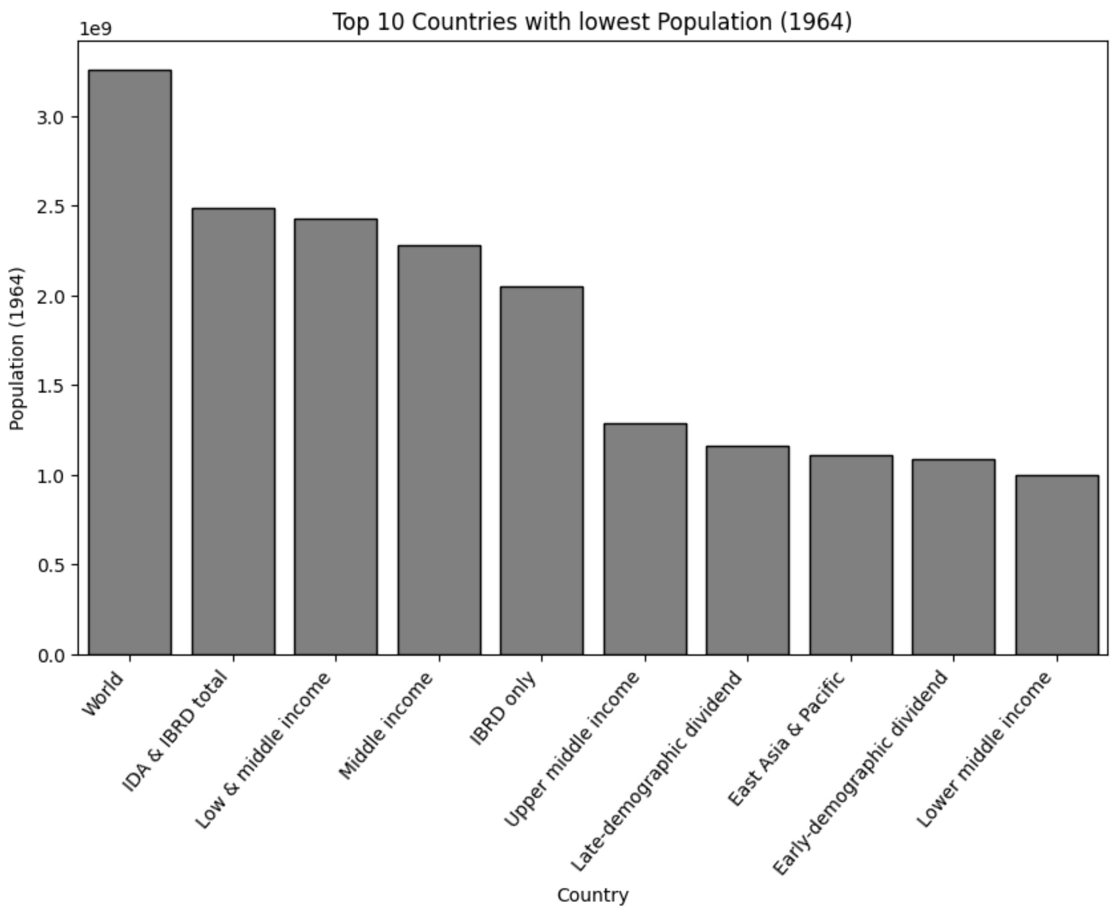
```
[20]: # Top 10 Countries with highest Population (2022)
      plot_top_countries(df,'2022',ascending=False,title='Top 10 Countries with␣
       ↪highest Population (2022)')
```



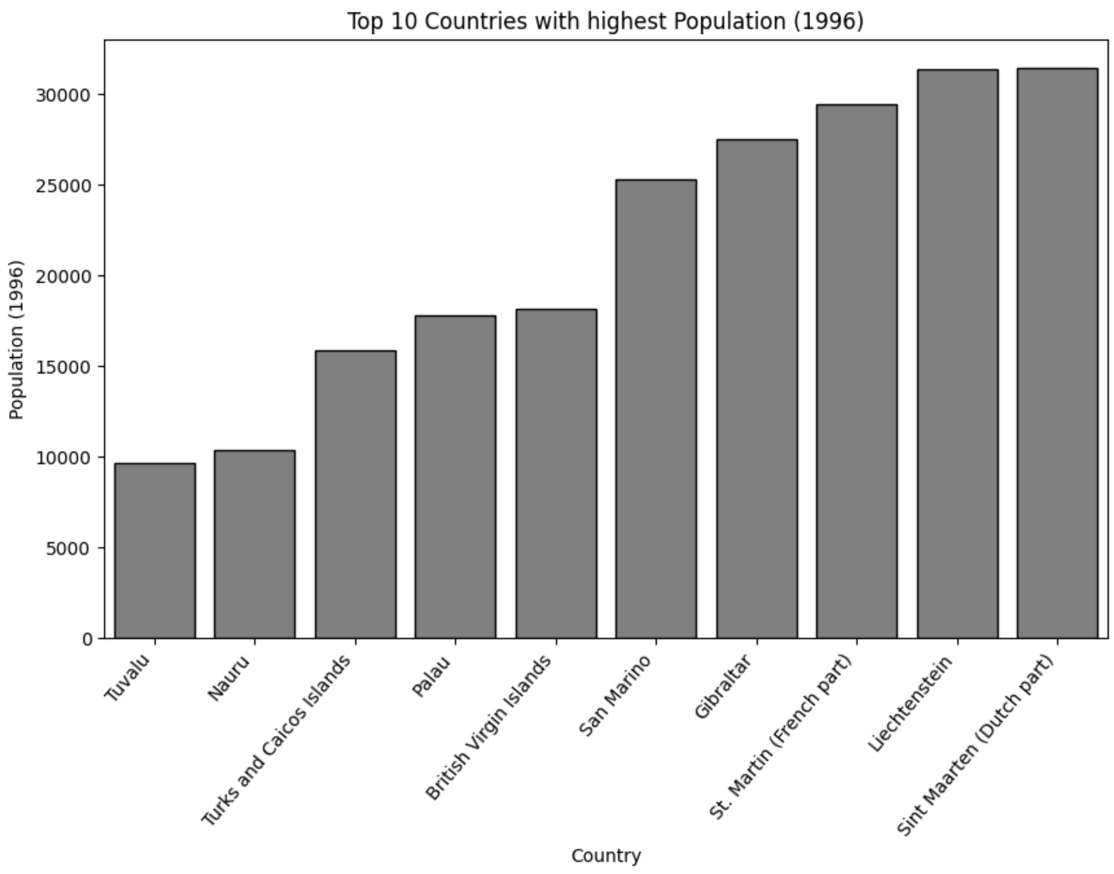
[21]:
```
# Top 10 Countries with highest Population (2022)
plot_top_countries(df,'2022',ascending=True,title='Top 10 Countries with␣
 ↪highest Population (2022)')
```



```
[22]: # Top 10 Countries with highest Population (2022)
      plot_top_countries(df,'1964',ascending=False,title='Top 10 Countries with␣
        ↪lowest Population (1964)')
```



[23]:
```
# Top 10 Countries with highest Population (2022)
plot_top_countries(df,'1996',ascending=True,title='Top 10 Countries with␣
↪highest Population (1996)')
```



Calculate the mean only for numerical columns along each row in a DataFrame, you can use the mean method

[24]:
```
row_avg =np.log(df.mean(axis=1))
country=df['Country Name'].to_list()
data={'Country Name':country,'mean (average)':row_avg}
df_avg=pd.DataFrame(data)
```

```
<ipython-input-24-94a15067acad>:1: FutureWarning: Dropping of nuisance columns
in DataFrame reductions (with 'numeric_only=None') is deprecated; in a future
version this will raise TypeError.  Select only valid columns before calling the
reduction.
  row_avg =np.log(df.mean(axis=1))
```

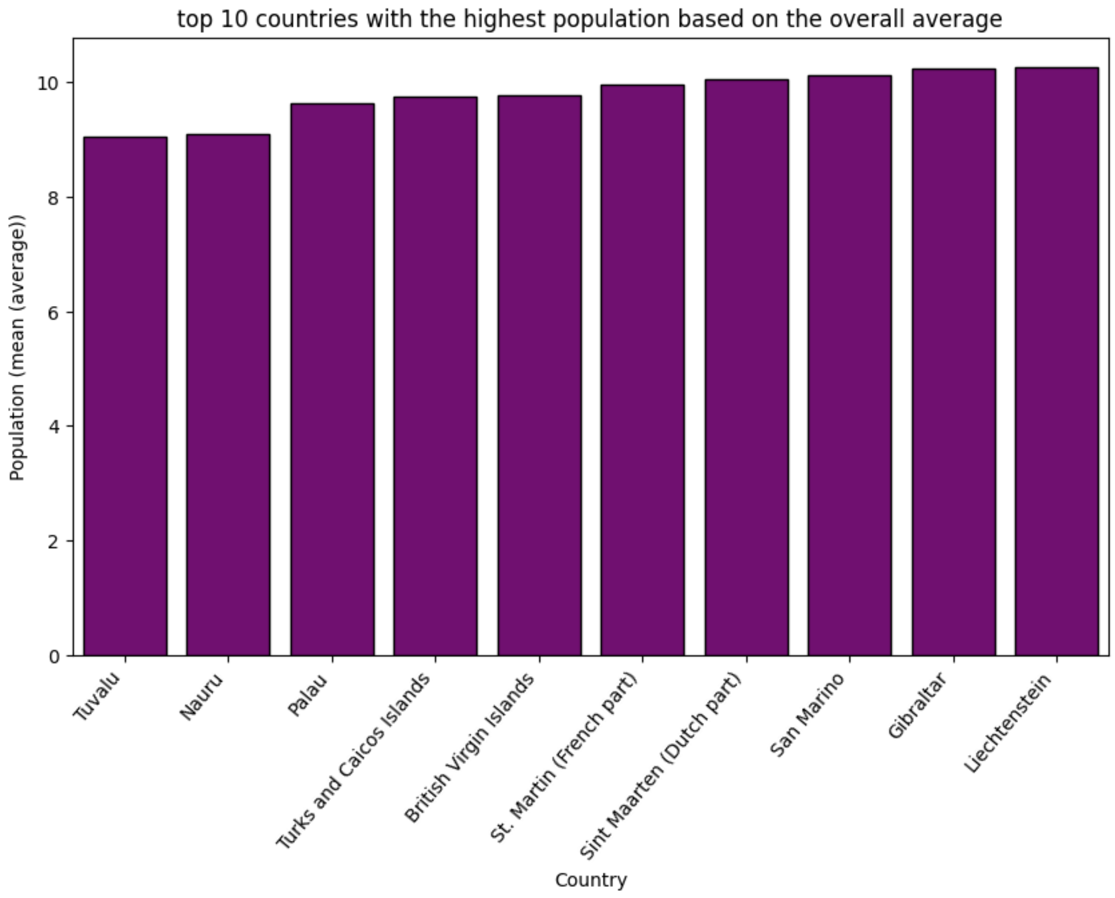
[25]:
```
pd.set_option('display.max_rows',30)
df_avg
```

[25]:
```
                   Country Name  mean (average)
0                         Aruba       11.257468
1   Africa Eastern and Southern       19.678914
```

```
2                      Afghanistan       16.728410
3      Africa Western and Central       19.295134
4                           Angola       16.513360
..                               …               …
261                         Kosovo       14.286503
262                   Yemen, Rep.       16.577622
263                   South Africa       17.468907
264                         Zambia       16.018880
265                       Zimbabwe       16.084263

[266 rows x 2 columns]
```

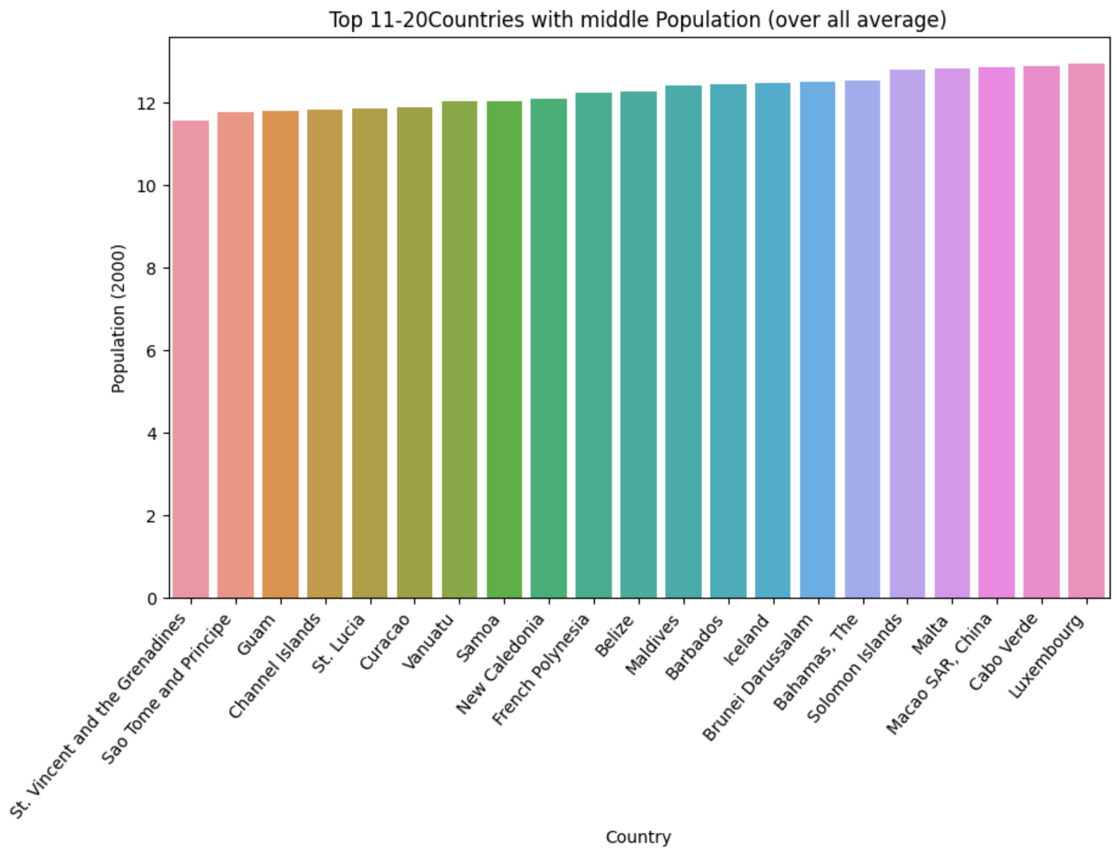
[26]:
```
# top 10 countries with the highest population based on the overall average
plot_top_countries(df_avg,'mean␣
↪(average)',ascending=True,color='Purple',title='top 10 countries with the␣
↪highest population based on the overall average')
```



[27]:
```
# top 30-50 countries with the middle population based on the overall average
df_avg1=df_avg.sort_values('mean (average)',ascending=True).iloc[30:51]
```

```
plt.figure(figsize=(10, 6))
sns.barplot(x=df_avg1['Country Name'],y=df_avg1['mean (average)'])
plt.xlabel('Country')
plt.ylabel('Population (2000)')
plt.title('Top 11-20Countries with middle Population (over all average)')
plt.xticks(rotation=50, ha='right')
```

```
[27]: (array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14, 15, 16,
              17, 18, 19, 20]),
       [Text(0, 0, 'St. Vincent and the Grenadines'),
        Text(1, 0, 'Sao Tome and Principe'),
        Text(2, 0, 'Guam'),
        Text(3, 0, 'Channel Islands'),
        Text(4, 0, 'St. Lucia'),
        Text(5, 0, 'Curacao'),
        Text(6, 0, 'Vanuatu'),
        Text(7, 0, 'Samoa'),
        Text(8, 0, 'New Caledonia'),
        Text(9, 0, 'French Polynesia'),
        Text(10, 0, 'Belize'),
        Text(11, 0, 'Maldives'),
        Text(12, 0, 'Barbados'),
        Text(13, 0, 'Iceland'),
        Text(14, 0, 'Brunei Darussalam'),
        Text(15, 0, 'Bahamas, The'),
        Text(16, 0, 'Solomon Islands'),
        Text(17, 0, 'Malta'),
        Text(18, 0, 'Macao SAR, China'),
        Text(19, 0, 'Cabo Verde'),
        Text(20, 0, 'Luxembourg')])
```

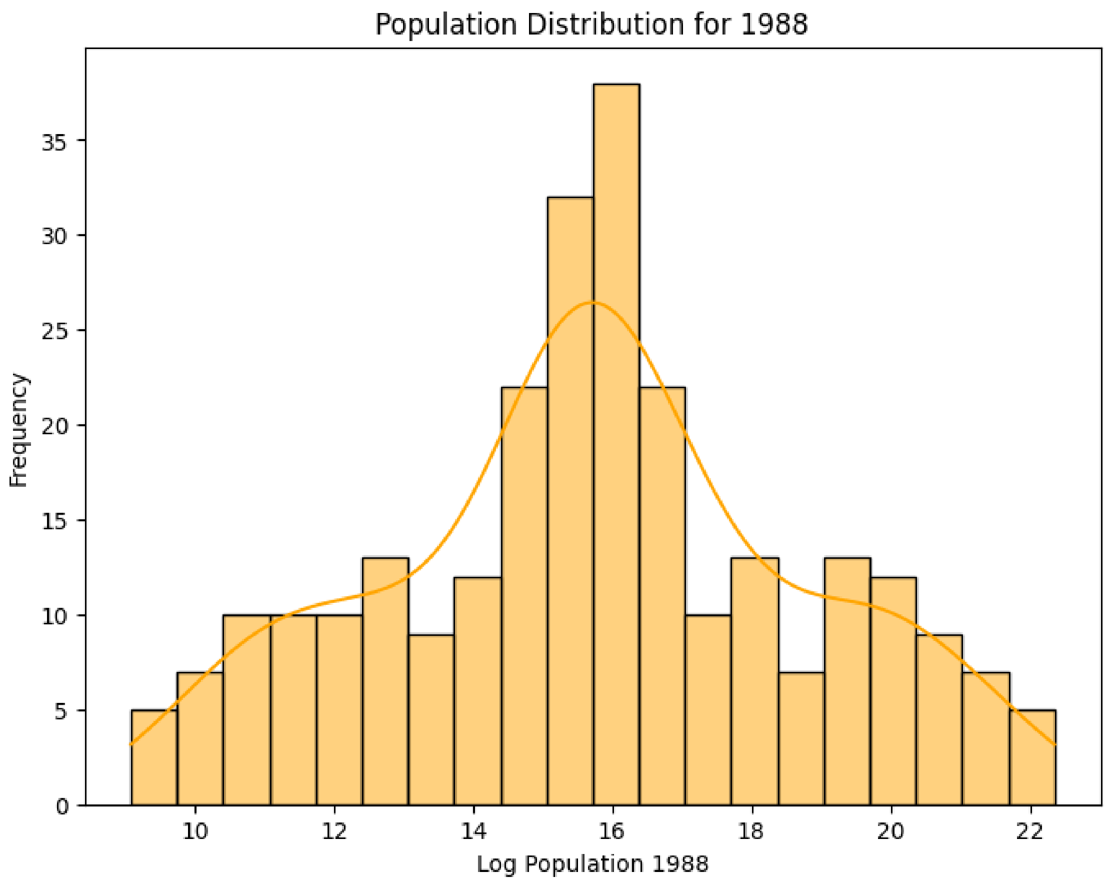


[28]:
```
df.iloc[6]
```

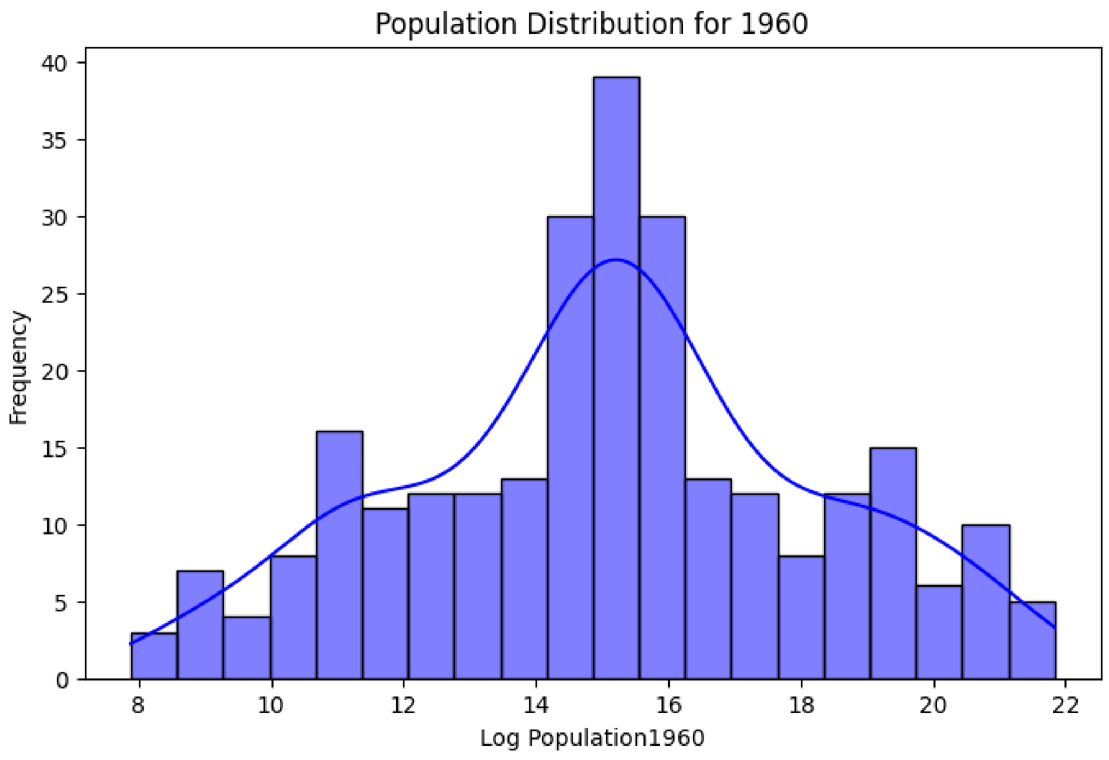
[28]:
```
Country Name                Andorra
Country Code                    AND
Indicator Name    Population, total
Indicator Code          SP.POP.TOTL
1960                         9443.0
                          …
2018                        75013.0
2019                        76343.0
2020                        77700.0
2021                        79034.0
2022                        79824.0
Name: 6, Length: 67, dtype: object
```

Visualization - Histogram

[29]:
```
plt.figure(figsize=(8,6))
sns.histplot(np.log(df['1988']),bins=20,kde=True,color='Orange')
plt.title(f'Population Distribution for 1988')
plt.xlabel(f'Log Population 1988')
plt.ylabel('Frequency')
plt.show()
```



[30]:
```
for i in df.columns[4:]:
  plt.figure(figsize=(8,5))
  sns.histplot(np.log(df[i]),bins=20,kde=True,color='blue')
  plt.title(f'Population Distribution for {i}')
  plt.xlabel(f'Log Population{i}')
  plt.ylabel('Frequency')
  plt.show()
```


