DSC640 Assignment 6.2

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In [1]:
```
# Import required modules

import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import math
from matplotlib.ticker import FuncFormatter
import plotly
import plotly.figure_factory as ff
from pandas.plotting import parallel_coordinates
import numpy as np

%matplotlib inline
```

Data load and transformation

In [2]:
```
education = pd.read_csv('ex6-2/education.csv')
crime = pd.read_csv('ex6-2/crimeratesbystate-formatted.csv')
birthrate = pd.read_csv('ex6-2/birth-rate.csv')

# remove whitespaces from crime dataset (sine we have already encountered i
education = education.applymap(lambda x: x.strip() if type(x) is str else x
crime = crime.applymap(lambda x: x.strip() if type(x) is str else x)
birthrate = birthrate.applymap(lambda x: x.strip() if type(x) is str else x
```

Histogram

Distribution of birth rate

In [3]:
```
birthrate_hist = pd.melt(birthrate, id_vars="Country", var_name="Year", val
birthrate_hist["BirthRate_int"] = birthrate_hist["BirthRate"].apply(lambda
birthrate_hist.head()
```

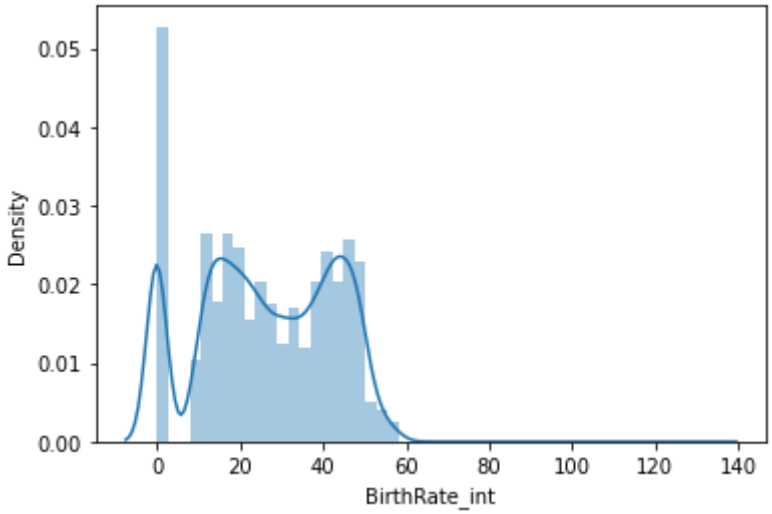
Out[3]:

	Country	Year	BirthRate	BirthRate_int
0	Aruba	1960	36.400	37
1	Afghanistan	1960	52.201	53
2	Angola	1960	54.432	55
3	Albania	1960	40.886	41
4	Netherlands Antilles	1960	32.321	33

In [4]:
```
sns.distplot( birthrate_hist["BirthRate_int"] )
```

```
/Users/anjanibonda/opt/anaconda3/lib/python3.9/site-packages/seaborn/distributions.py:2619: FutureWarning: `distplot` is a deprecated function and will be removed in a future version. Please adapt your code to use either `displot` (a figure-level function with similar flexibility) or `histplot` (an axes-level function for histograms).
  warnings.warn(msg, FutureWarning)
```

Out[4]: <AxesSubplot:xlabel='BirthRate_int', ylabel='Density'>

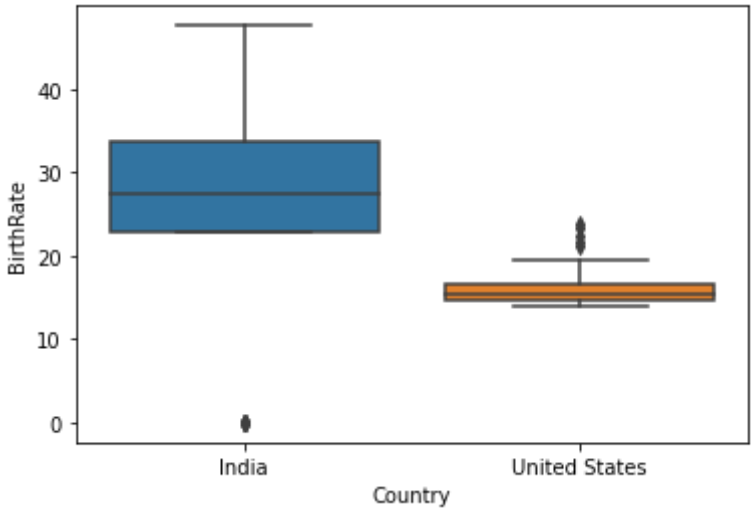


Box plot

Comparison of birthrate between India and USA

In [5]:
```
birthrate_box = birthrate_hist[(birthrate_hist["Country"]=="United States")
sns.boxplot(x = birthrate_box["Country"], y=birthrate_box["BirthRate"])
```

Out[5]: <AxesSubplot:xlabel='Country', ylabel='BirthRate'>



Bullet chart

US burglary statistics against some dummy benchmark

In [6]:
```
# transform data
crime_bullet = crime[crime["state"]=="United States"][["state","burglary"]]
crime_bullet['target'] = 500
crime_bullet_tuple = [tuple(x) for x in crime_bullet.values][0]


# set parameter for bullet chart
limits = [300, 500, 1000]
palette = sns.color_palette("Blues_r", len(limits))
fig, ax = plt.subplots()
ax.set_aspect('equal')
ax.set_yticks([1])
ax.set_yticklabels='United States'

prev_limit = 0
for idx, lim in enumerate(limits):
    ax.barh([1], lim-prev_limit, left=prev_limit, height=75, color=palette[
    prev_limit = lim

# draw the value we're measuring
ax.barh([1], crime_bullet_tuple[1], color='black', height=45)

ax.axvline(crime_bullet_tuple[2], color="gray", ymin=0.10, ymax=0.9)
```

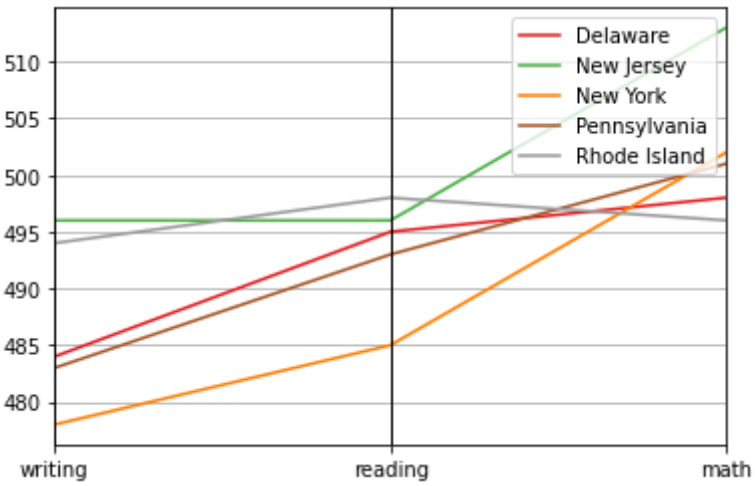
Out[6]:
```
<matplotlib.lines.Line2D at 0x7fd1e43fbc10>
```

Parallel Coordinate plot

Comparison of reading, writing and math numbers between 5 states

In [7]:
```
# transform data
education_parallel = education[education['state'].isin(['New York','New Jer

# make the plot
parallel_coordinates(education_parallel, 'state', colormap=plt.get_cmap("Se
plt.show()
```