Population Distribution for 1960
Frequency
Log Population1960
0
5
10
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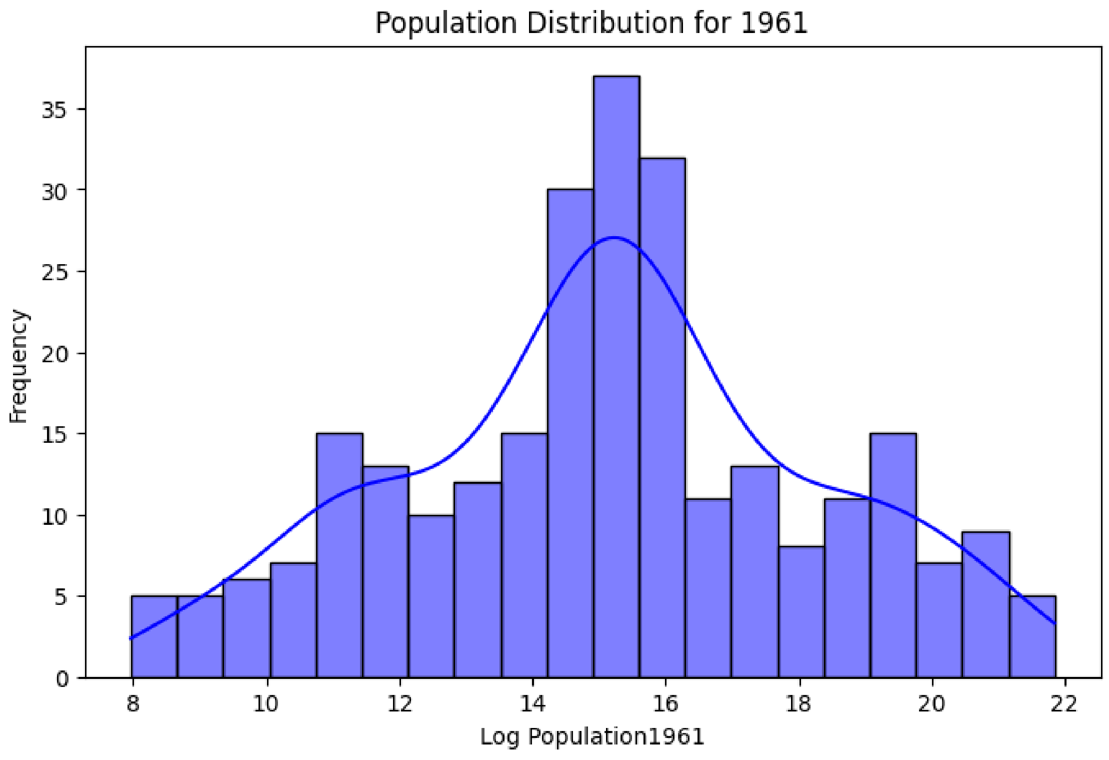
Population Distribution for 1961
Frequency
Log Population1961
0
5
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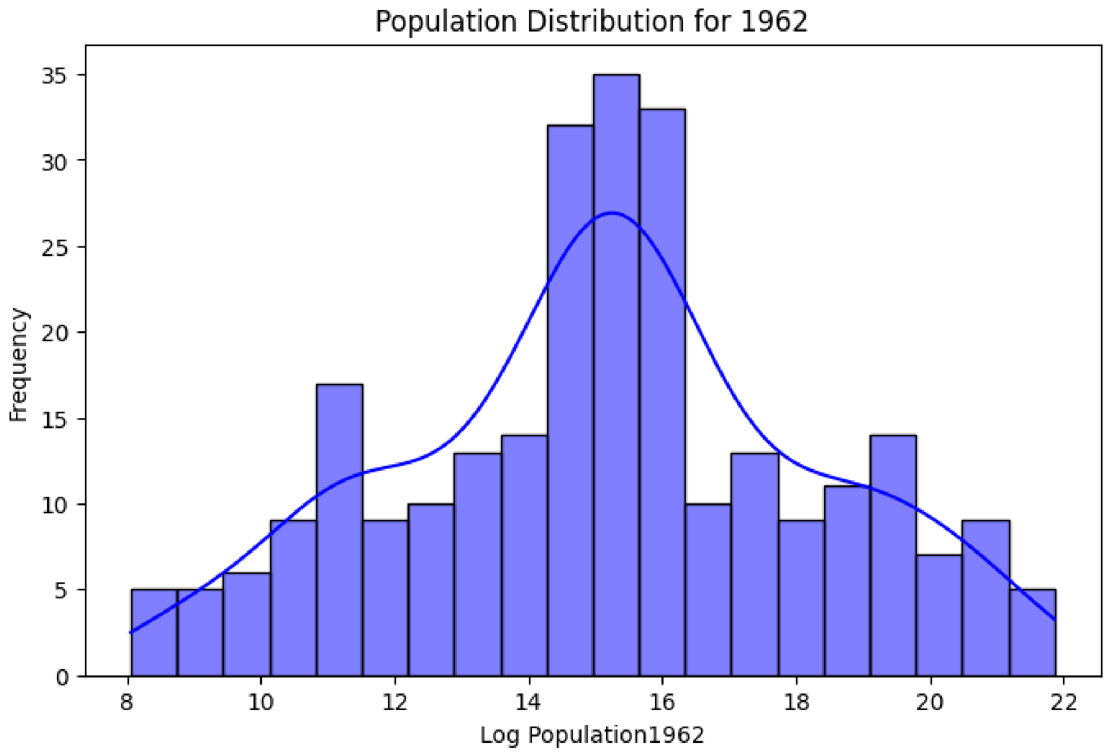
Population Distribution for 1962
Frequency
Log Population1962
0
5
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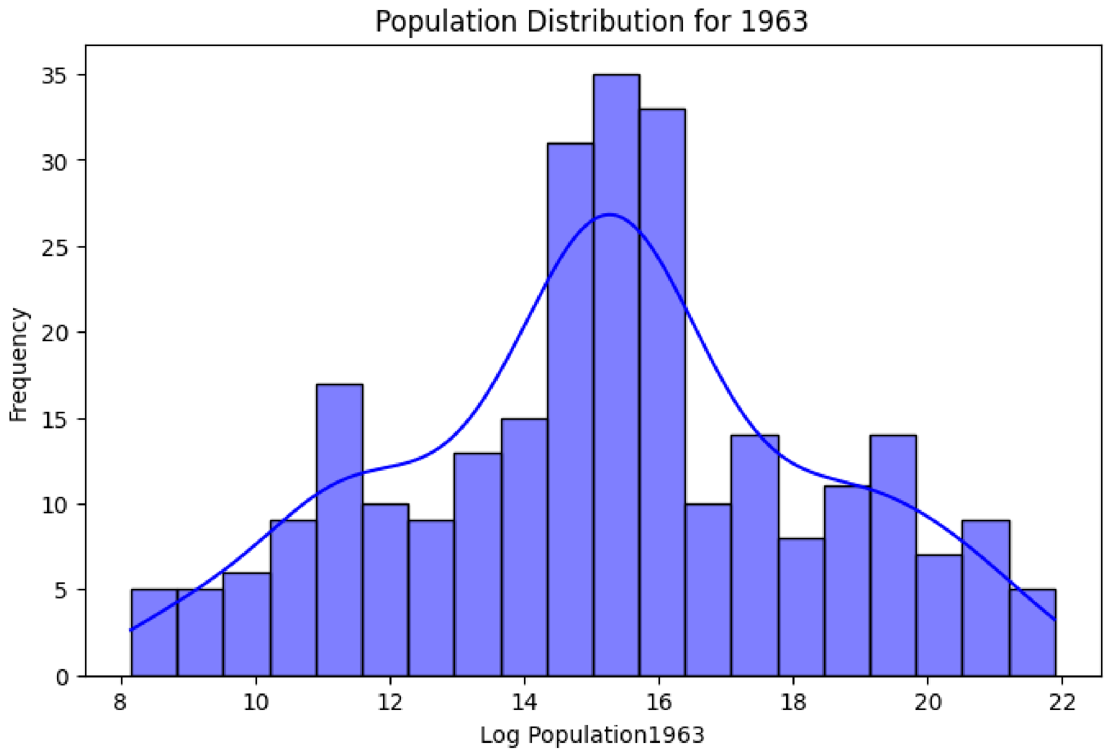
Population Distribution for 1963
Frequency
Log Population1963
0
5
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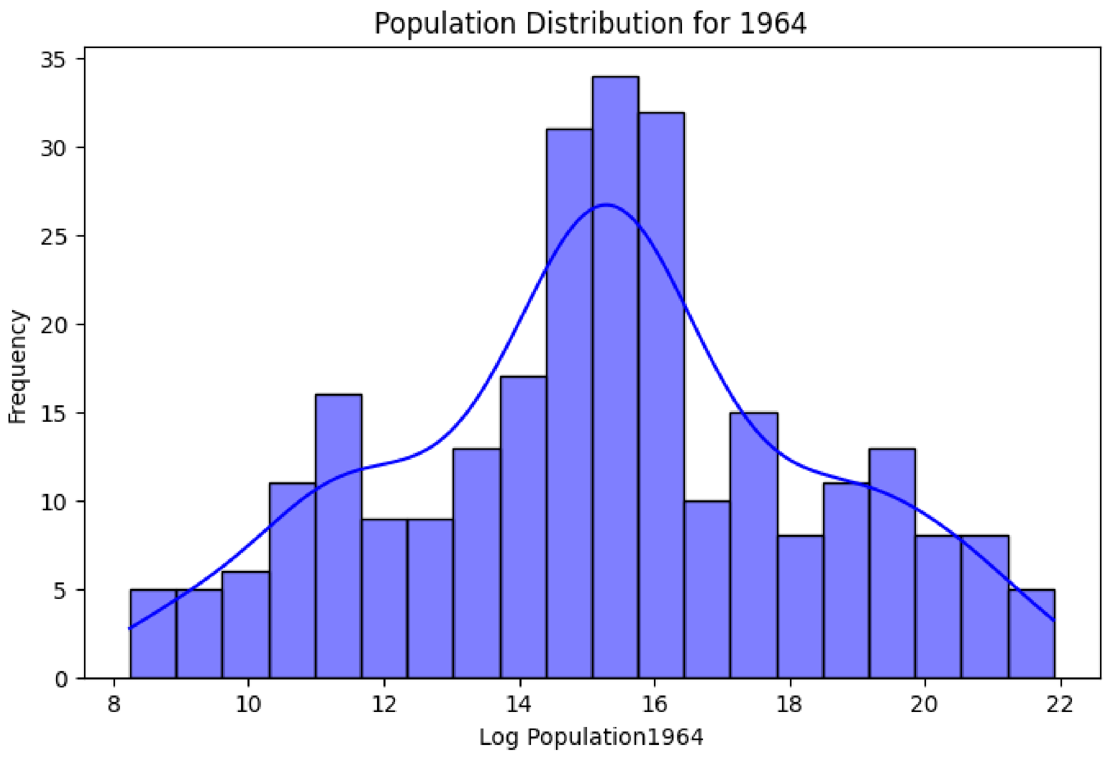
Population Distribution for 1964
Frequency
Log Population1964
0
5
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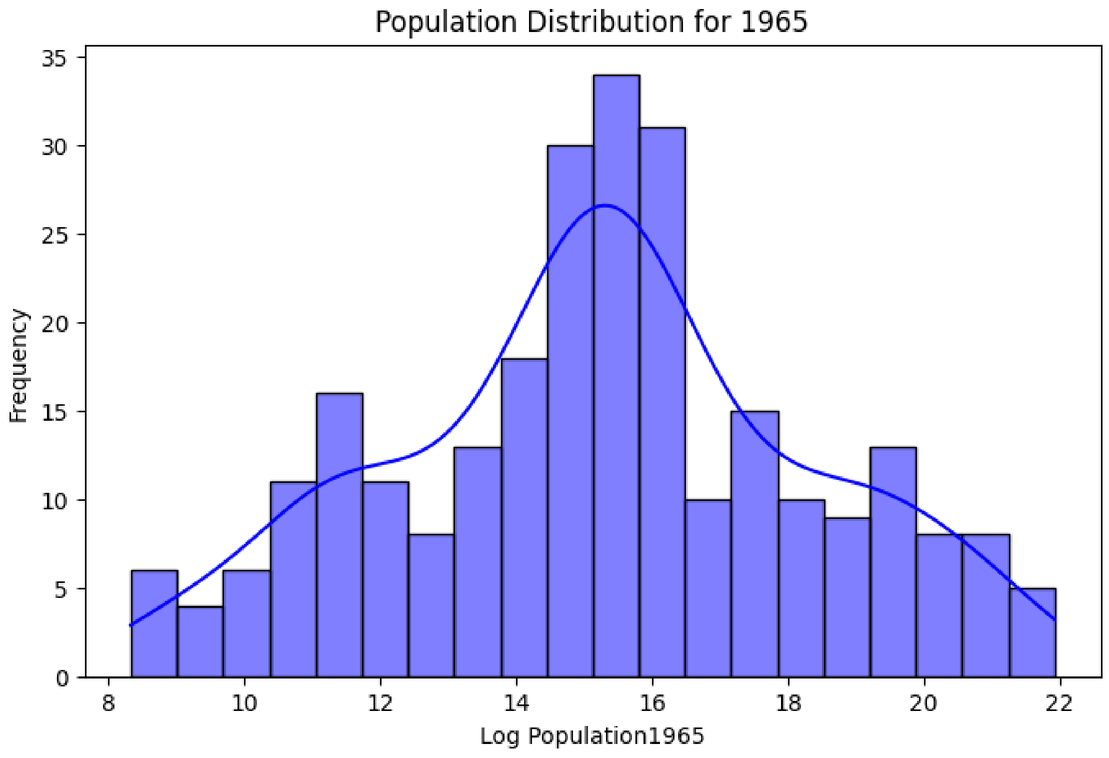
Population Distribution for 1965
Frequency
Log Population1965
0
5
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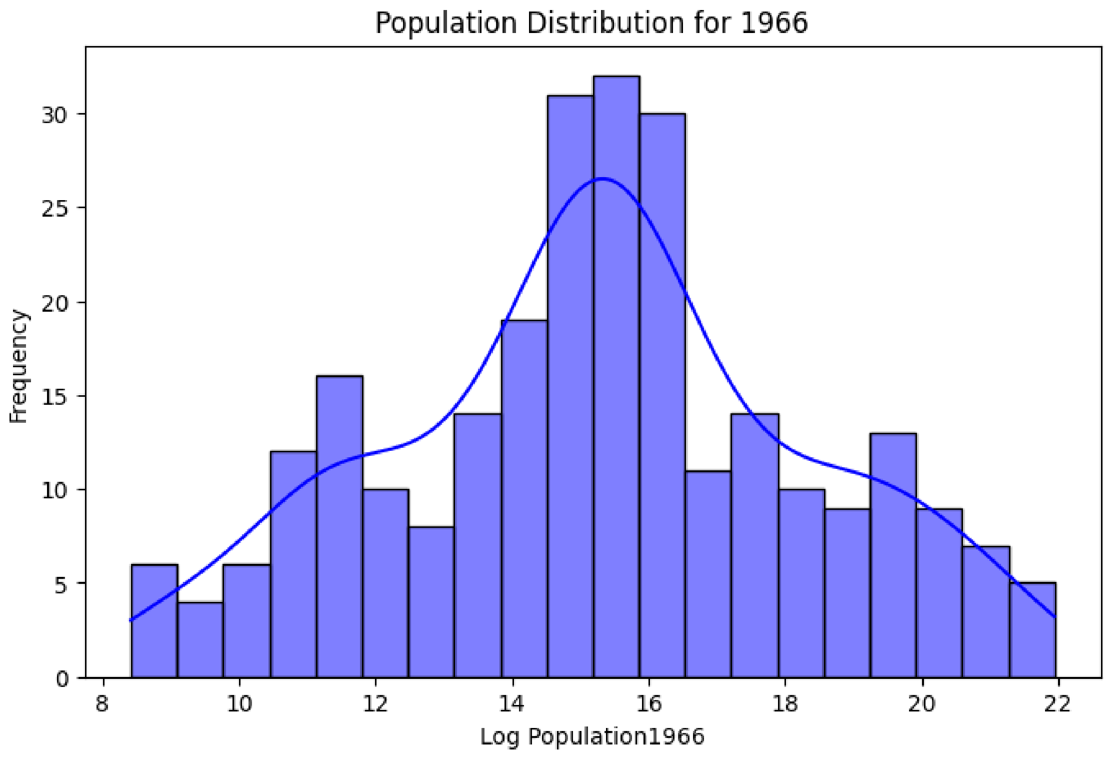
Population Distribution for 1966
Frequency
Log Population1966
0
5
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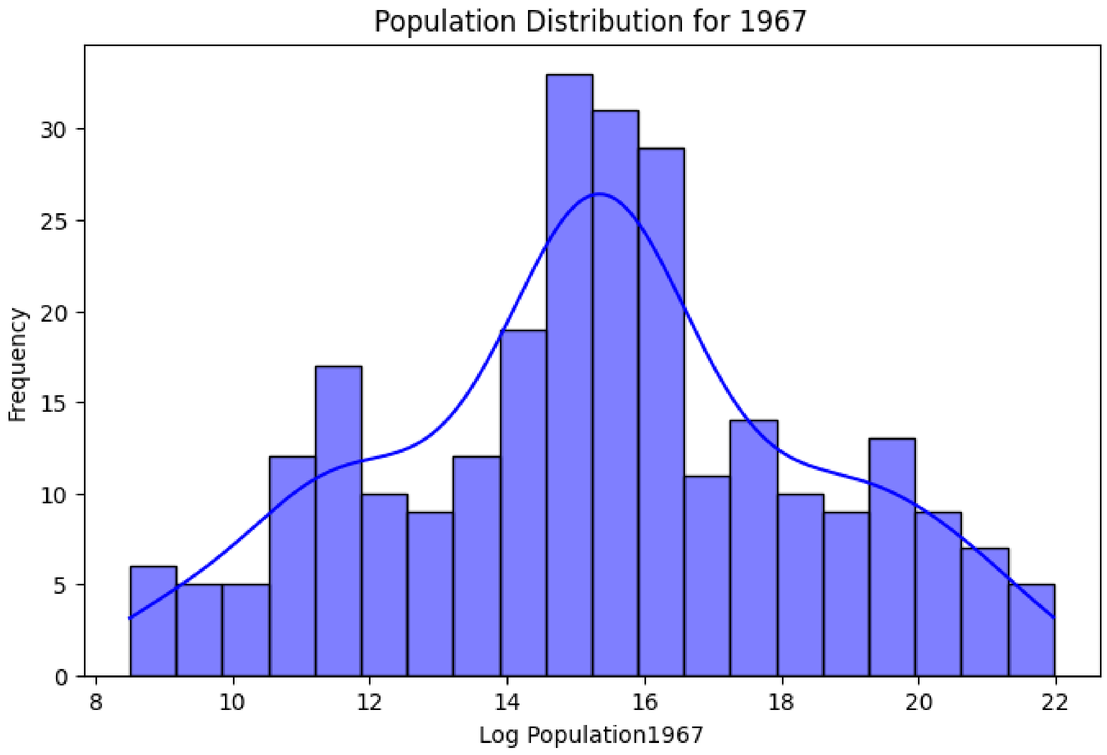
Population Distribution for 1967
Frequency
Log Population1967
0
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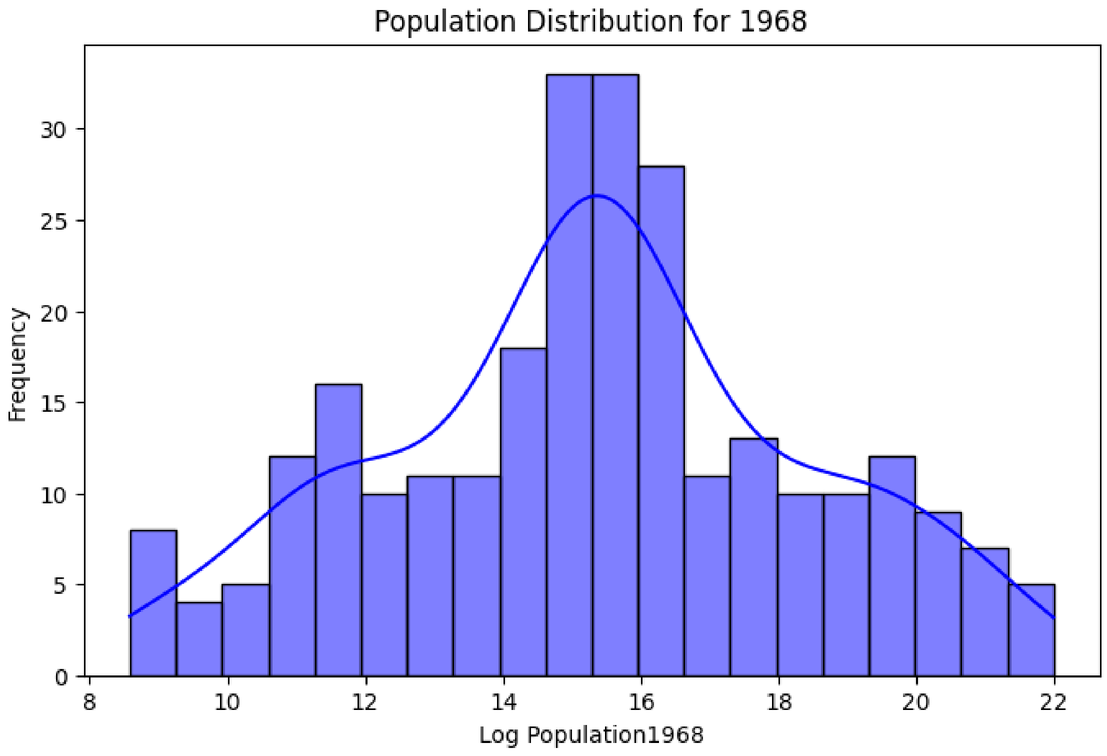
Population Distribution for 1968
Frequency
Log Population1968
0
5
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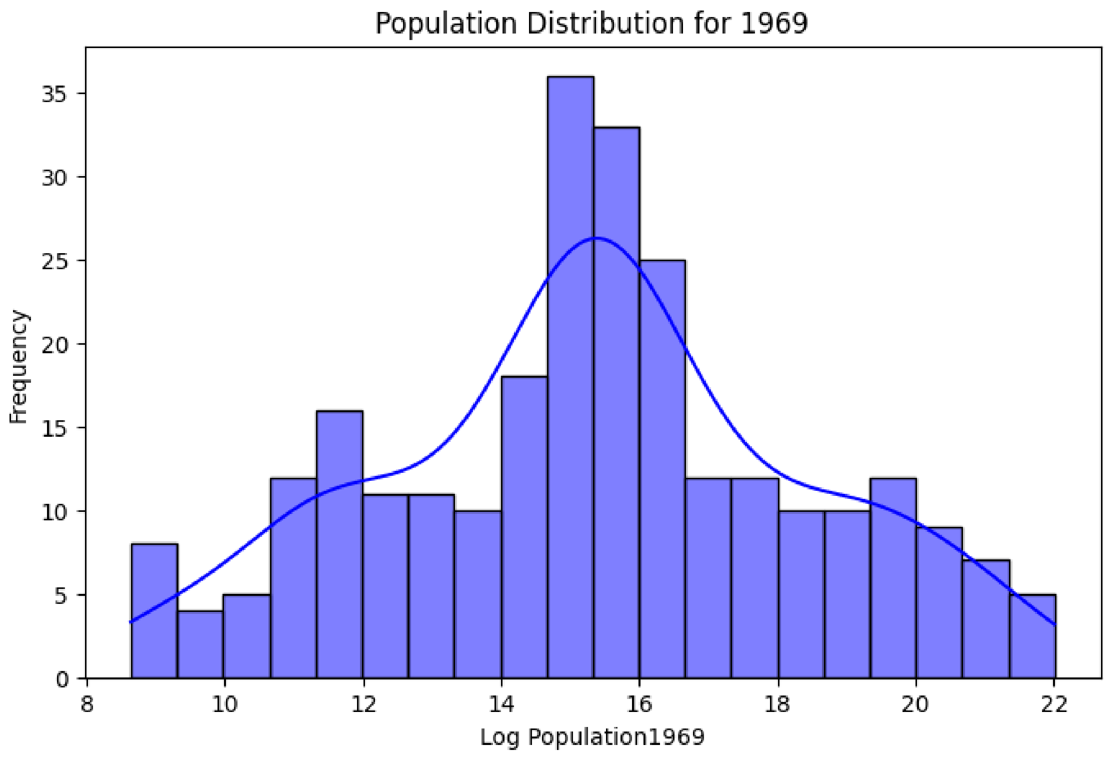
Population Distribution for 1969
Frequency
Log Population1969
0
5
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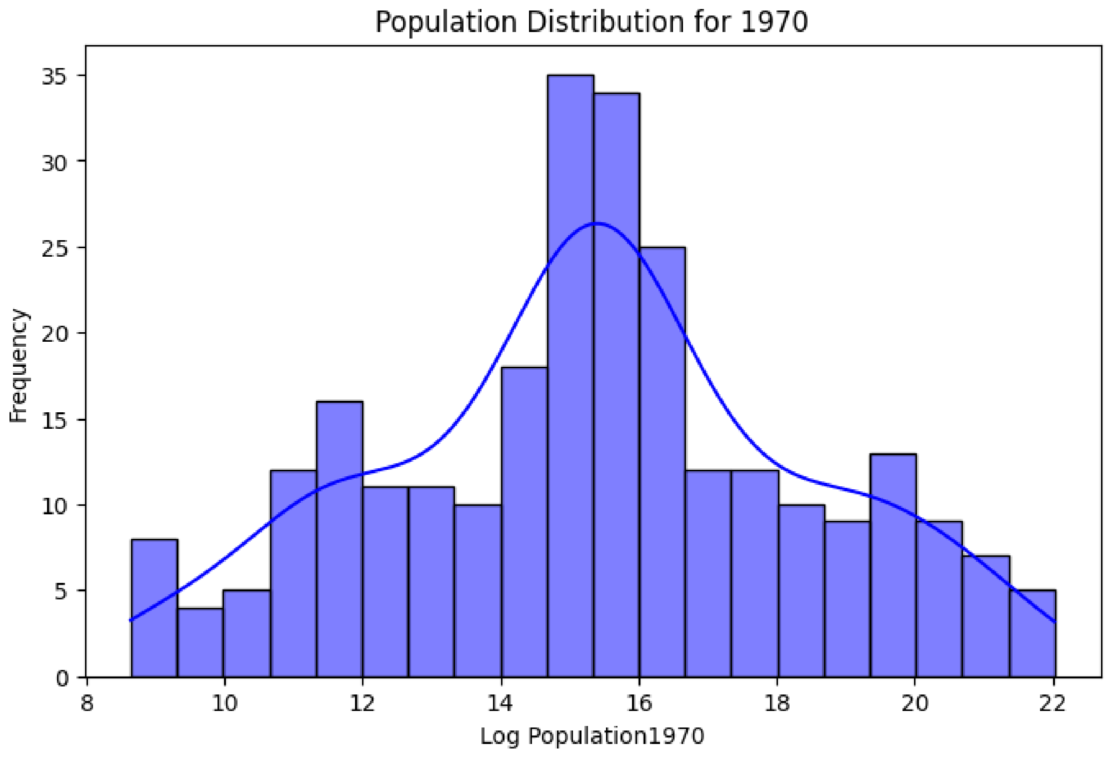
Population Distribution for 1970
Frequency
Log Population1970
0
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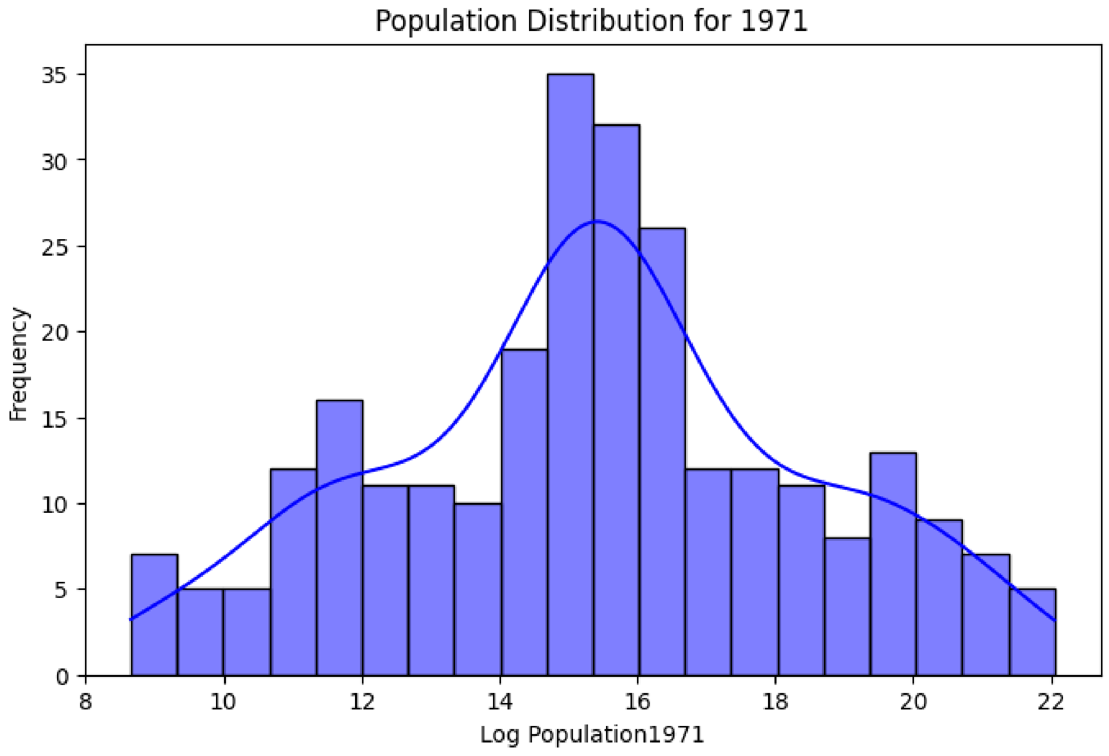
Population Distribution for 1971
Frequency
Log Population1971
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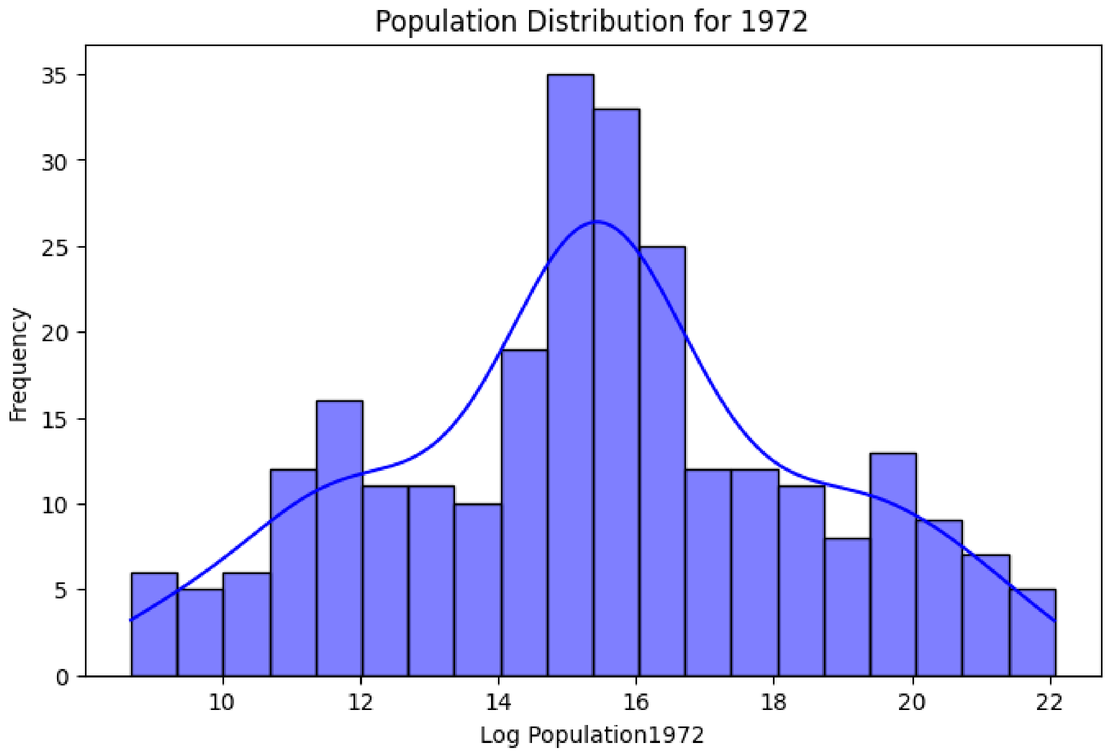
Population Distribution for 1972
Frequency
Log Population1972
0
5
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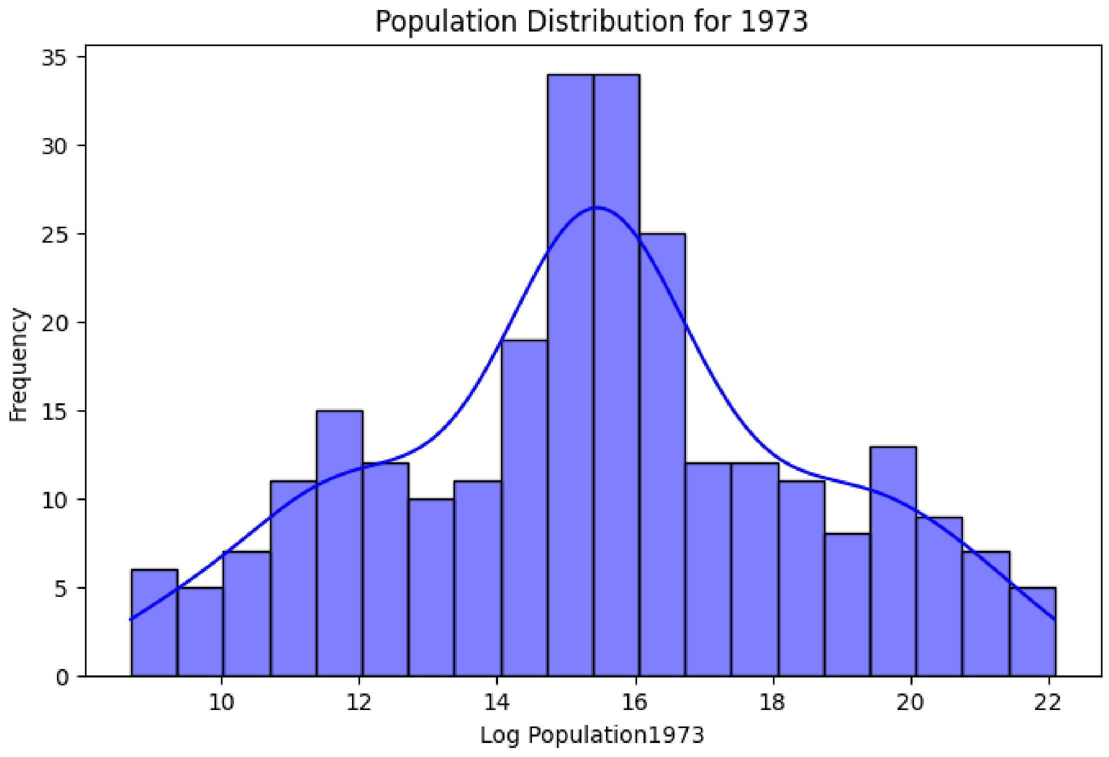
Population Distribution for 1973
Frequency
Log Population1973
0
5
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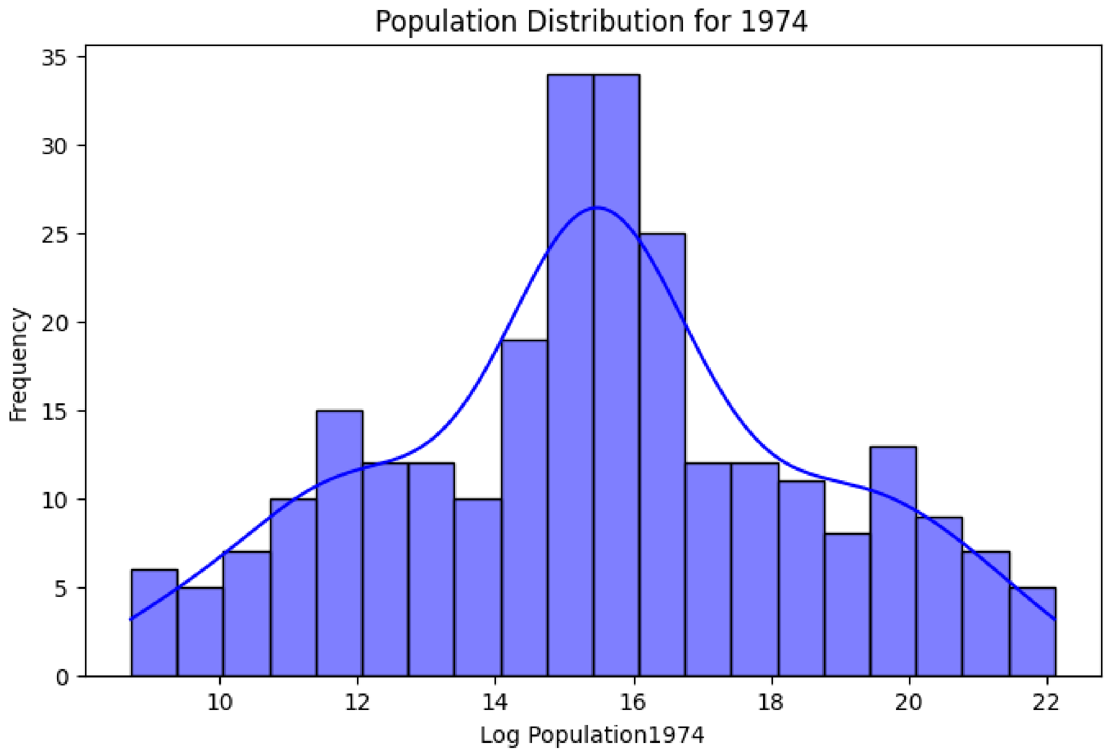
Population Distribution for 1974
Frequency
Log Population1974
0
5
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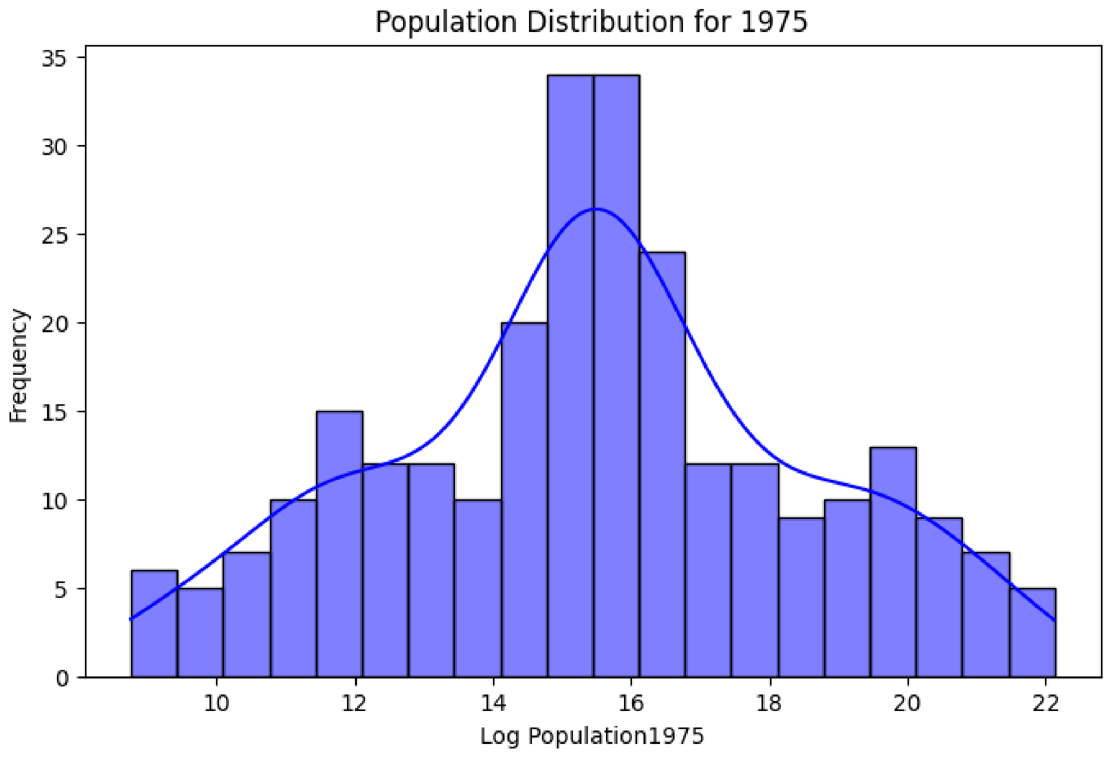
Population Distribution for 1975
Frequency
Log Population1975
0
5
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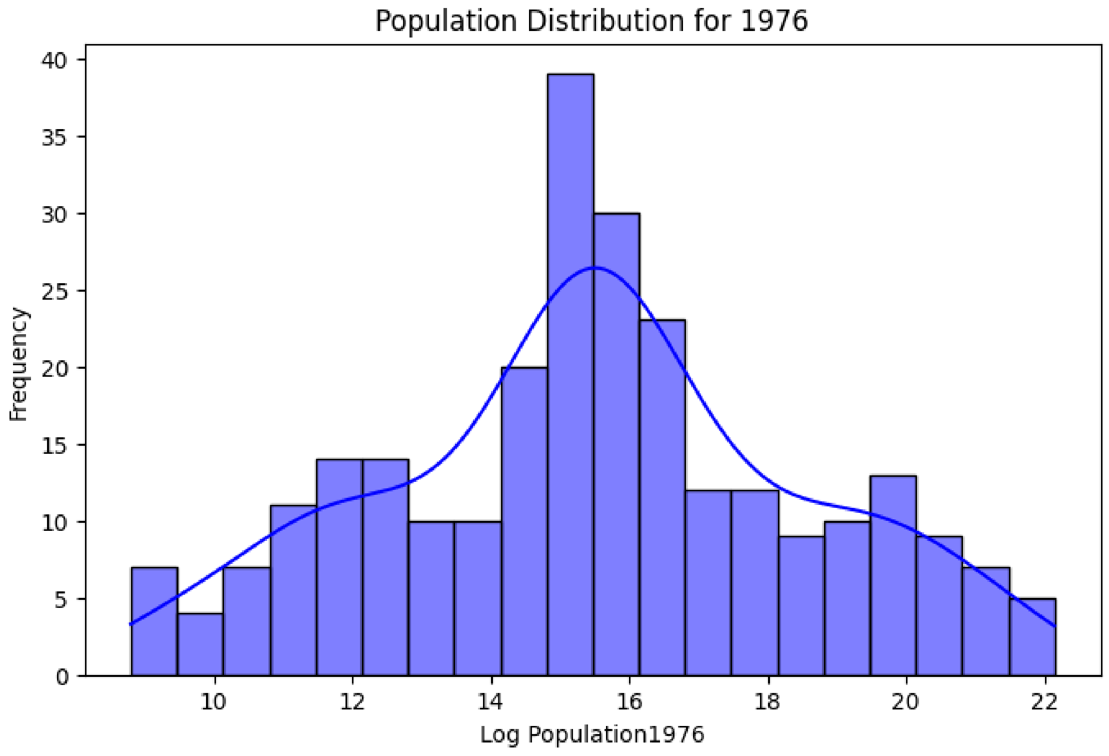
Population Distribution for 1976
Frequency
Log Population1976
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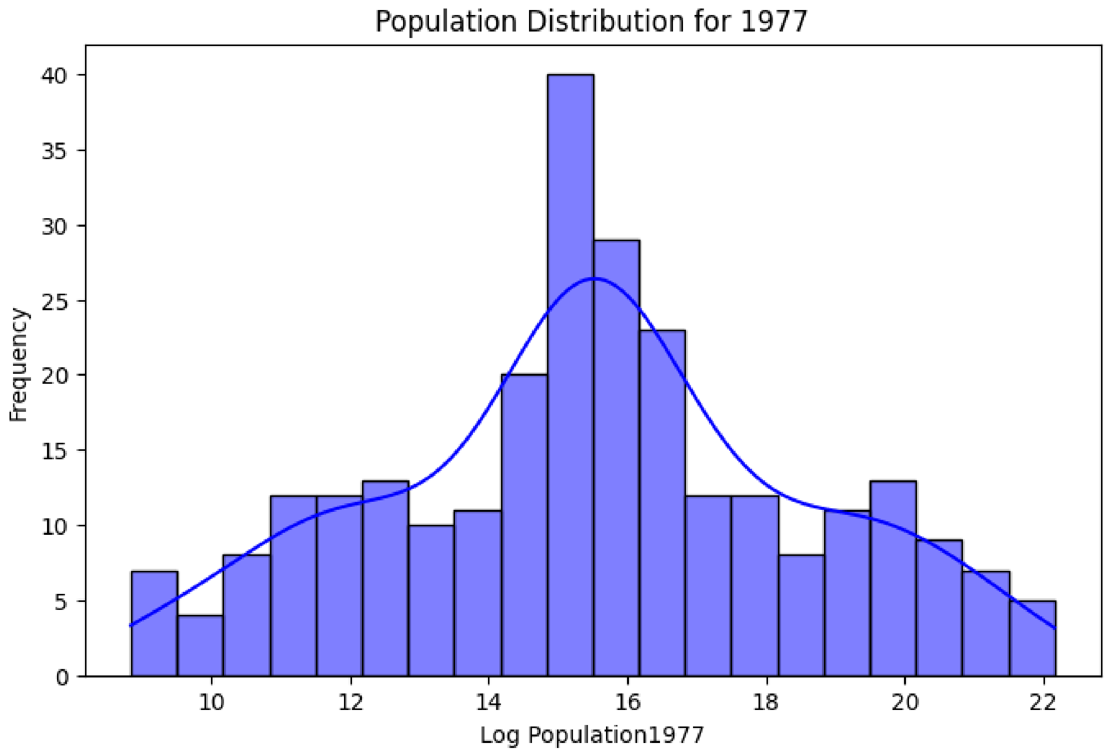
Population Distribution for 1977
Frequency
Log Population1977
0
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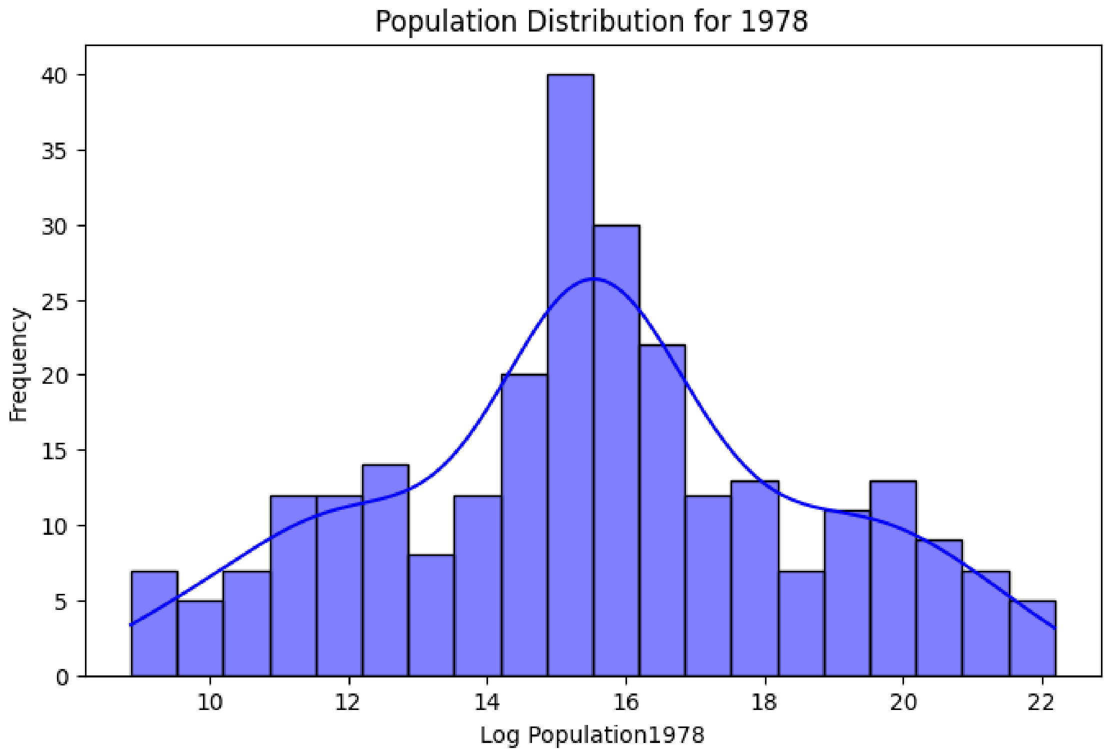
Population Distribution for 1978
Frequency
Log Population1978
0
5
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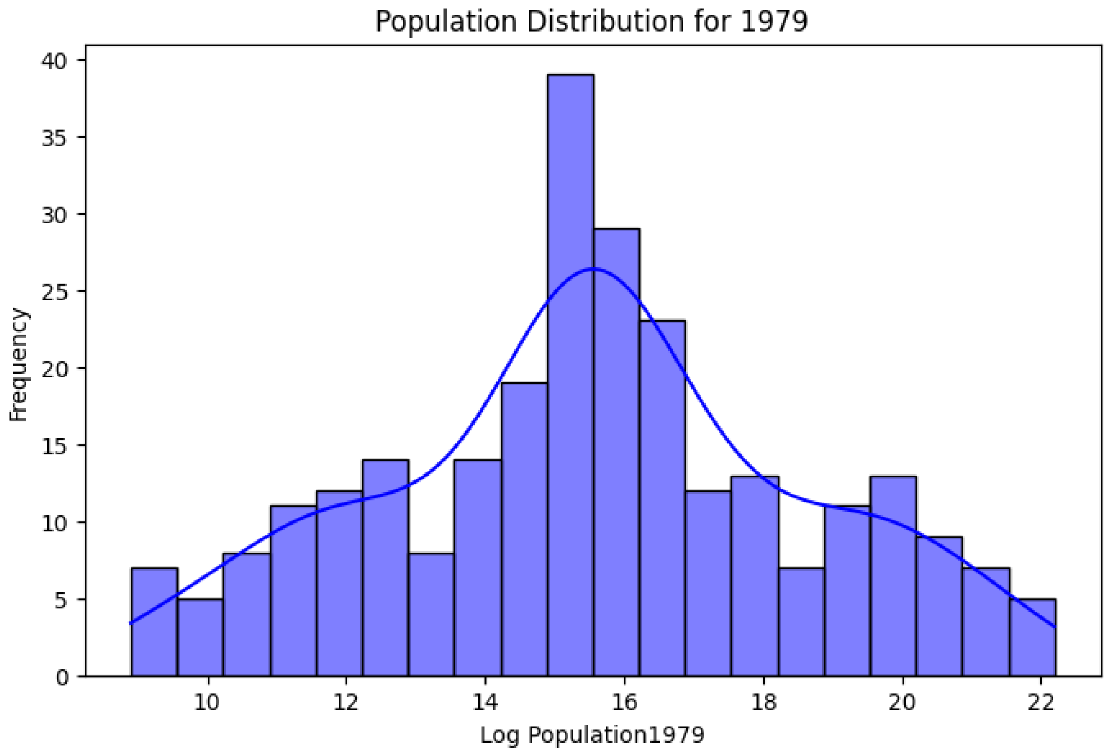
Population Distribution for 1979
Frequency
Log Population1979
0
5
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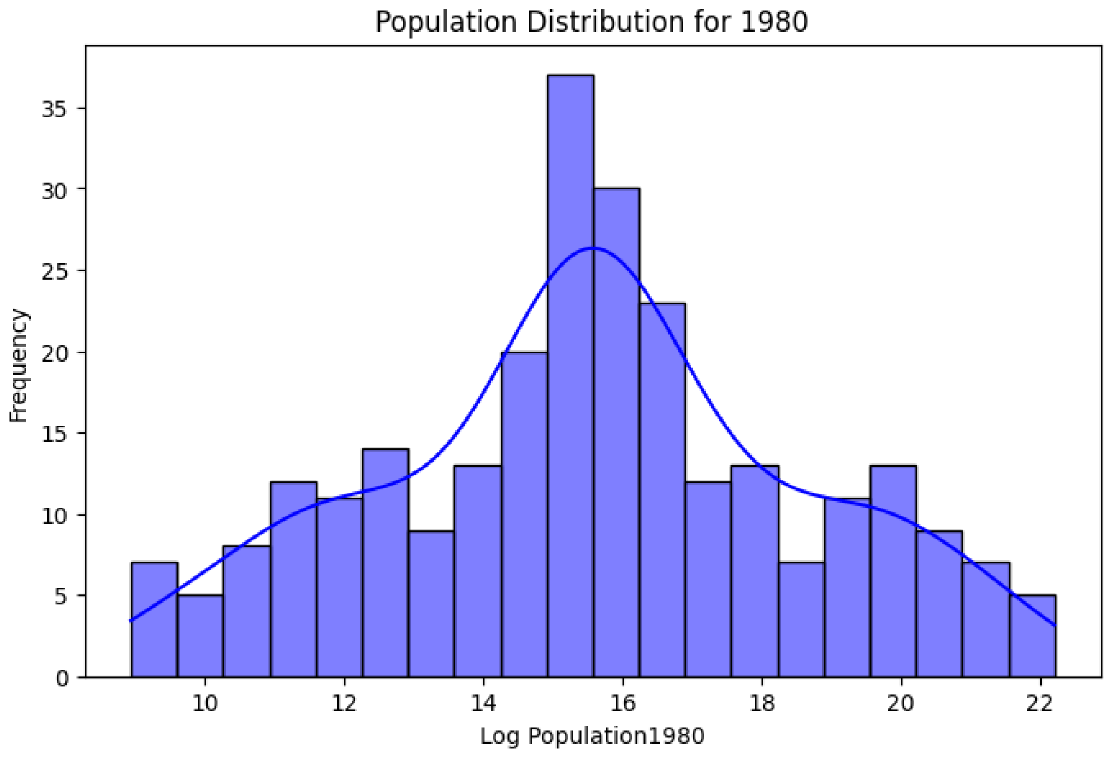
Population Distribution for 1980
Frequency
Log Population1980
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5
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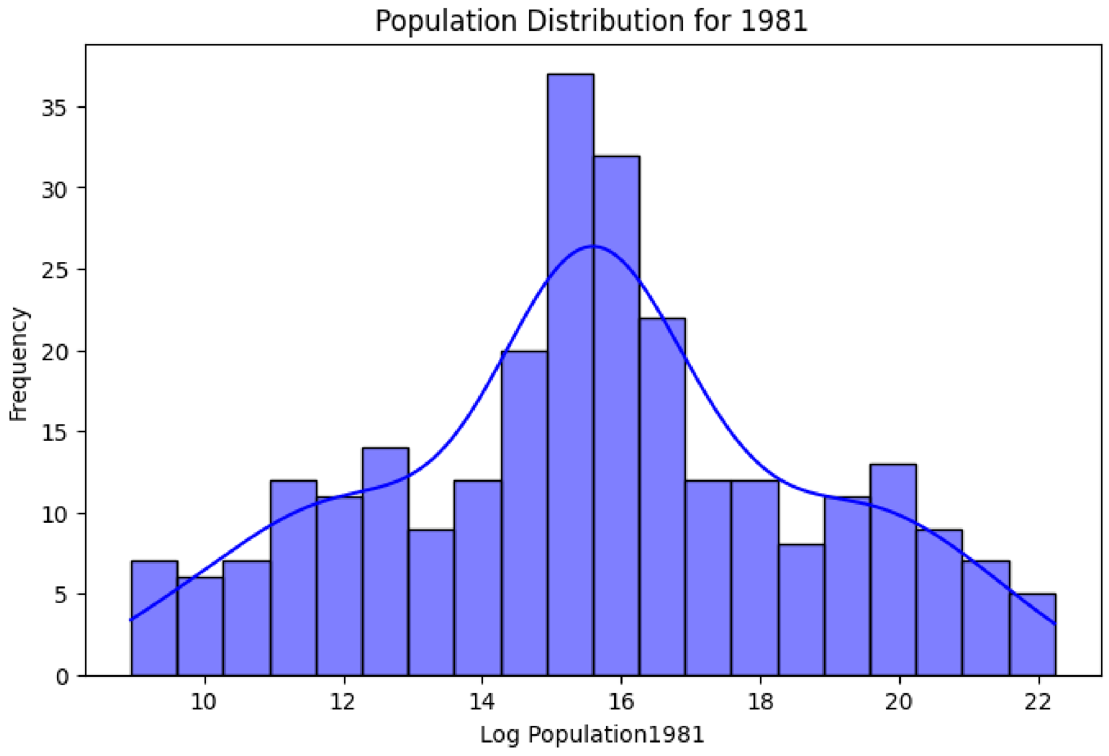
Population Distribution for 1981
Frequency
Log Population1981
0
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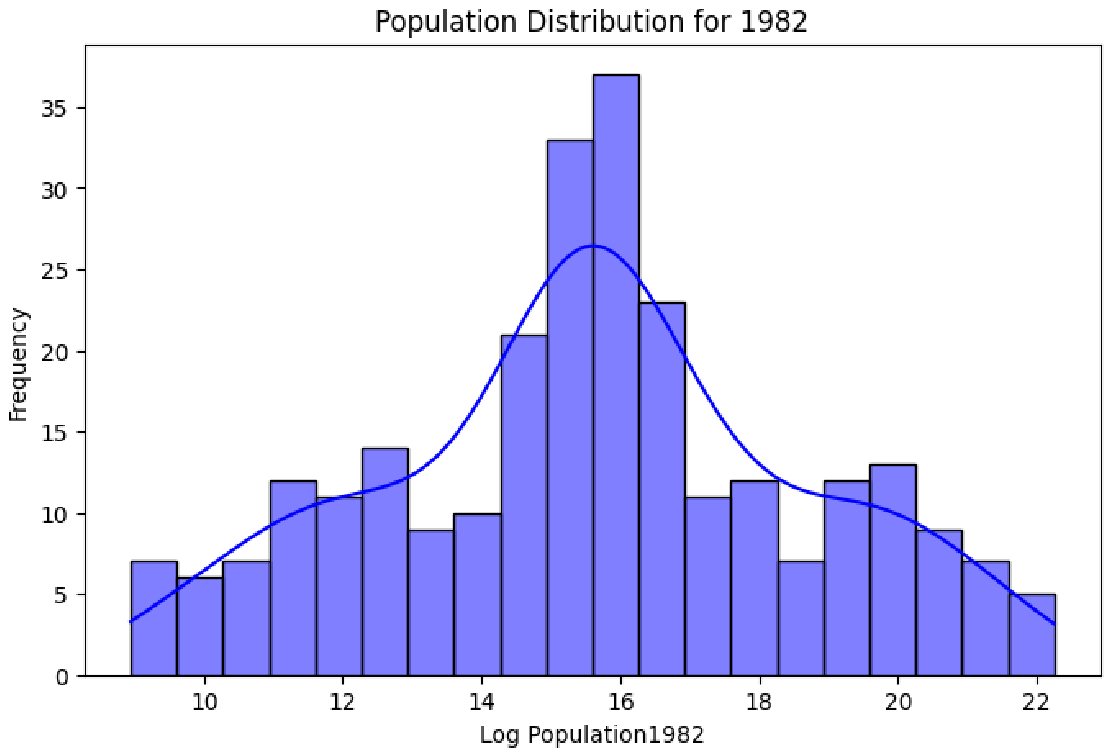
Population Distribution for 1982
Frequency
Log Population1982
0
5
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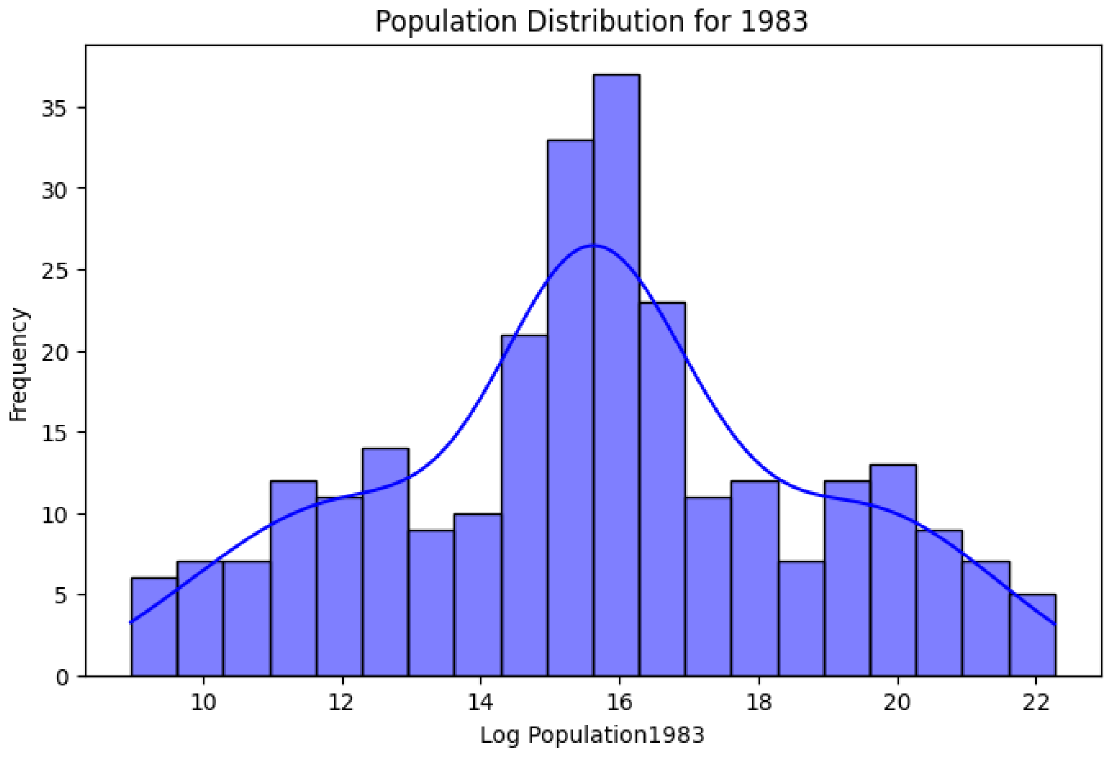
Population Distribution for 1983
Frequency
Log Population1983
0
5
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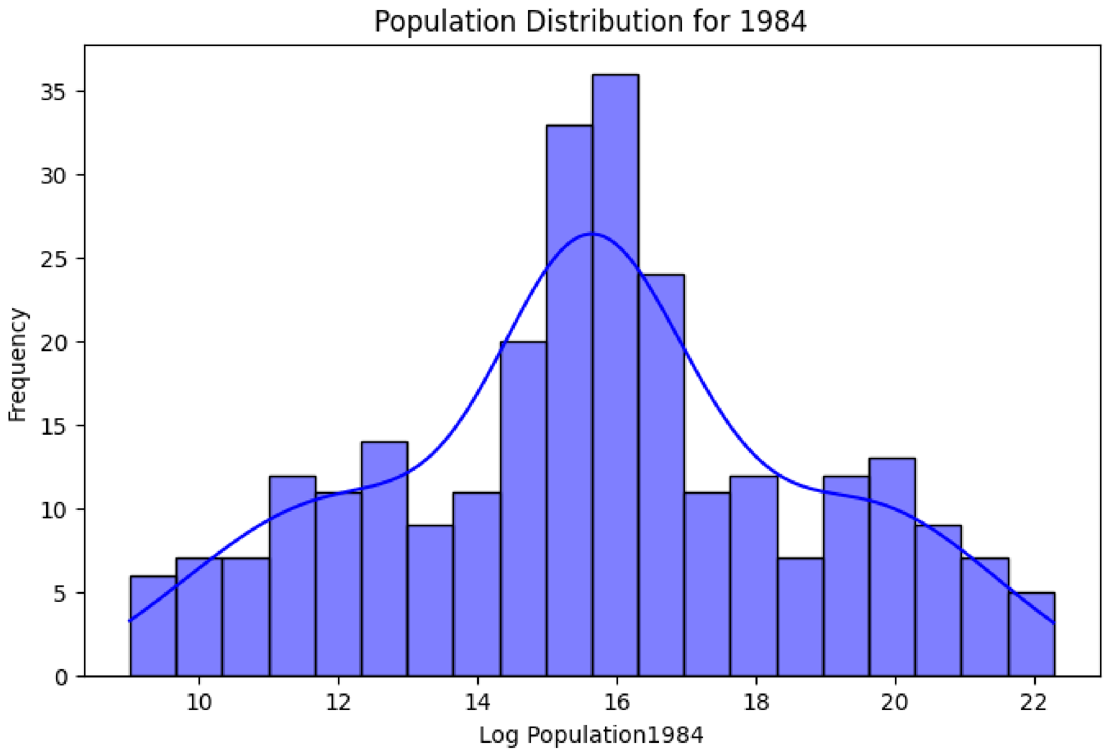
Population Distribution for 1984
Frequency
Log Population1984
0
5
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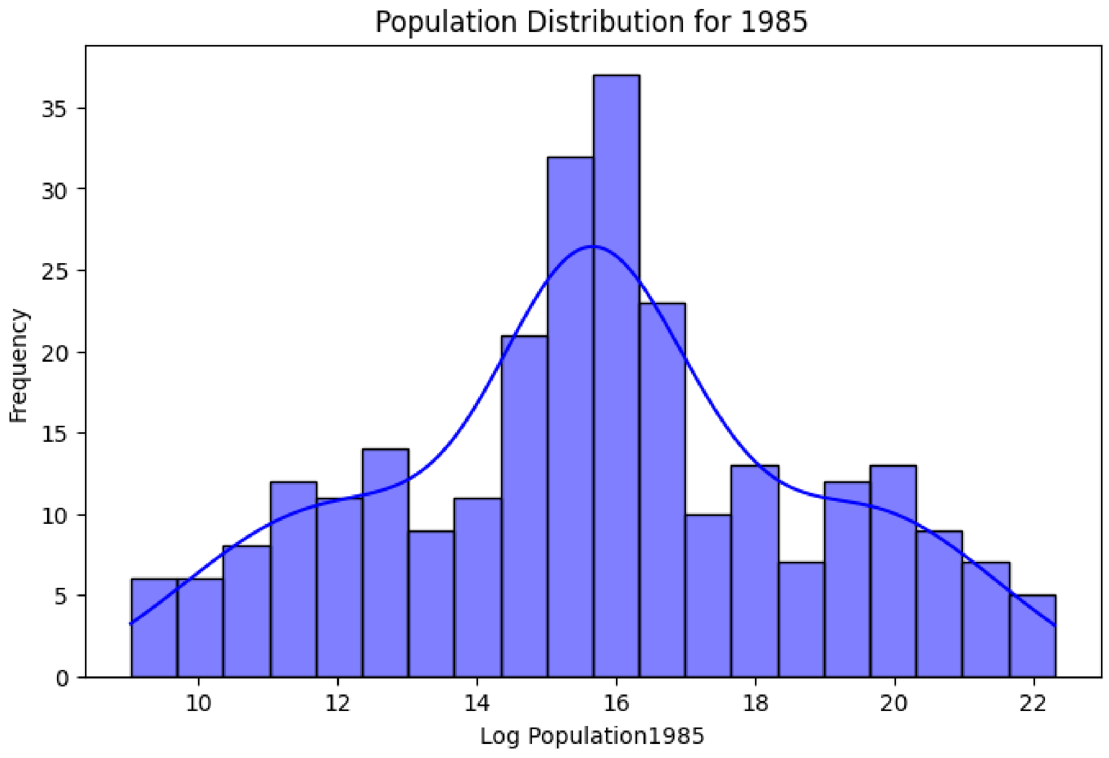
Population Distribution for 1985
Frequency
0
5
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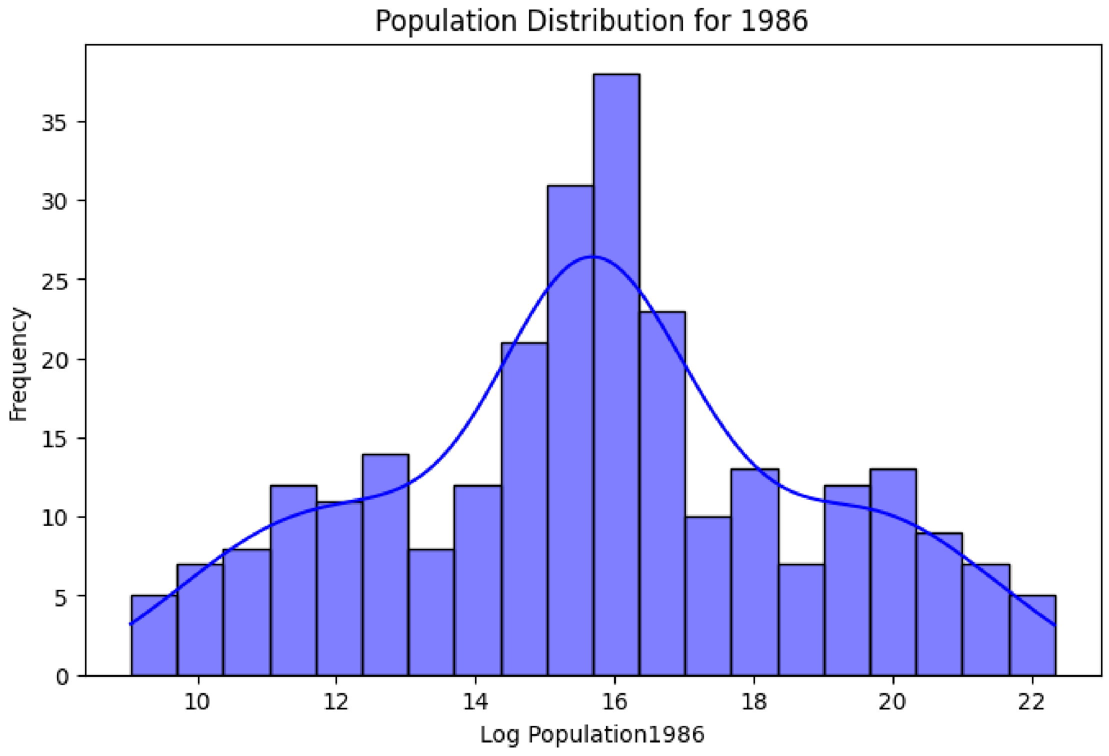
22
Log Population1985


Population Distribution for 1986
Frequency
0
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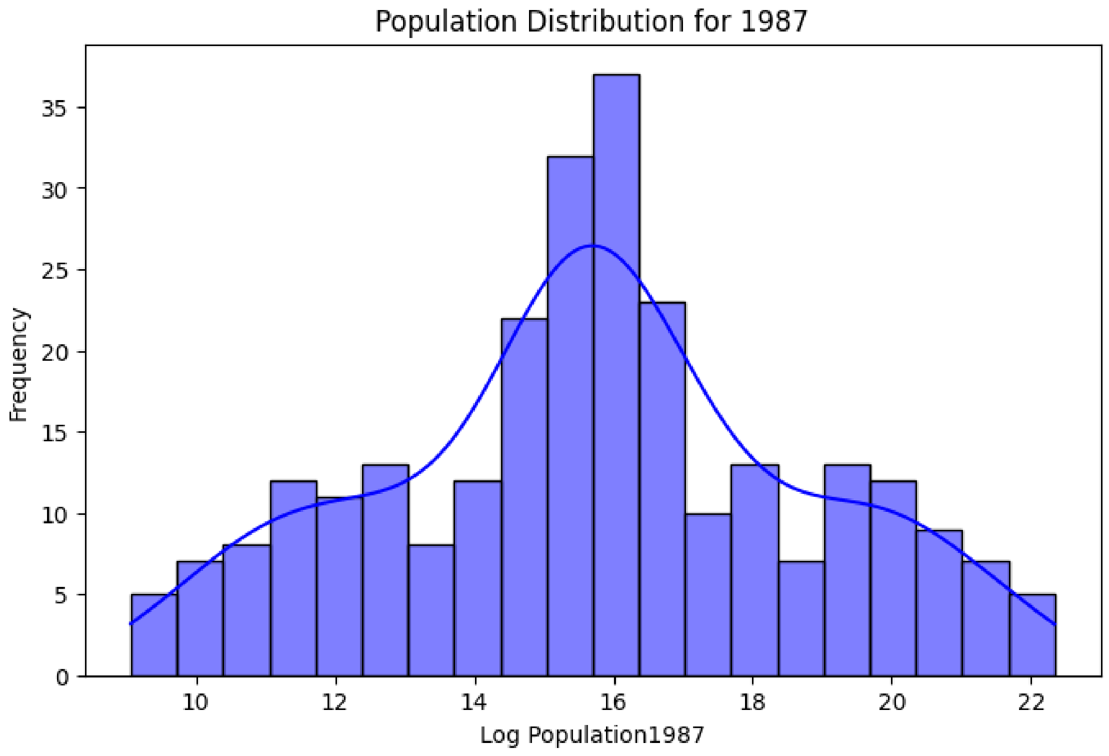
22
Log Population1986