Pie chart

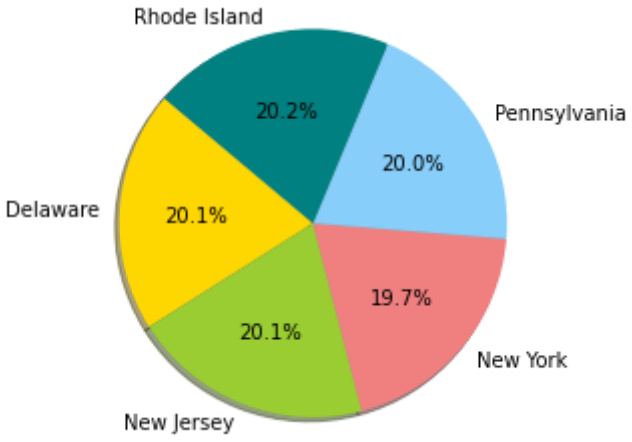
Comparison of reading numbers between 5 states

In [8]:
```
# transform data
education_pie = education_parallel[['state','reading']]

# set colors
colors = ['gold', 'yellowgreen', 'lightcoral', 'lightskyblue','teal']

# plot
plt.pie(education_pie['reading'], labels=education_pie['state'], colors=col
autopct='%1.1f%%', shadow=True, startangle=140)

plt.axis('equal')
plt.show()
```



Donought chart

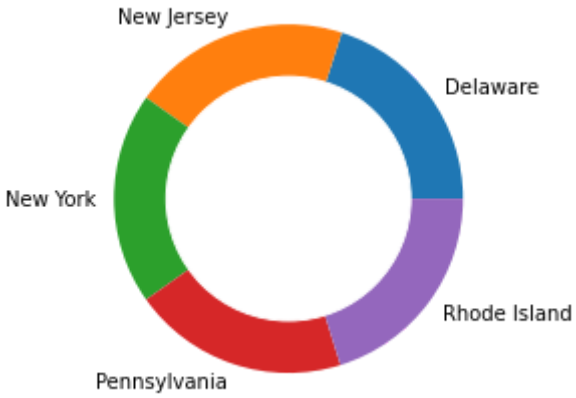
Comparison of reading, writing and math numbers between 5 states

In [9]:
```
# transform data
education_donut = education_pie

# create a pieplot
plt.pie(education_donut['reading'], labels=education_donut['state'])

# add a circle at the center
my_circle=plt.Circle( (0,0), 0.7, color='white')
p=plt.gcf()
p.gca().add_artist(my_circle)

plt.show()
```