Population Distribution for 1987
Frequency
Log Population1987
0
5
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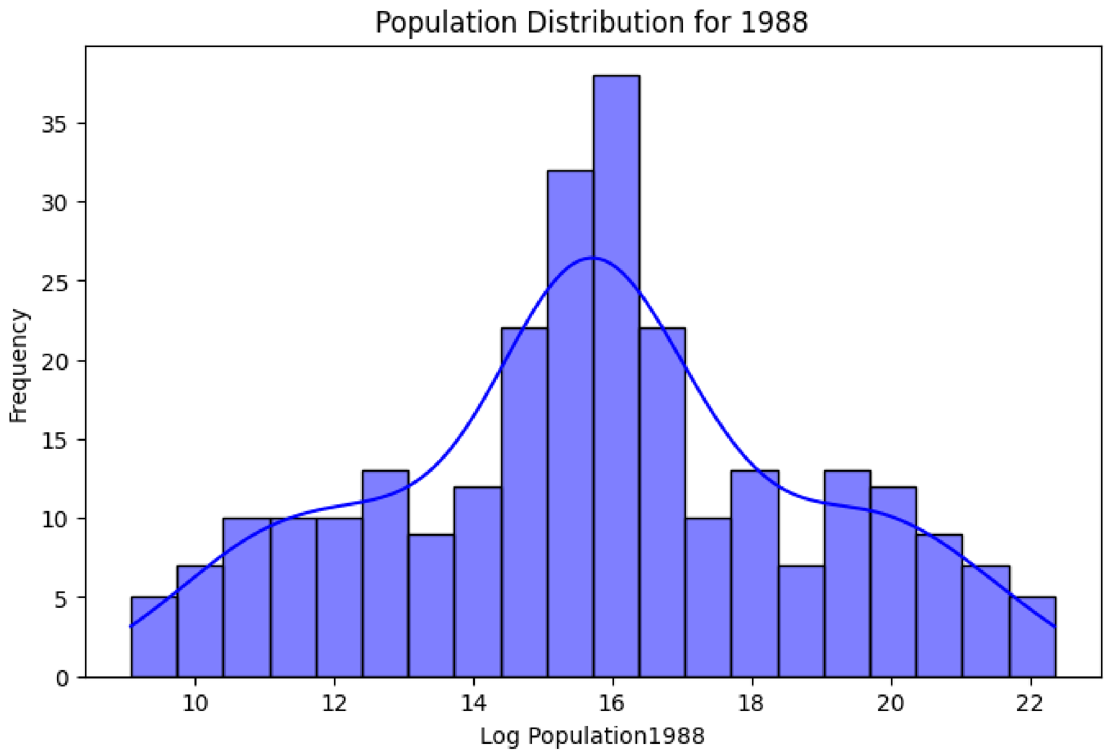
Population Distribution for 1988
Frequency
Log Population1988
0
5
10
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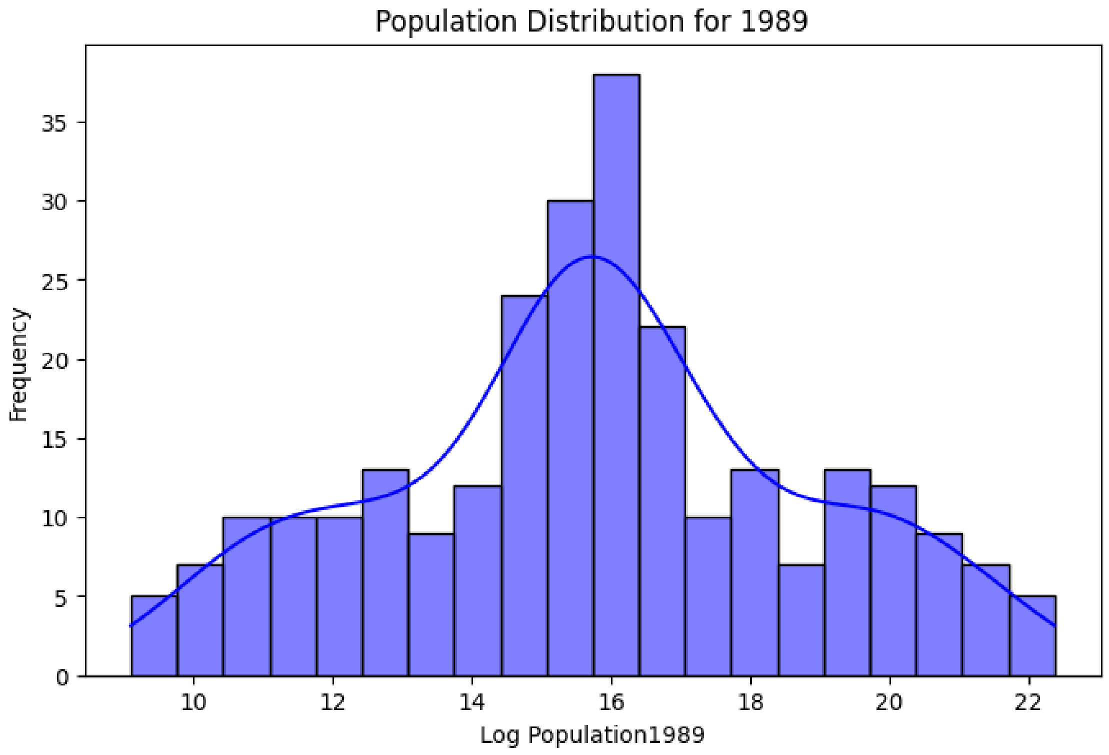
Population Distribution for 1989
Frequency
Log Population1989
0
5
10
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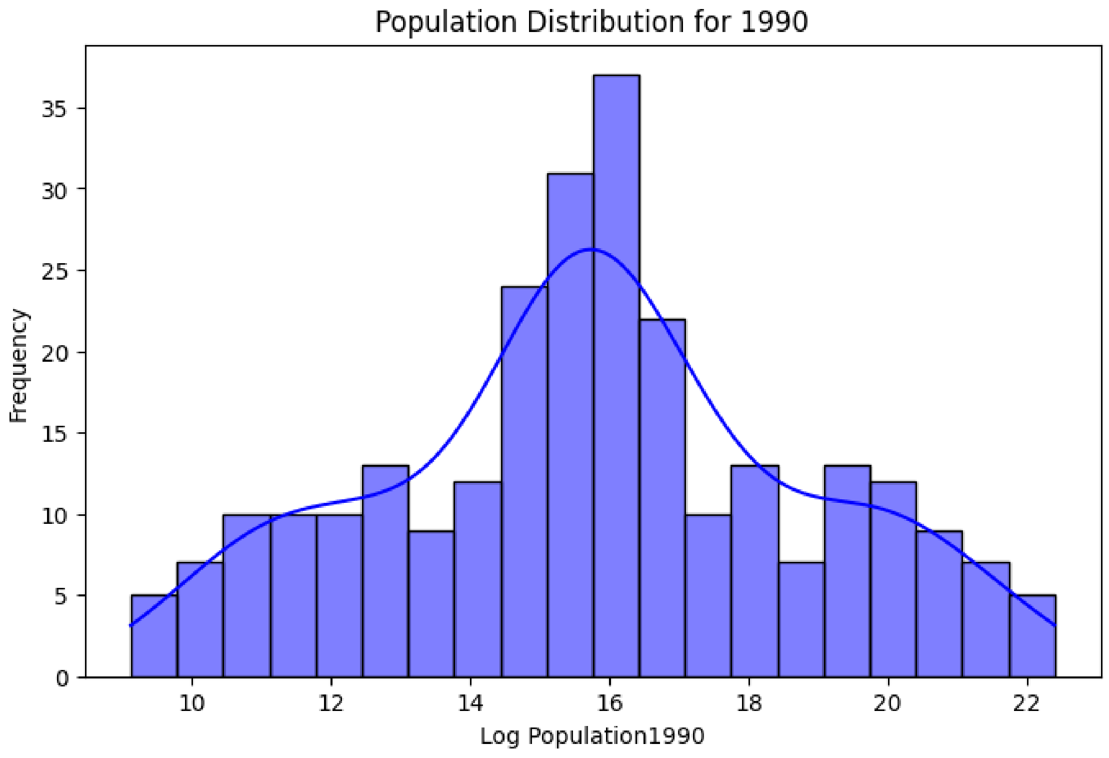
Population Distribution for 1990
Frequency
Log Population1990
0
5
10
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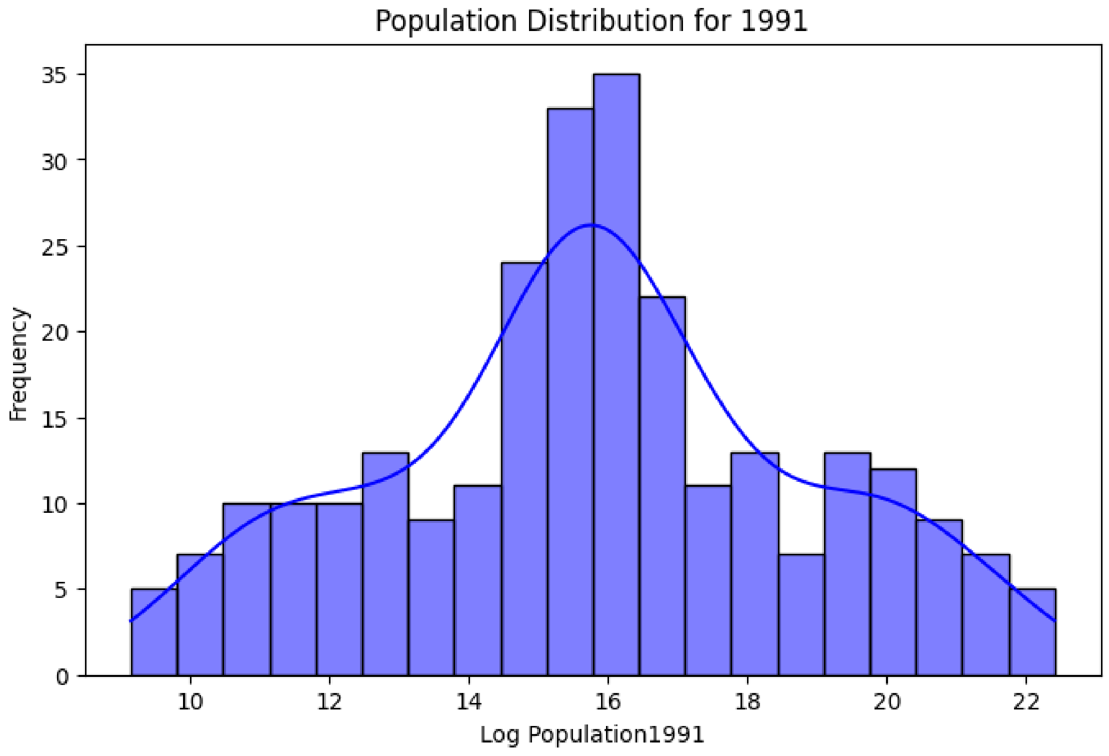
22