In [ ]:
```

```

Assignment 6.2

Anjani Bonda

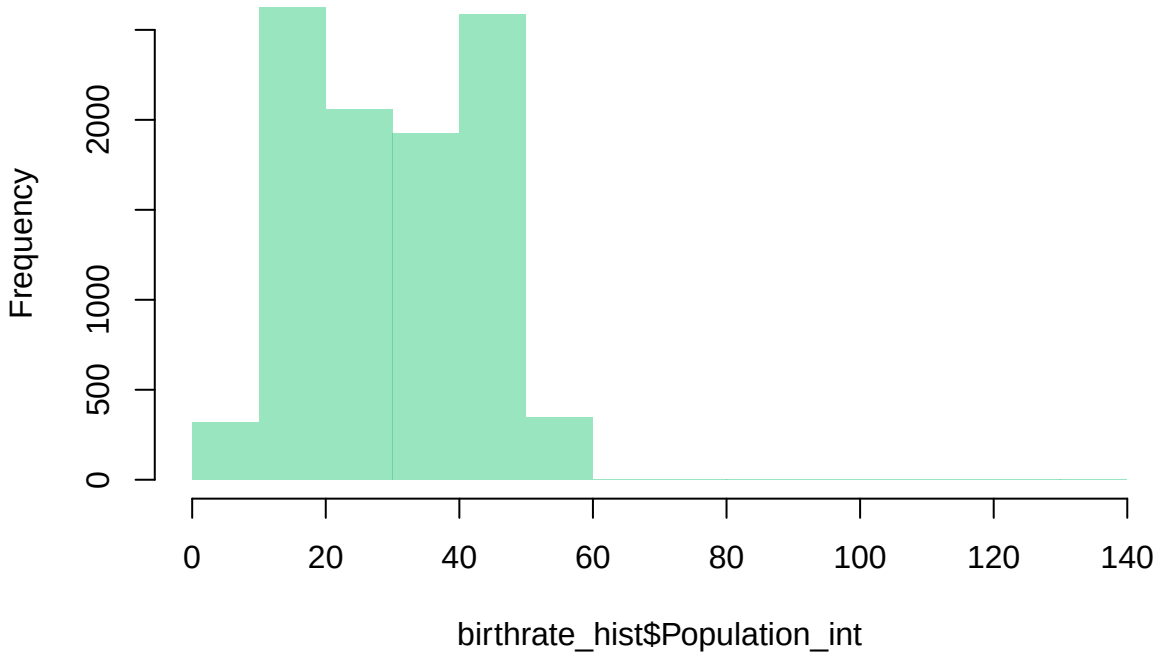
3/3/2023

These two weeks we are going to be focused on histograms, box plots, and bullet charts and using various tools to create these visualizations. You must consolidate all the charts into ONE document with each chart labeled with the type of chart and technology - for example: Python - Bar Chart. Failure to label and consolidate the charts will resort in points being taken off or a 0 for the assignment.

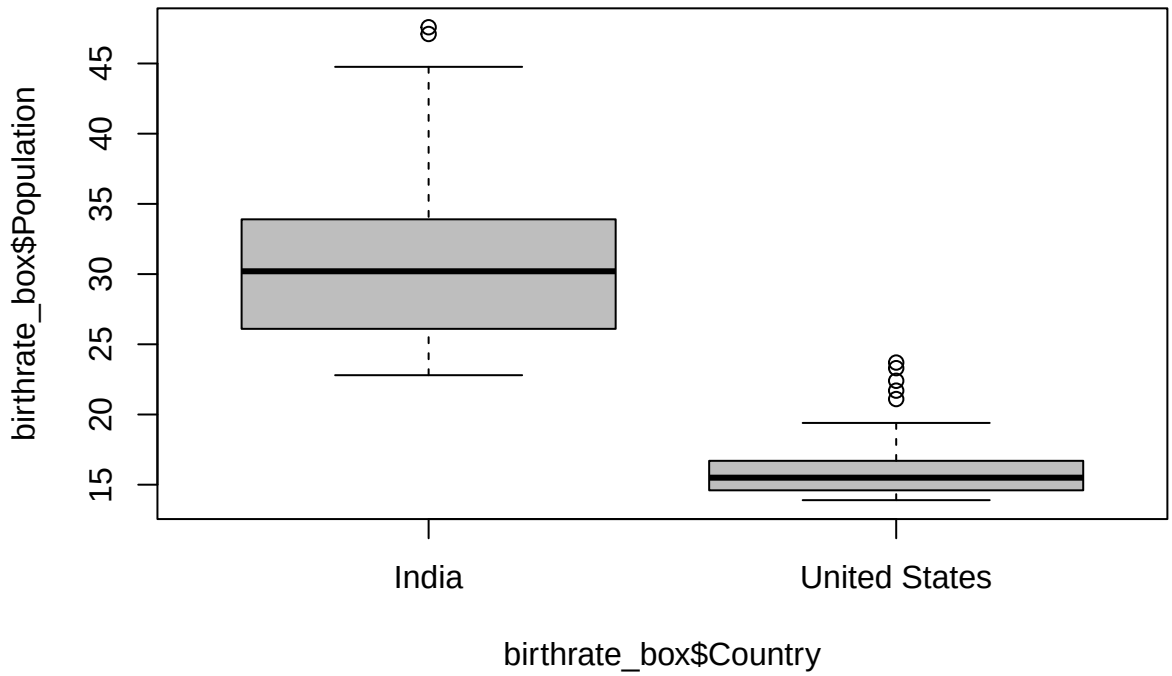
```
##  [1] "Country" "X1960"   "X1961"   "X1962"   "X1963"   "X1964"   "X1965"
##  [8] "X1966"   "X1967"   "X1968"   "X1969"   "X1970"   "X1971"   "X1972"
## [15] "X1973"   "X1974"   "X1975"   "X1976"   "X1977"   "X1978"   "X1979"
## [22] "X1980"   "X1981"   "X1982"   "X1983"   "X1984"   "X1985"   "X1986"
## [29] "X1987"   "X1988"   "X1989"   "X1990"   "X1991"   "X1992"   "X1993"
## [36] "X1994"   "X1995"   "X1996"   "X1997"   "X1998"   "X1999"   "X2000"
## [43] "X2001"   "X2002"   "X2003"   "X2004"   "X2005"   "X2006"   "X2007"
## [50] "X2008"
```

```
##  [1] "Country" "1960"    "1961"    "1962"    "1963"    "1964"    "1965"
##  [8] "1966"    "1967"    "1968"    "1969"    "1970"    "1971"    "1972"
## [15] "1973"    "1974"    "1975"    "1976"    "1977"    "1978"    "1979"
## [22] "1980"    "1981"    "1982"    "1983"    "1984"    "1985"    "1986"
## [29] "1987"    "1988"    "1989"    "1990"    "1991"    "1992"    "1993"
## [36] "1994"    "1995"    "1996"    "1997"    "1998"    "1999"    "2000"
## [43] "2001"    "2002"    "2003"    "2004"    "2005"    "2006"    "2007"
## [50] "2008"
```