Population Distribution for 1991
Frequency
Log Population1991
0
5
10
15
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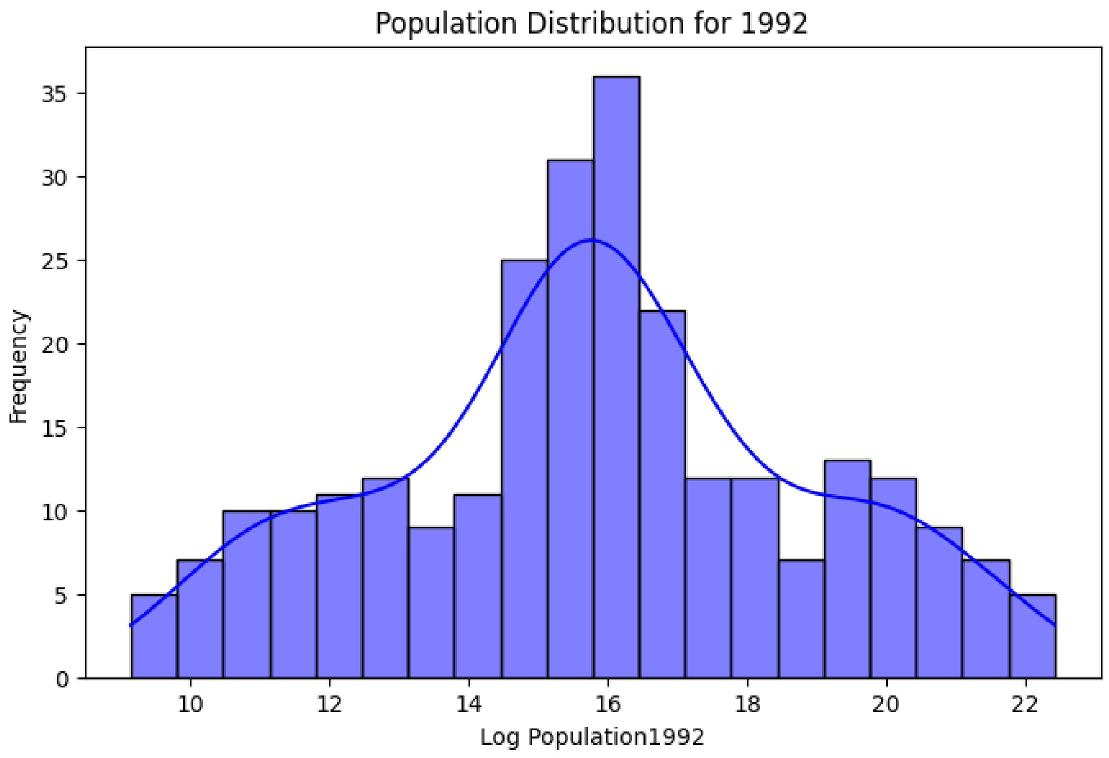
Population Distribution for 1992
Frequency
Log Population1992
0
5
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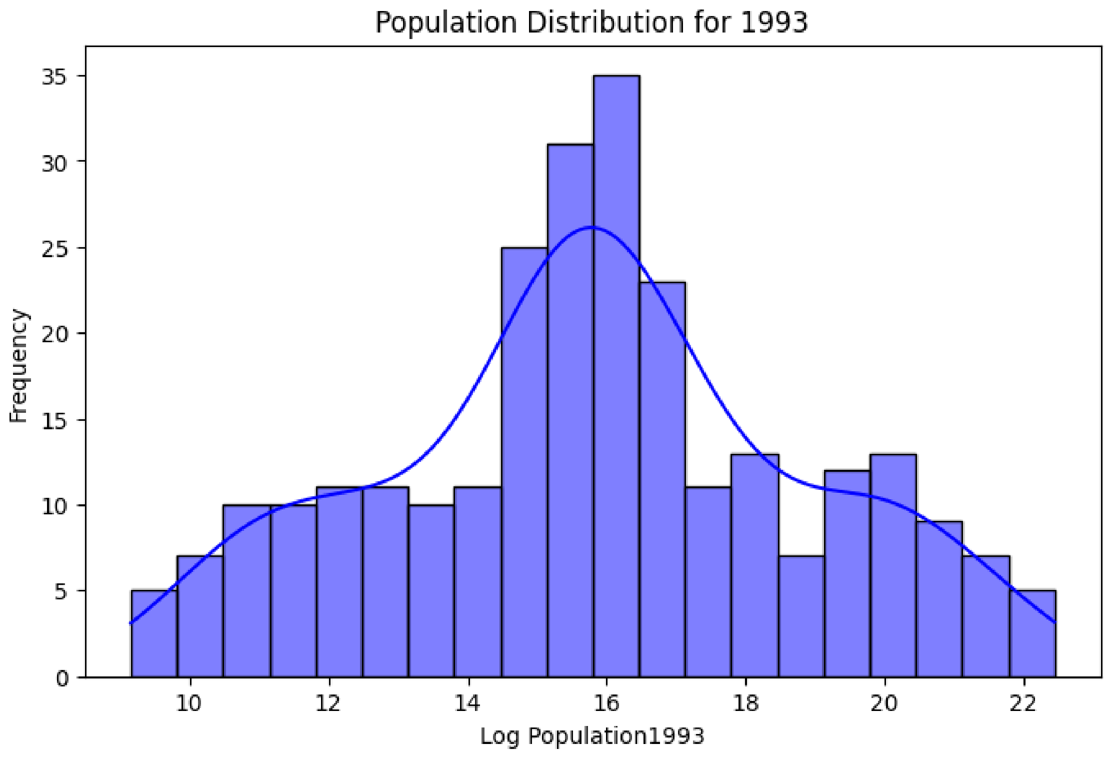
Population Distribution for 1993
Frequency
Log Population1993
0
5
10
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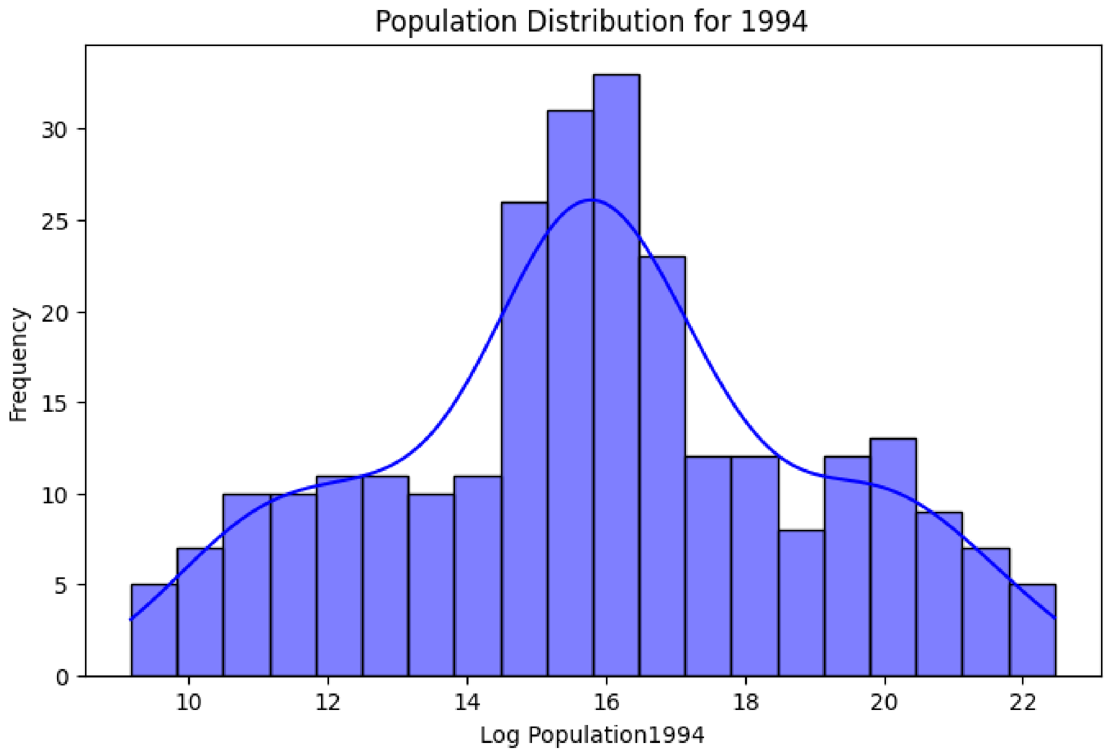
22


Population Distribution for 1994
Frequency
Log Population1994
0
5
10
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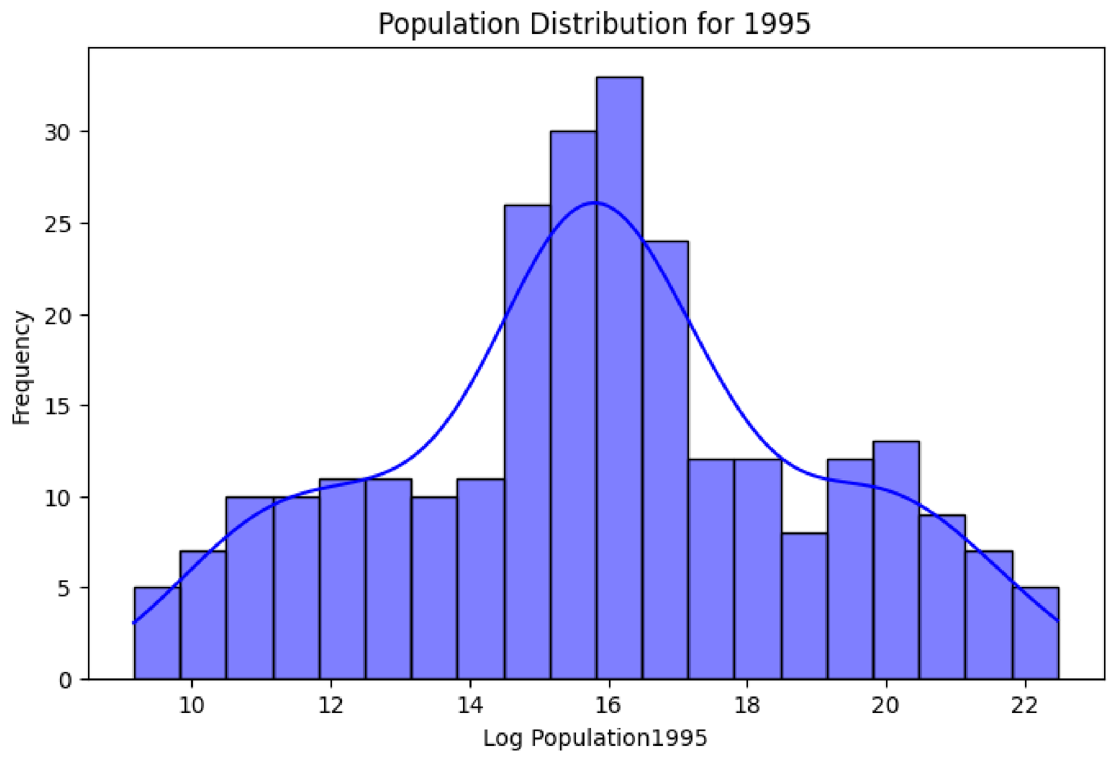
22


Population Distribution for 1995
Frequency
Log Population1995
0
5
10
15
20
25
30
10
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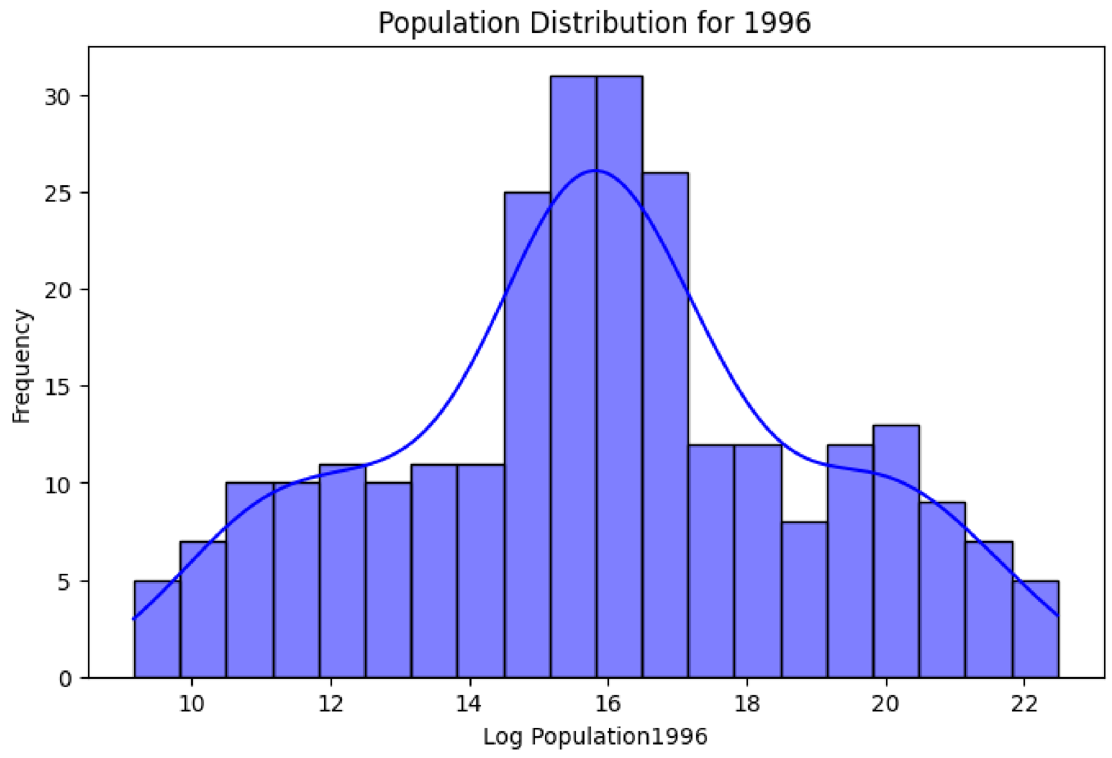
22


Population Distribution for 1996
Frequency
Log Population1996
0
5
10
15
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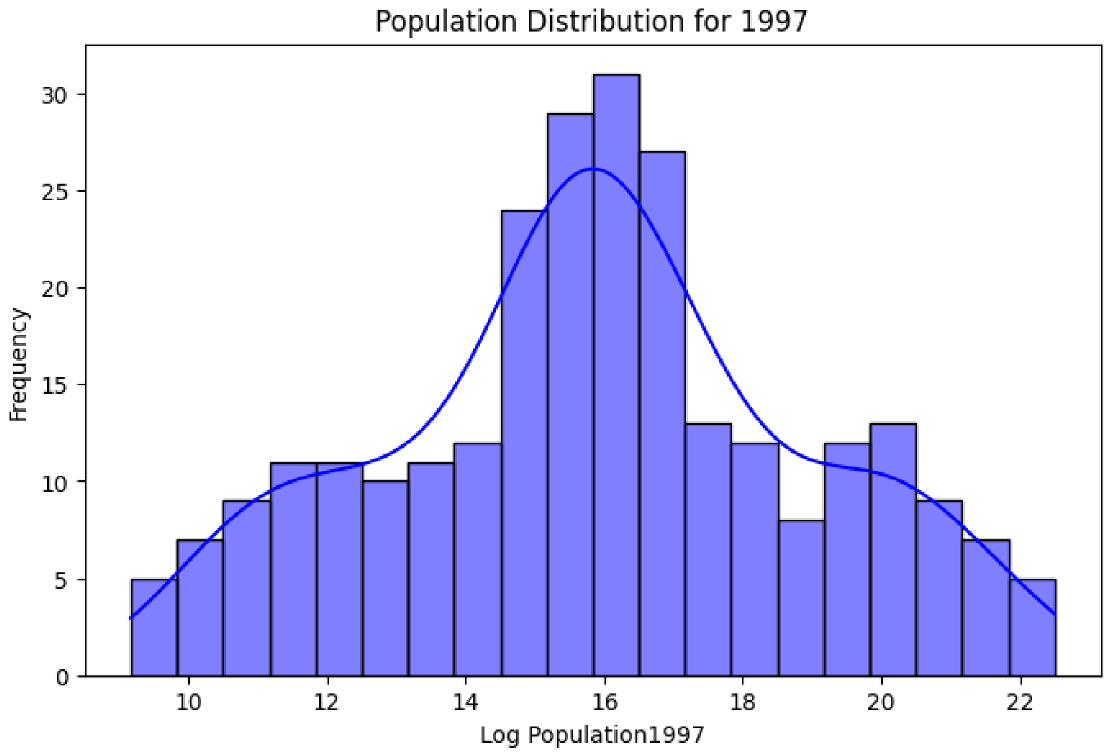
22


Population Distribution for 1997
Frequency
Log Population1997
0
5
10
15
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25
30
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20
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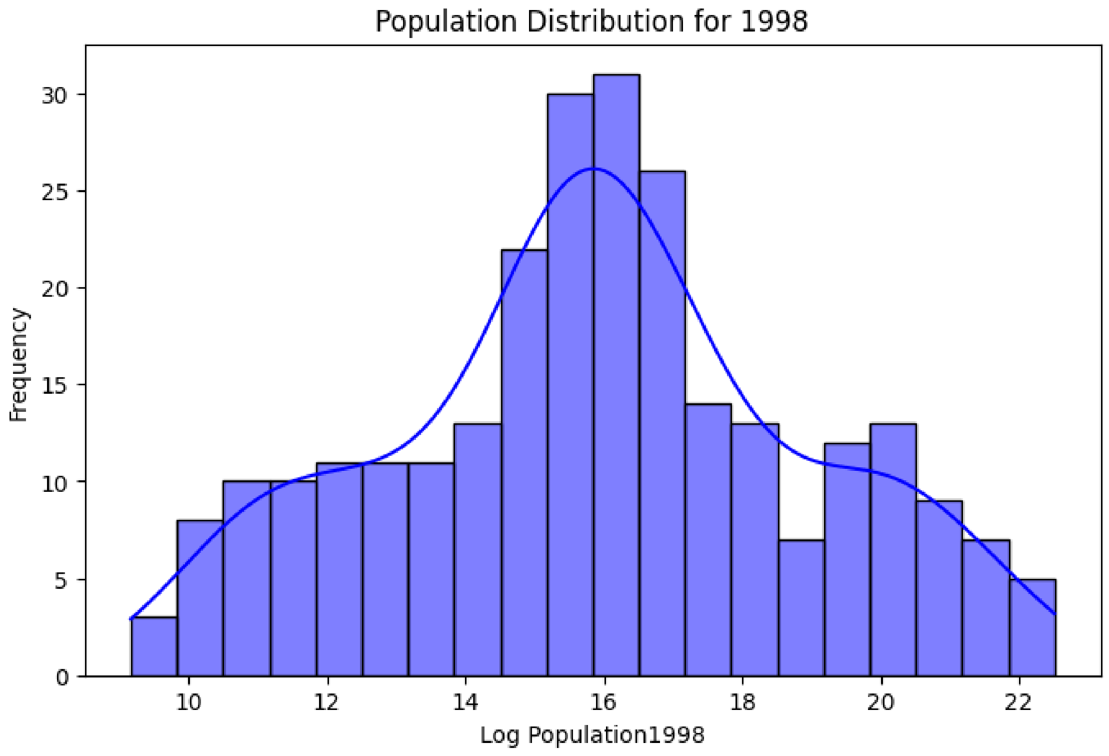
Population Distribution for 1998
Frequency
Log Population1998
0
5
10
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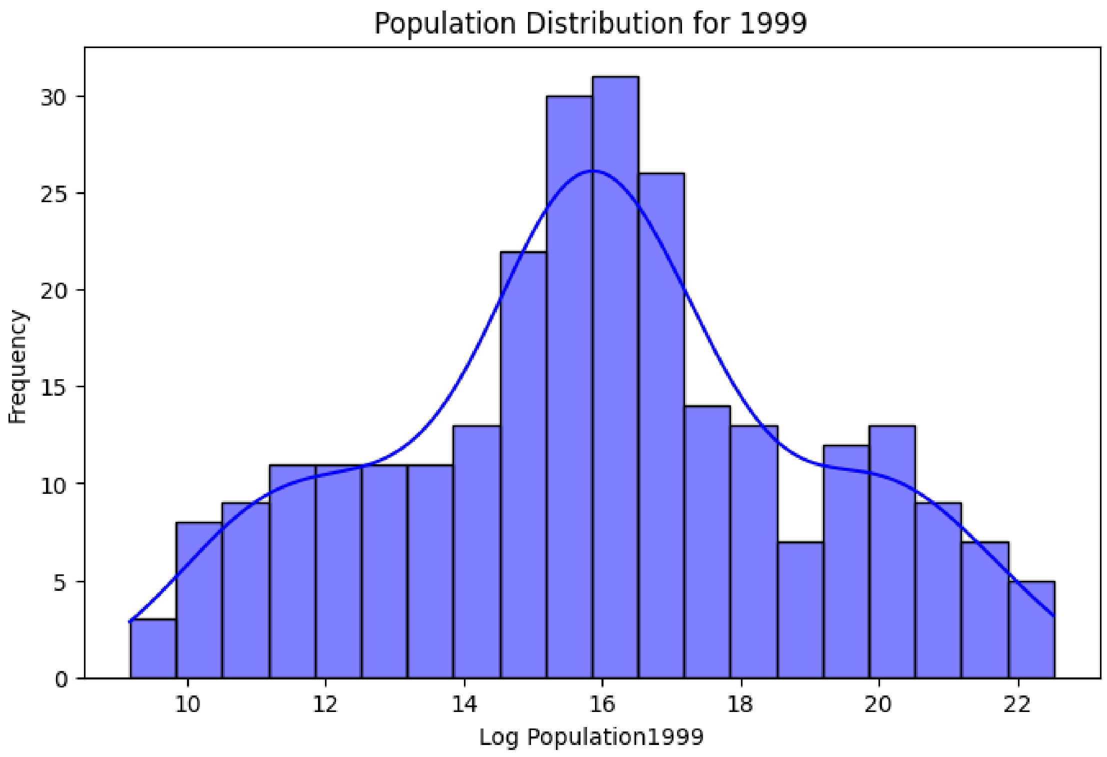
Population Distribution for 1999
Frequency
Log Population1999
0
5
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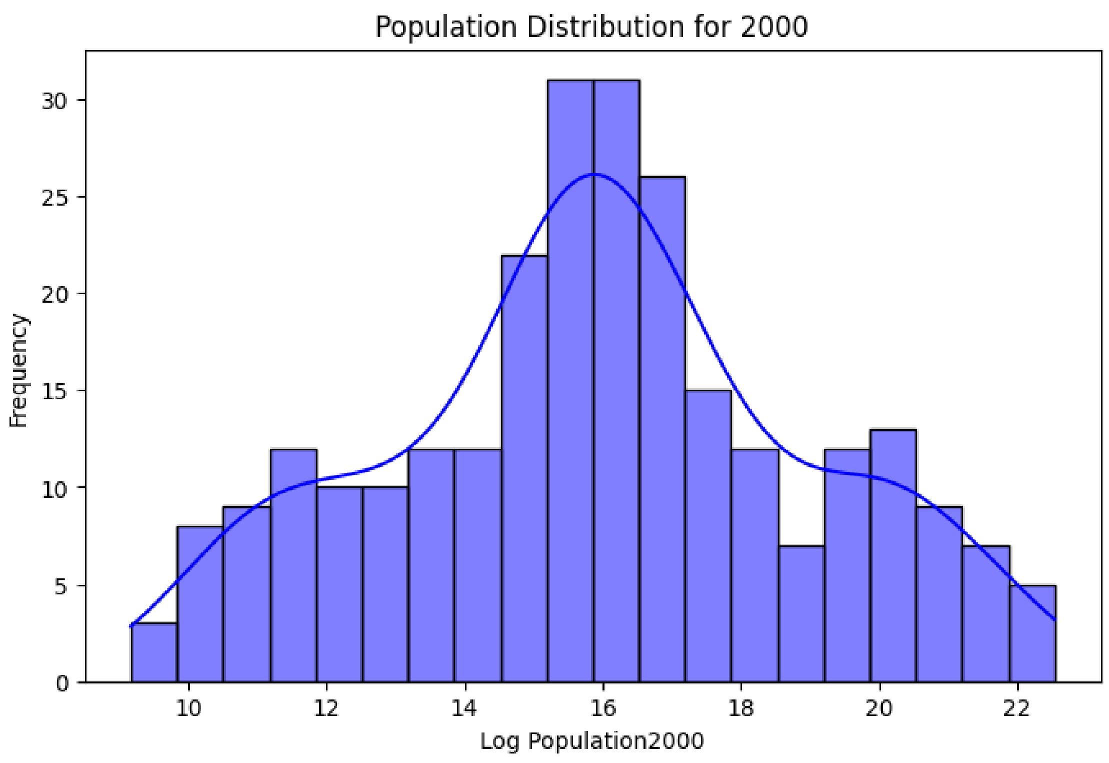
22


Population Distribution for 2000
Frequency
Log Population2000
0
5
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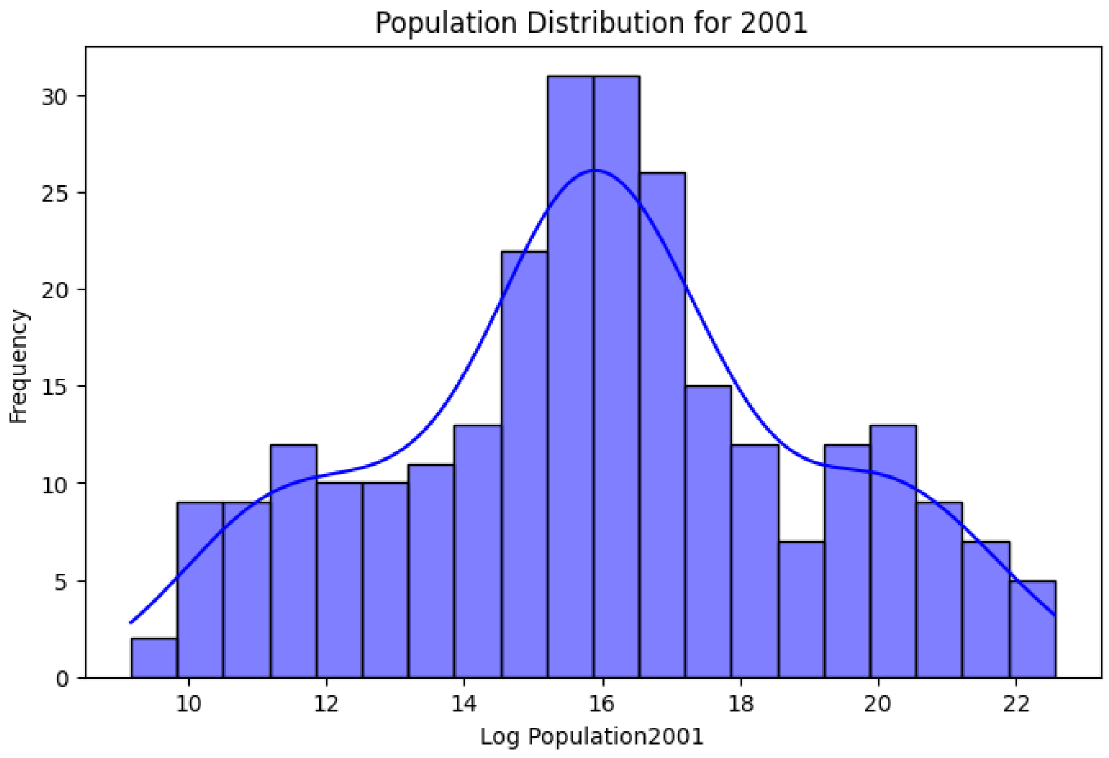
Population Distribution for 2001
Frequency
Log Population2001
0
5
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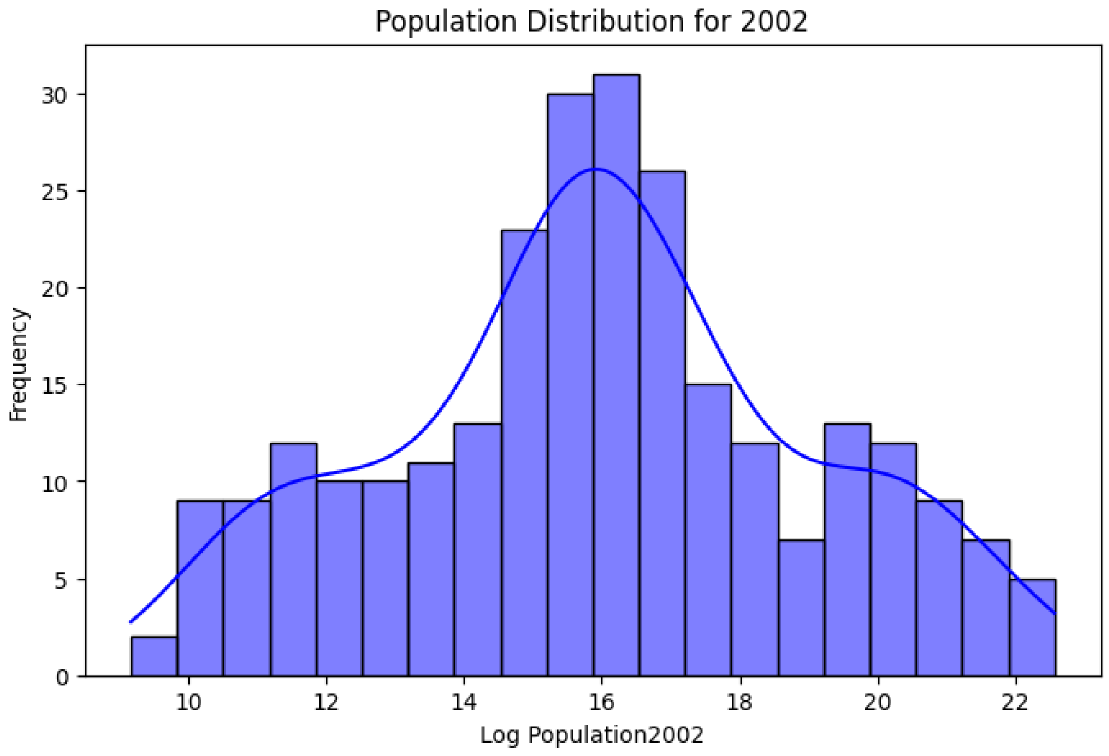
Population Distribution for 2002
Frequency
Log Population2002
0
5
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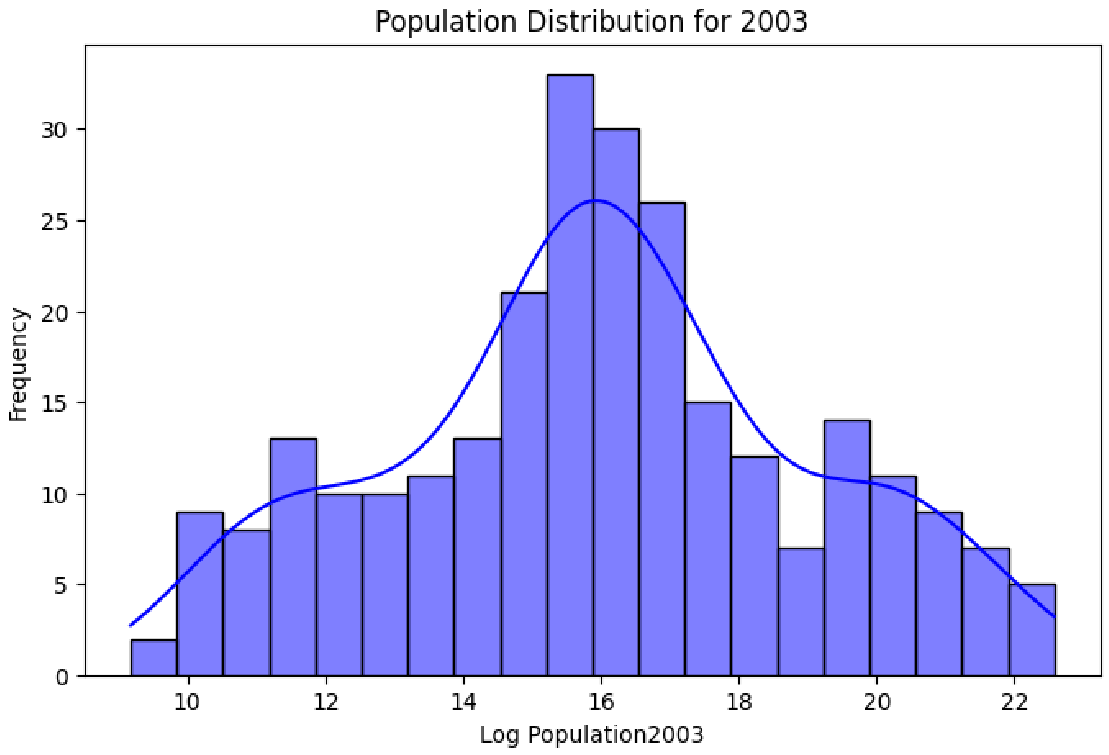
Population Distribution for 2003
Frequency
Log Population2003
0
5
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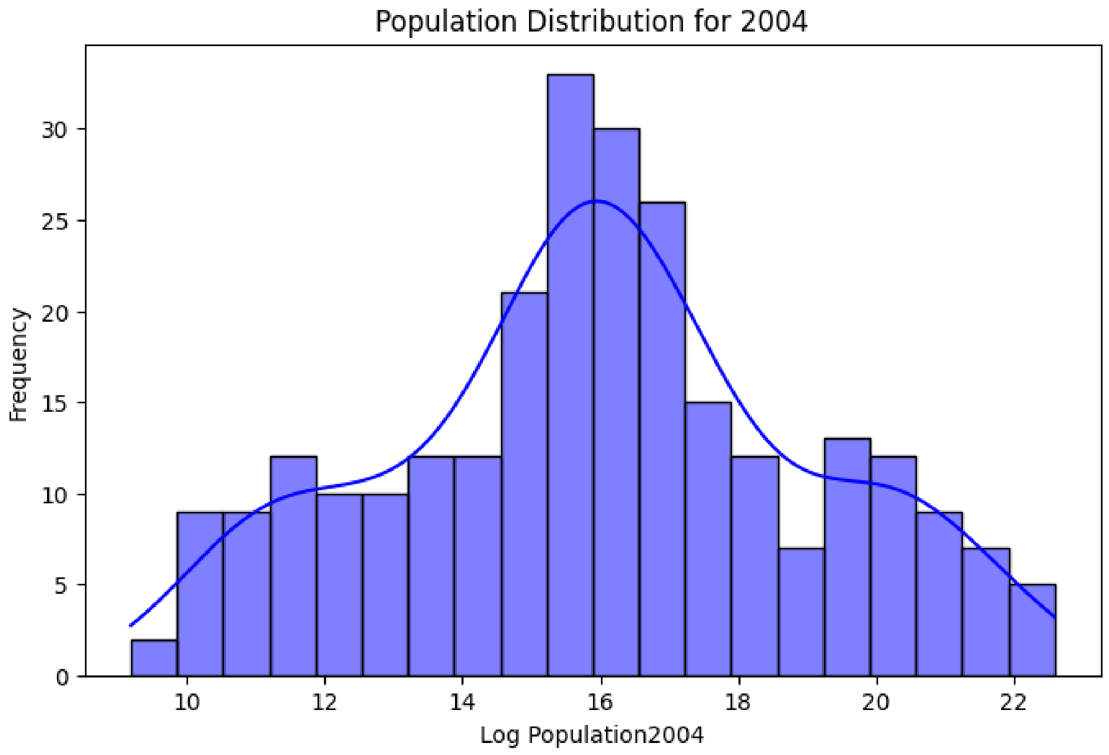
Population Distribution for 2004
Frequency
Log Population2004
0
5
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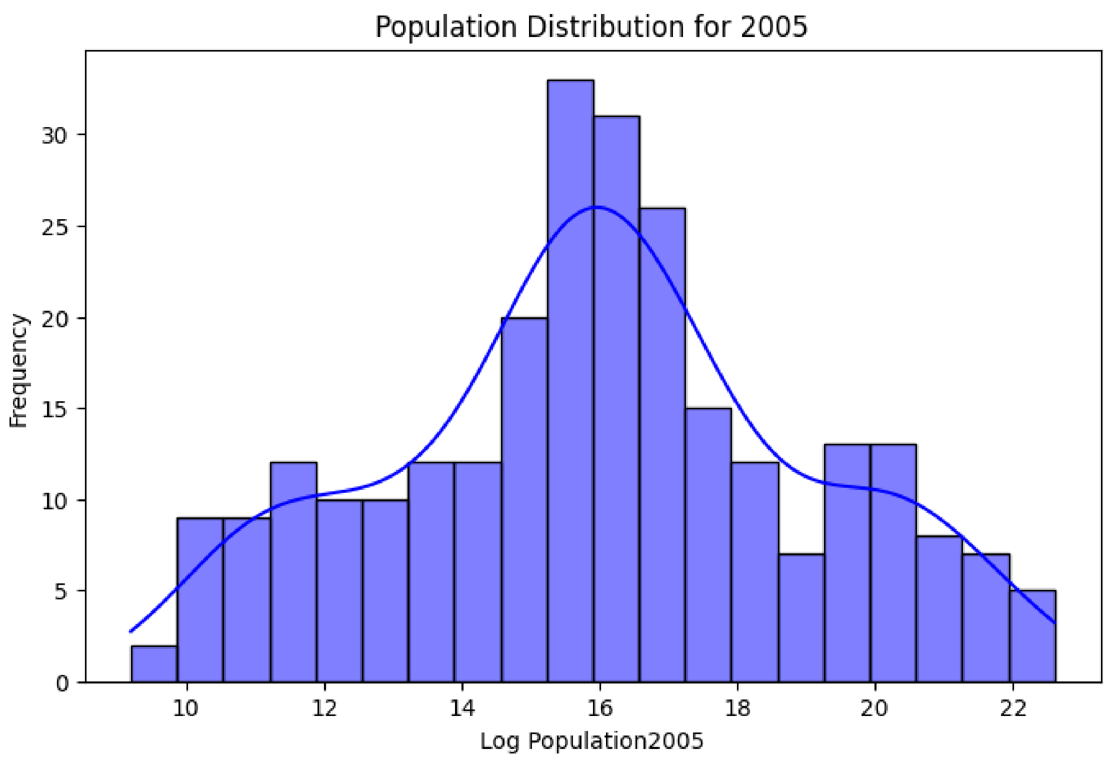
Population Distribution for 2005
Frequency
Log Population2005
0
5
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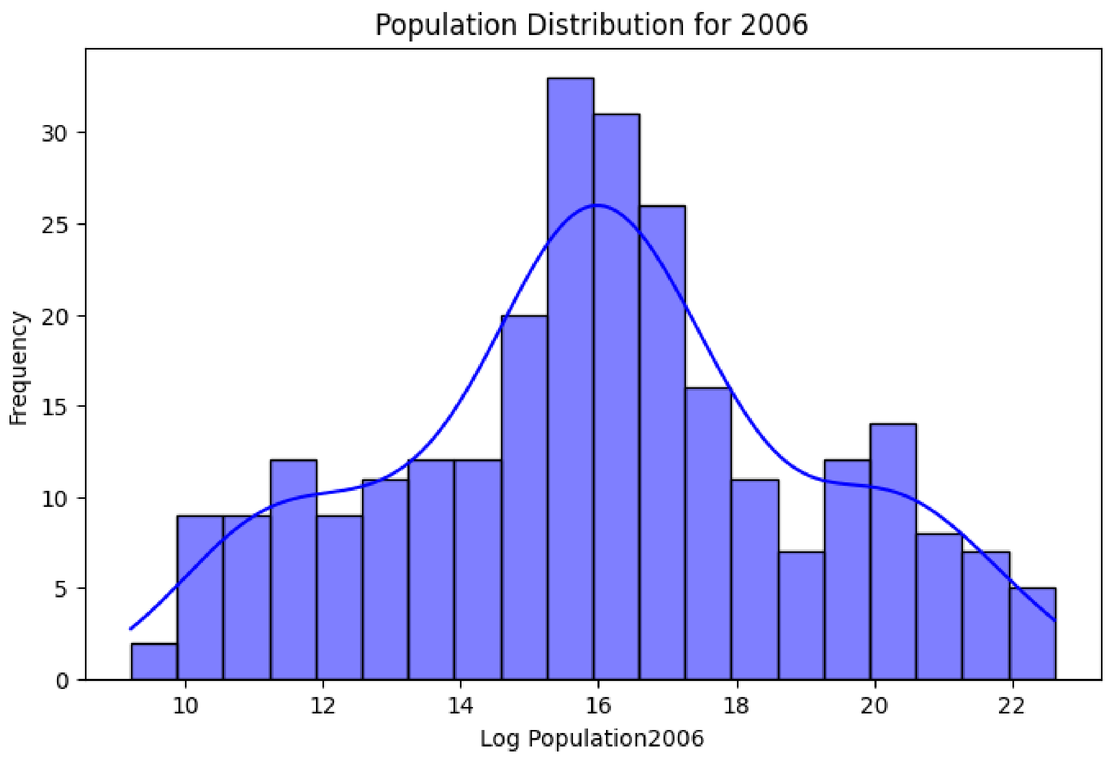
Population Distribution for 2006
Frequency
Log Population2006
0
5
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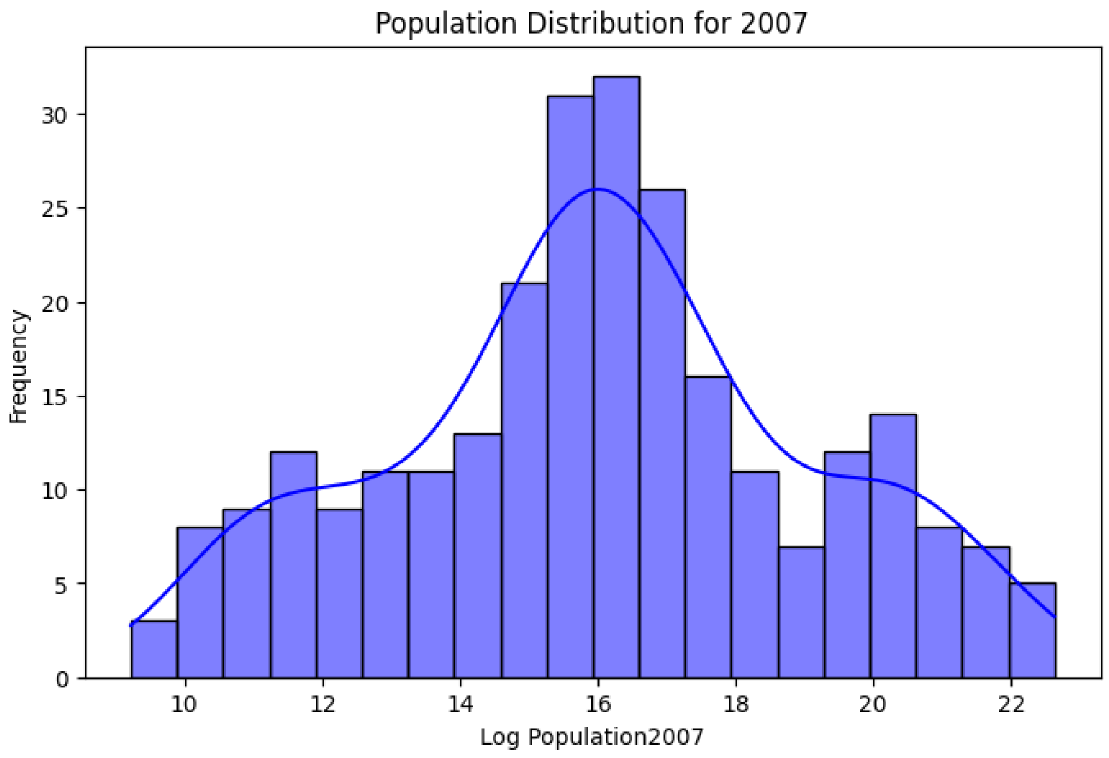
Population Distribution for 2007
Frequency
Log Population2007
0
5
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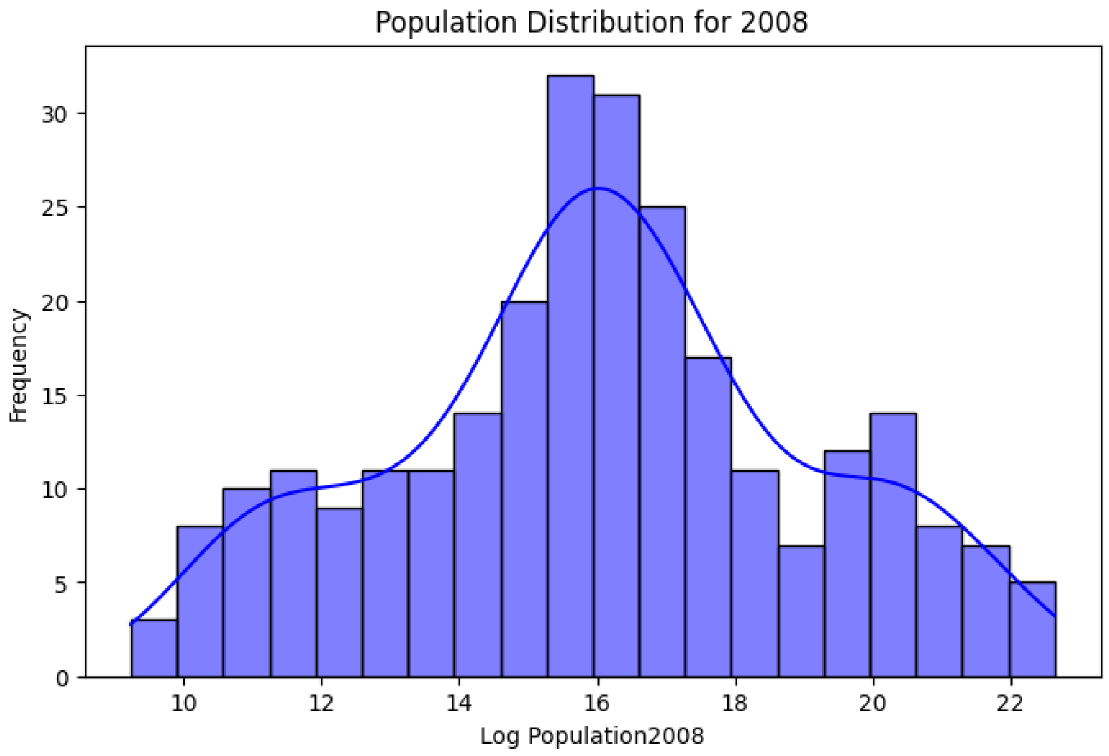
Population Distribution for 2008
Frequency
Log Population2008
0
5
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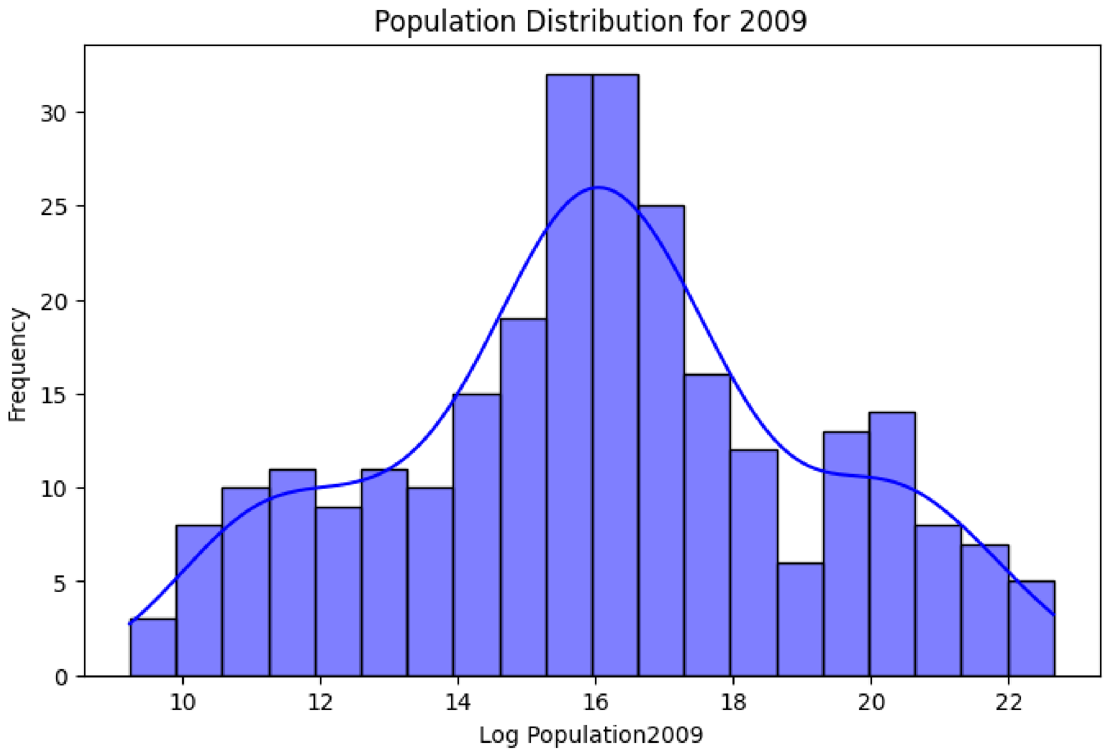
Population Distribution for 2009
Frequency
Log Population2009
0
5
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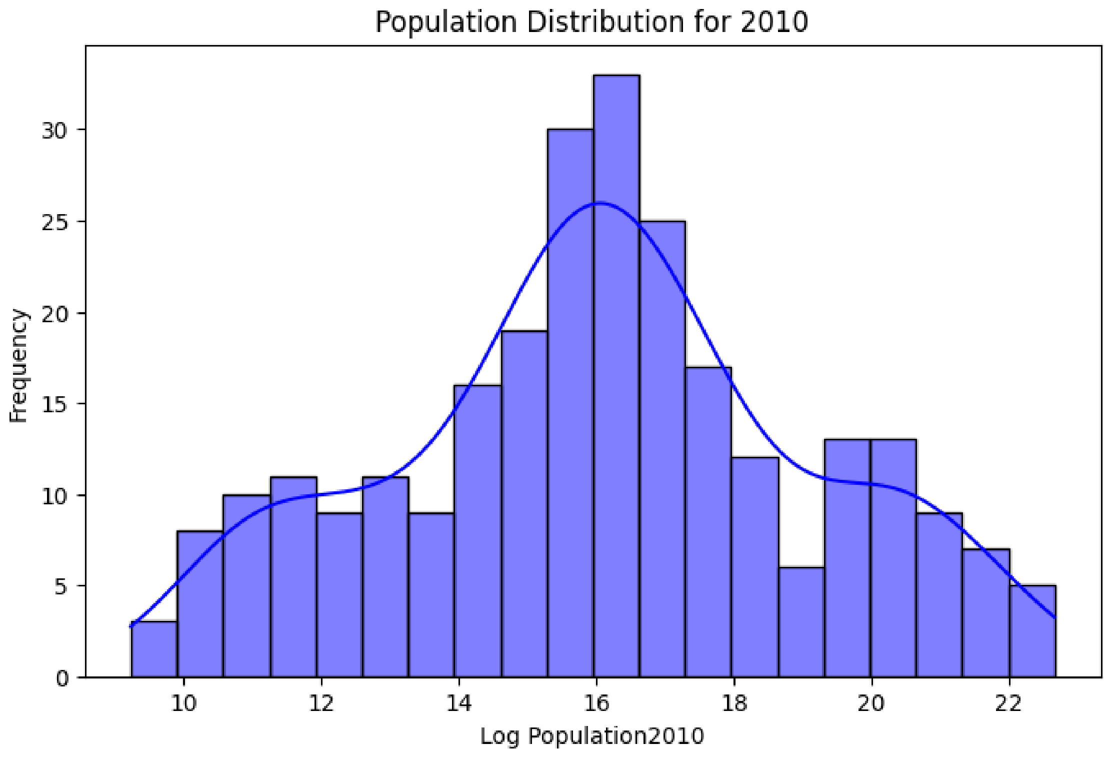
Population Distribution for 2010
Frequency
Log Population2010
0
5
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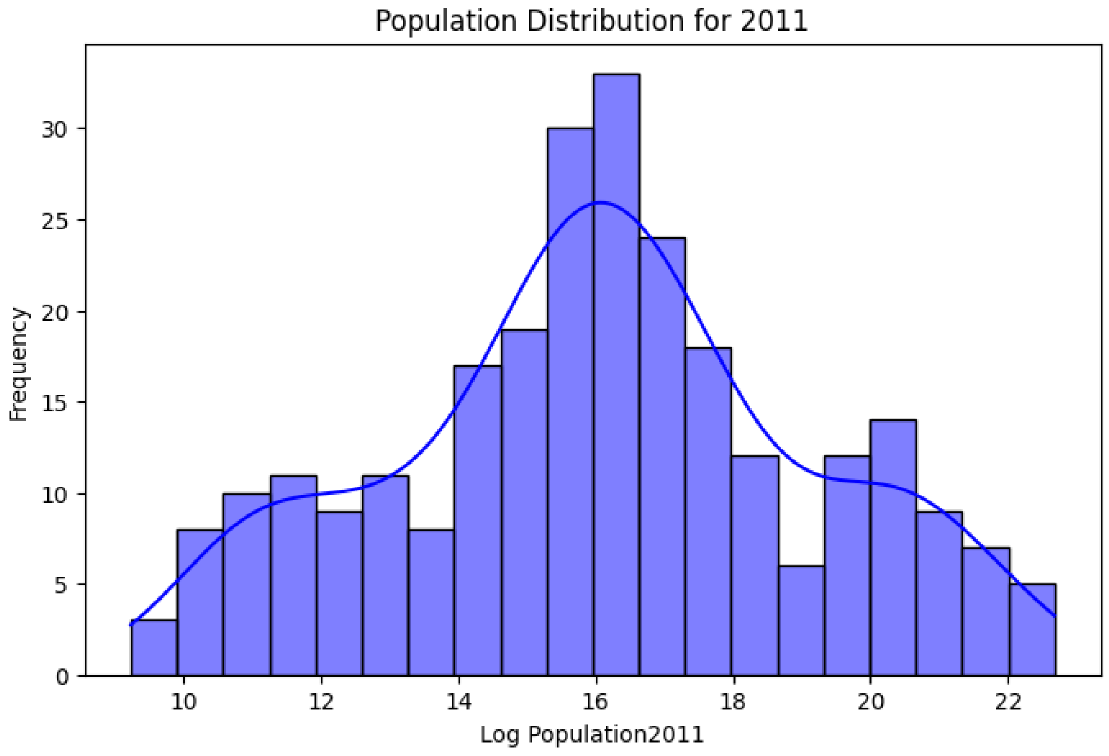
Population Distribution for 2011
Frequency
Log Population2011
0
5
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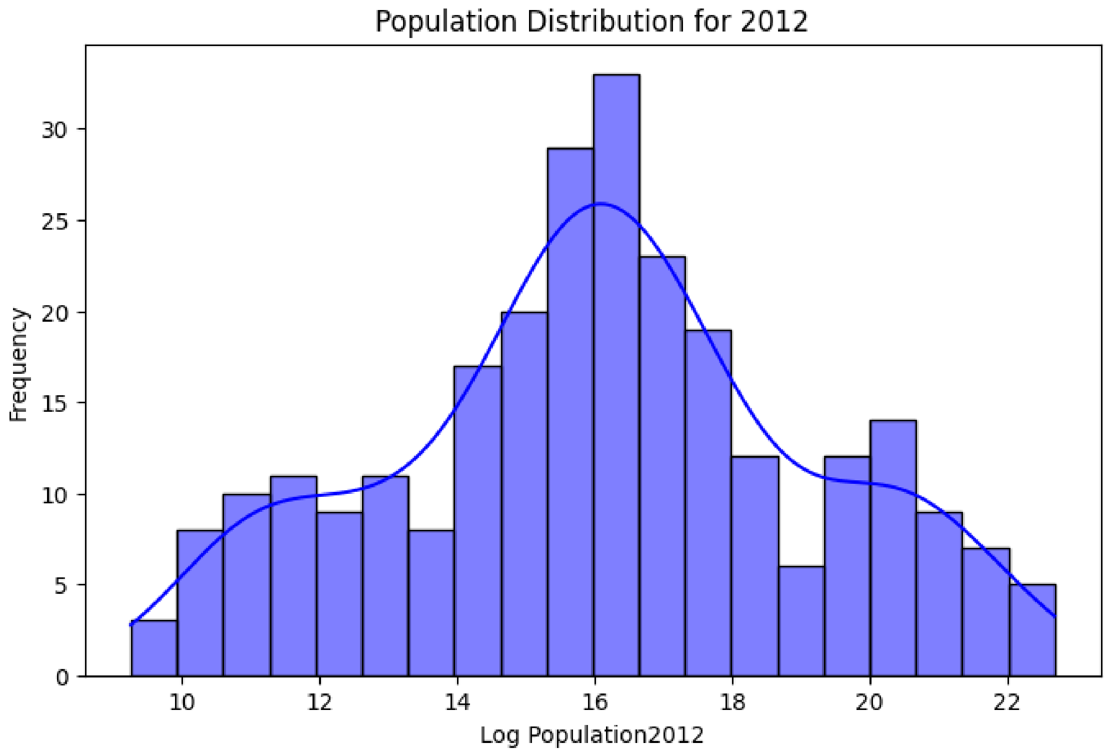
Population Distribution for 2012
Frequency
Log Population2012
0
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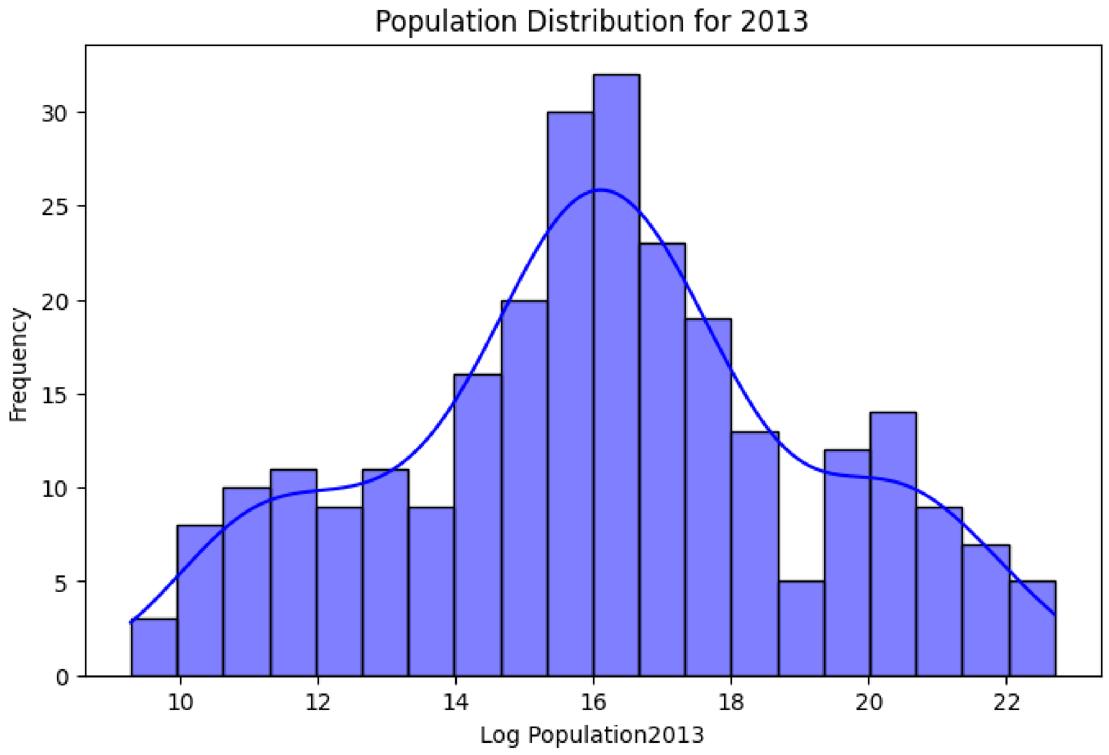
Population Distribution for 2013
Frequency
Log Population2013
0
5
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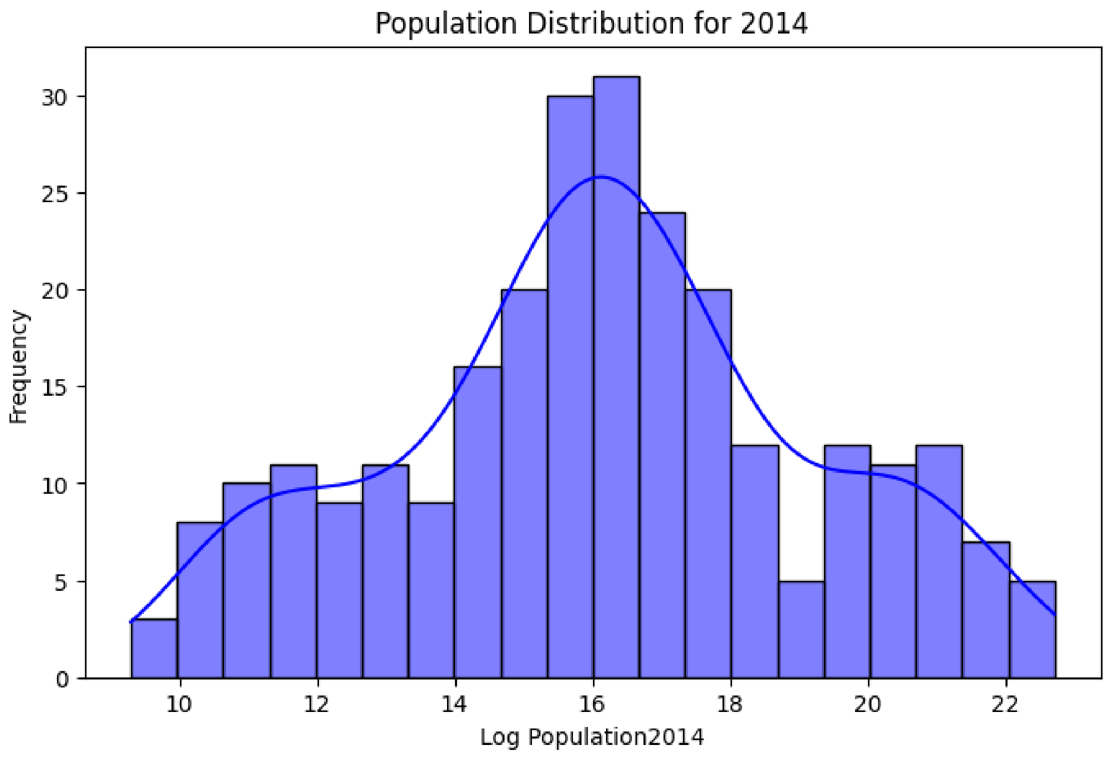
Population Distribution for 2014
Frequency
0
5
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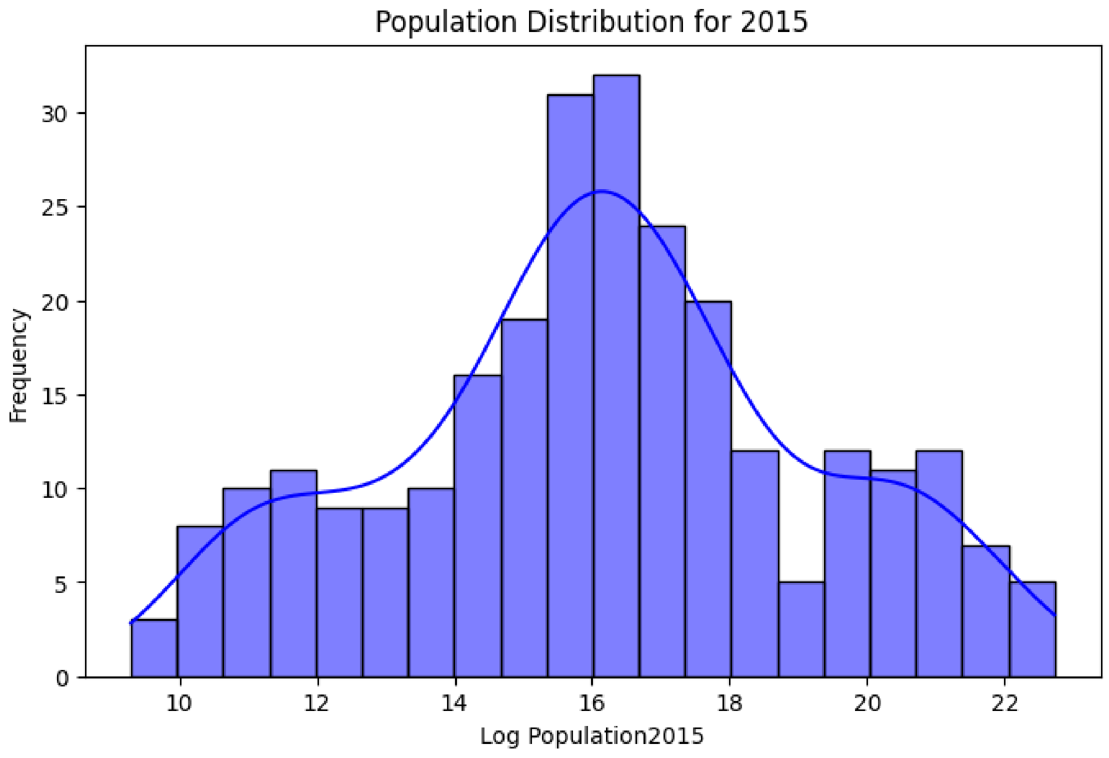
Log Population2014


Population Distribution for 2015
Frequency
Log Population2015
0
5
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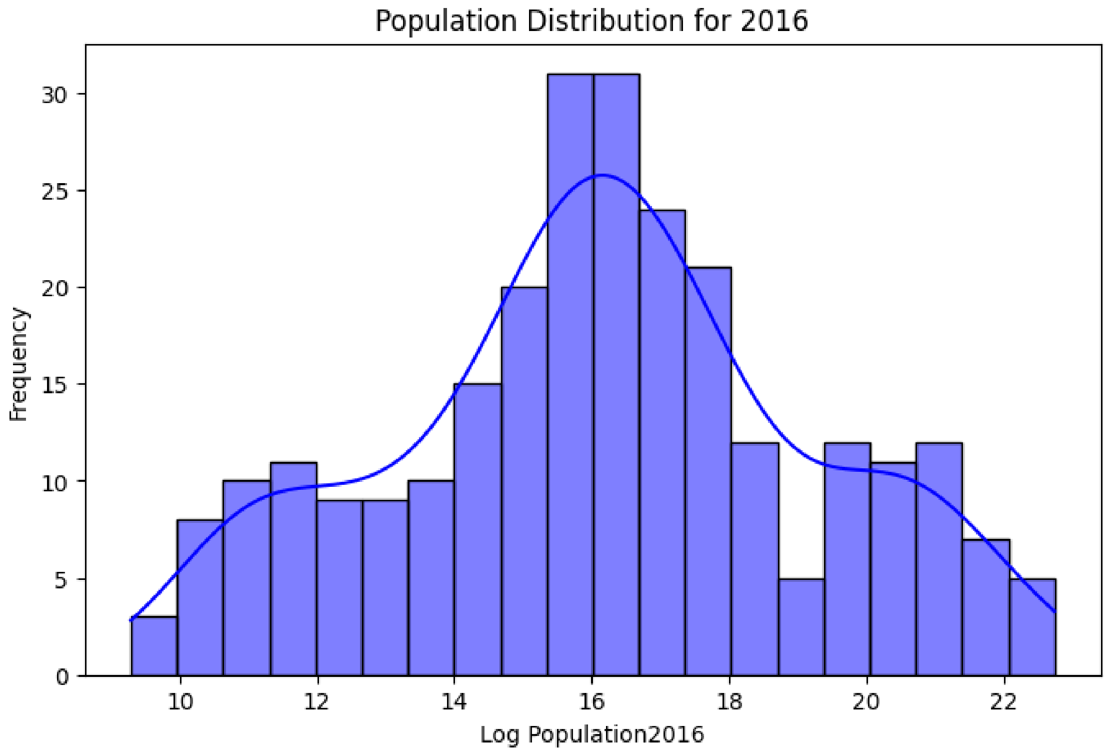
Population Distribution for 2016
Frequency
Log Population2016
0
5
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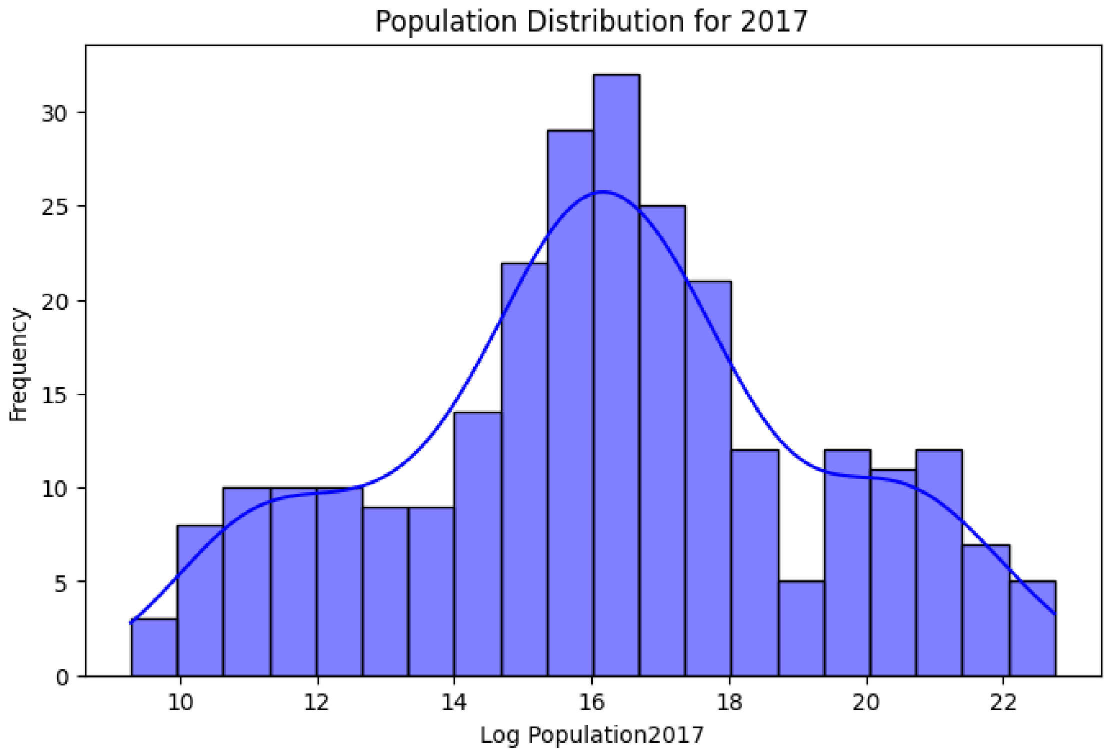
Population Distribution for 2017
Frequency
Log Population2017
0
5
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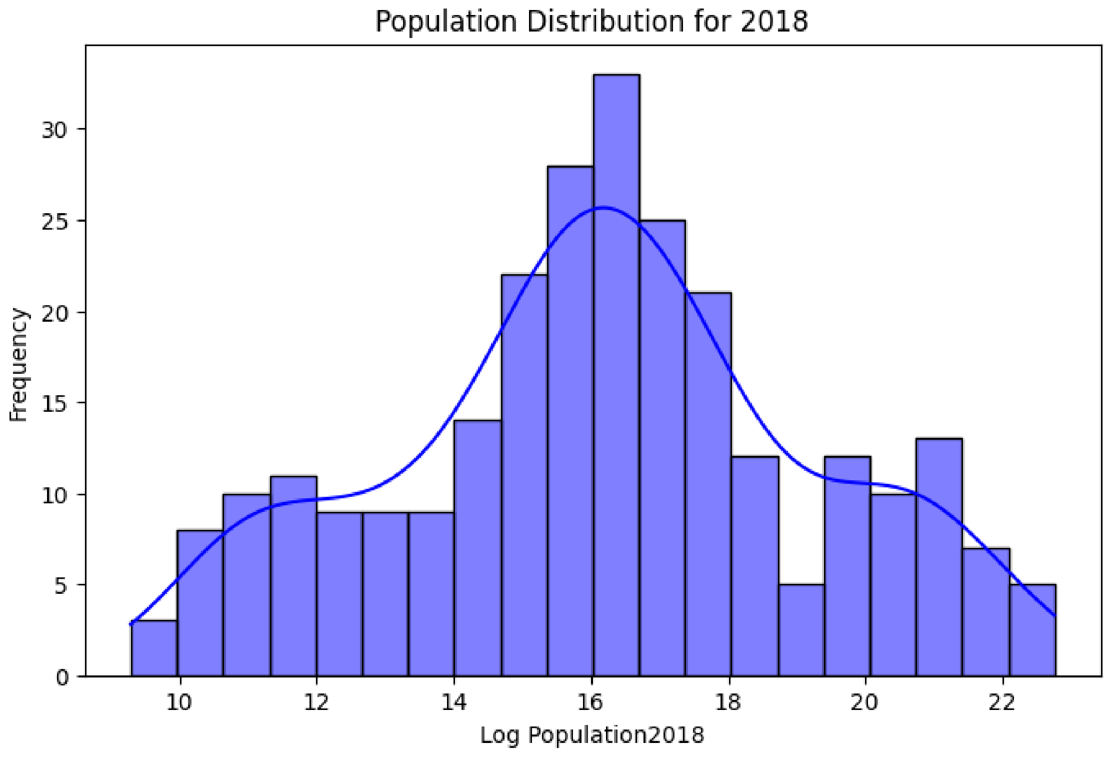
Population Distribution for 2018
Frequency
Log Population2018
0
5
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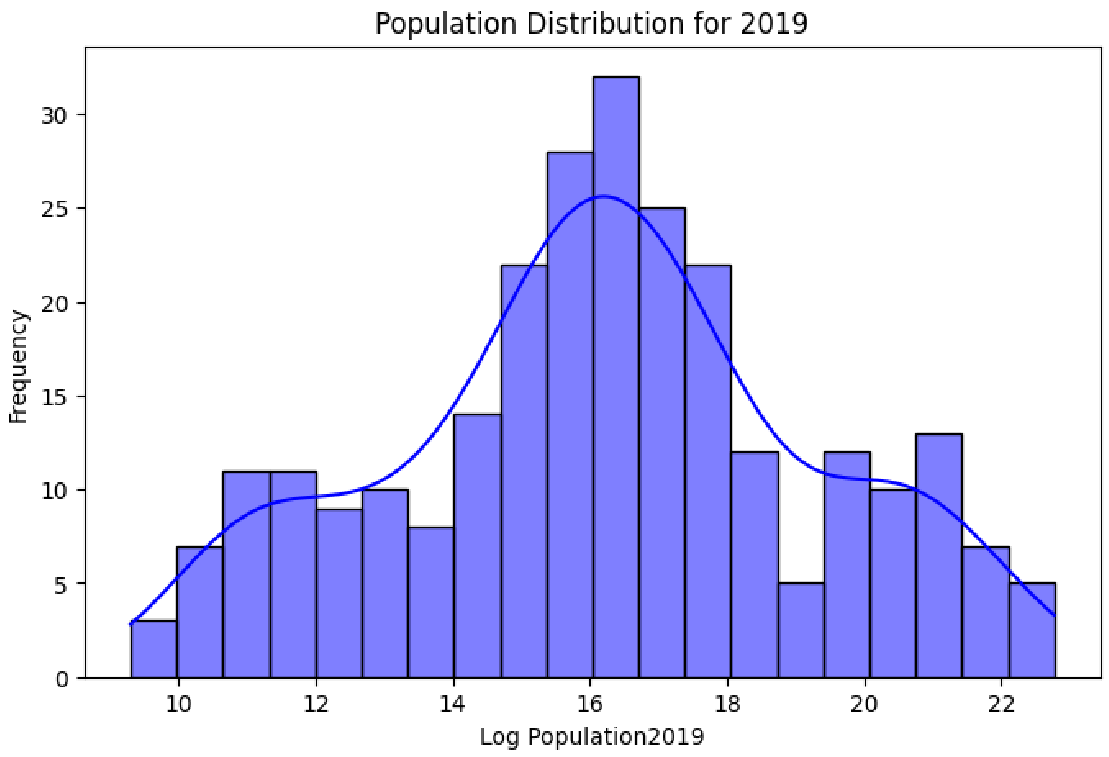
Population Distribution for 2019
Frequency
0
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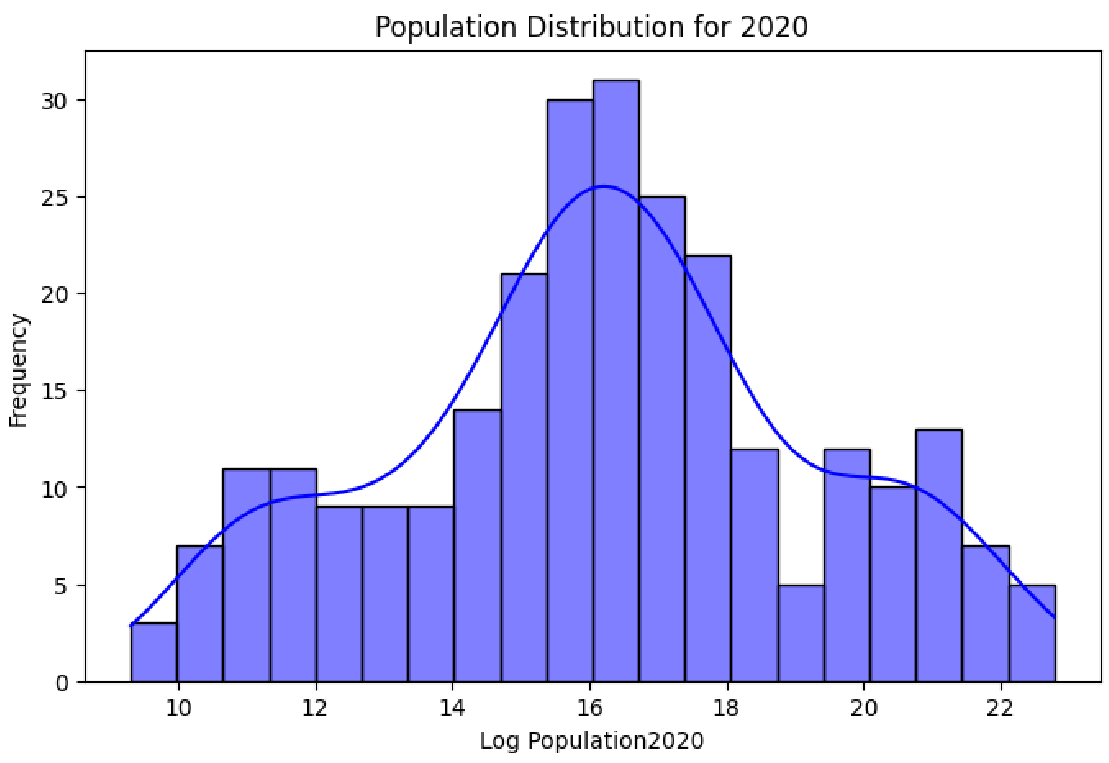
Log Population2019


Population Distribution for 2020
Frequency
Log Population2020
0
5
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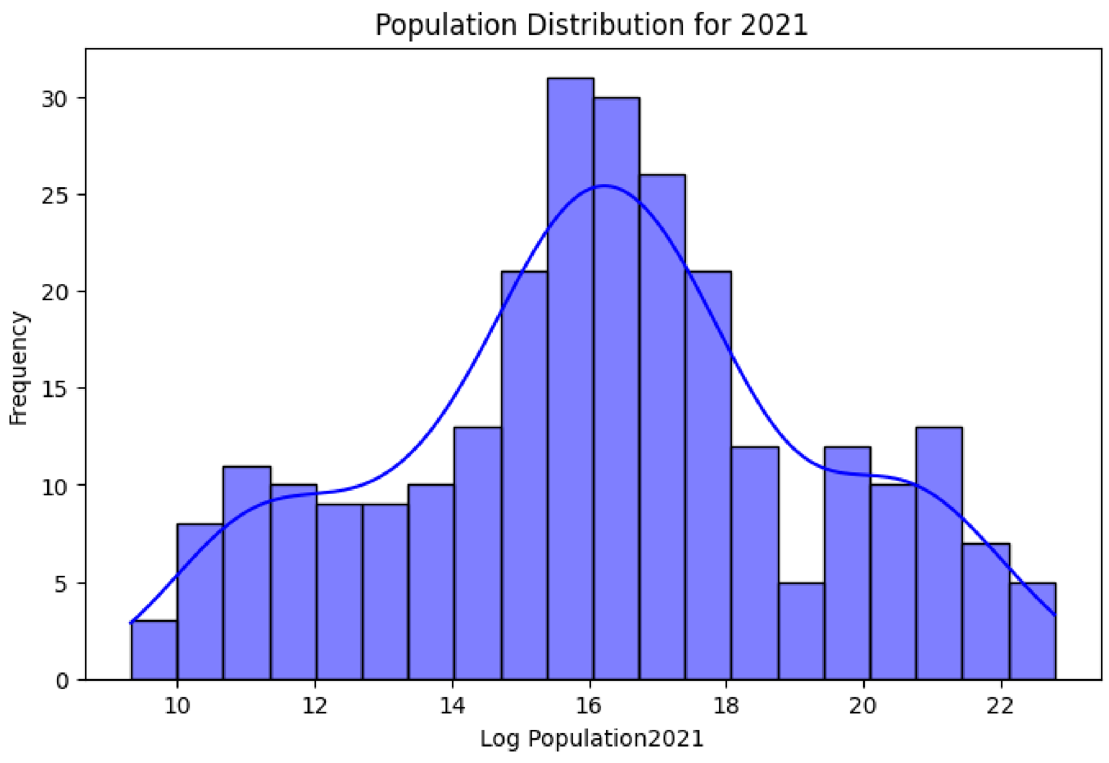
Population Distribution for 2021
Frequency
Log Population2021
0
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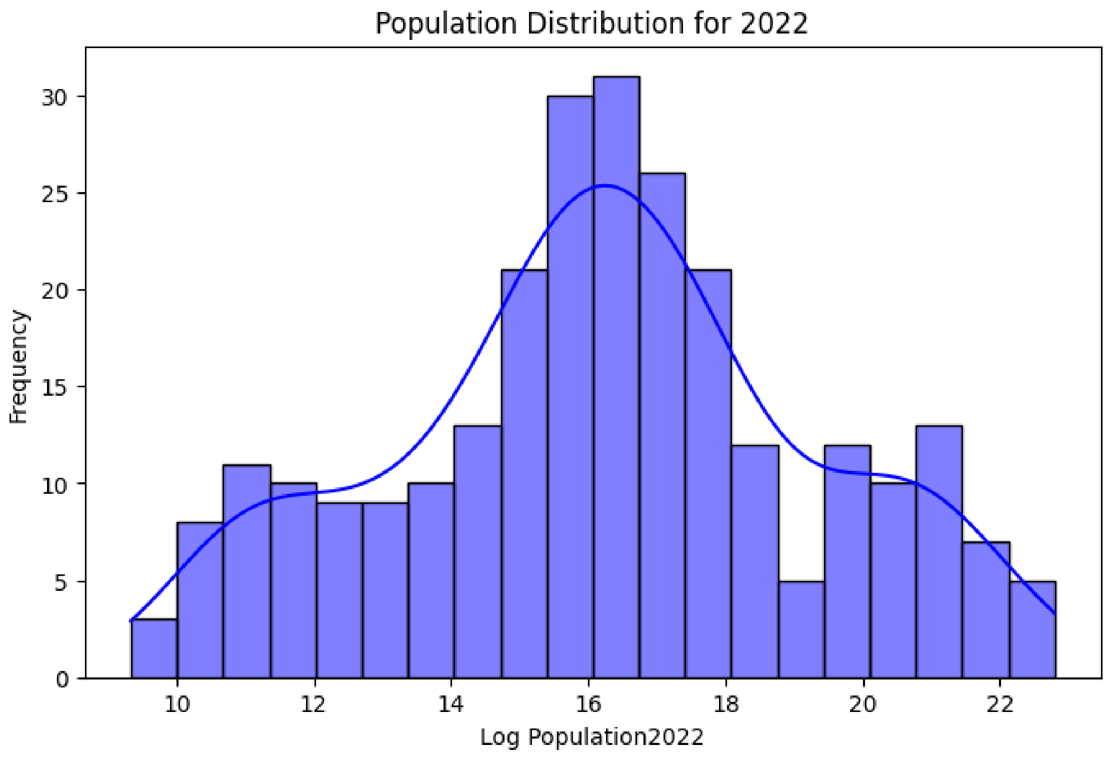


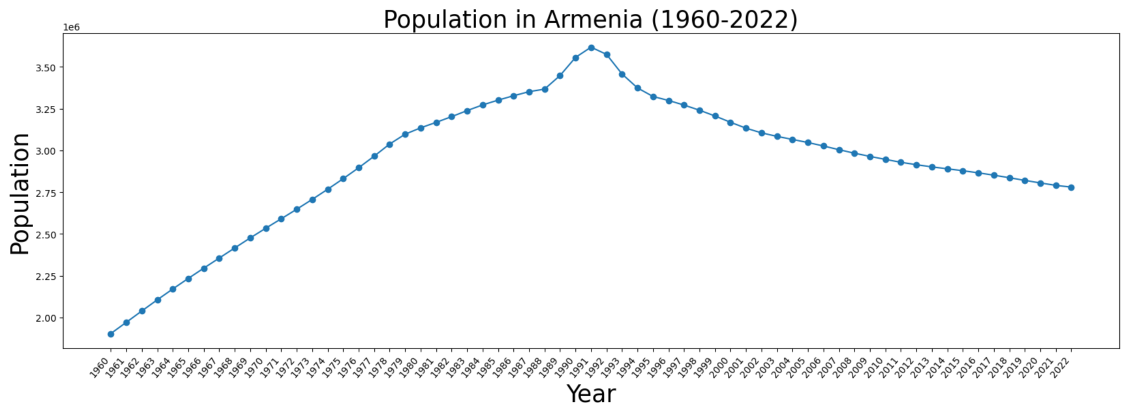
Visualization-ScattorPlot

[31]:
```
# Scatter plot for a specific country
def specific_country_scatterpolt(df,country_index_number):
  country=df['Country Name'][country_index_number]
  plt.figure(figsize=(20,6))
  years=df.columns[4:].to_list()
  population =df.iloc[country_index_number,4:]
  plt.plot(years, population, marker='o', linestyle='-')
  plt.xlabel('Year',fontsize=25)
  plt.ylabel('Population',fontsize=25)
  plt.title(f'Population in {country} (1960-2022)',fontsize=25)
  plt.xticks(rotation=50, ha='right')
```

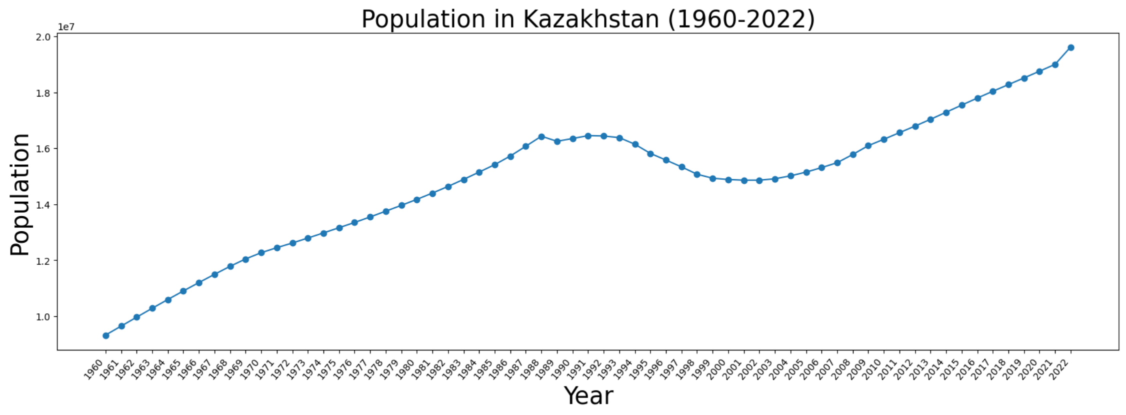
[32]:
```
df['Country Name'][100]
```

[32]:
```
'Haiti'
```

[33]:
```
specific_country_scatterpolt(df,10)
```



[34]:
```
specific_country_scatterpolt(df,120)
```



[35]:
```
# BY HARI
```

[36]:
```
# Happy coding.
```