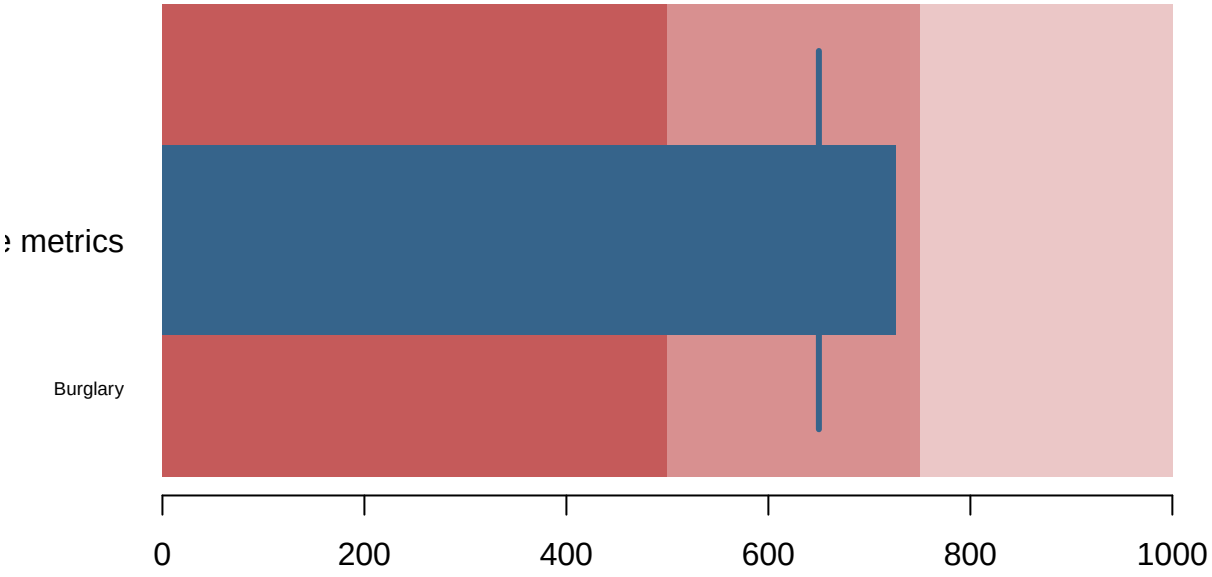
Plot1: Histogram



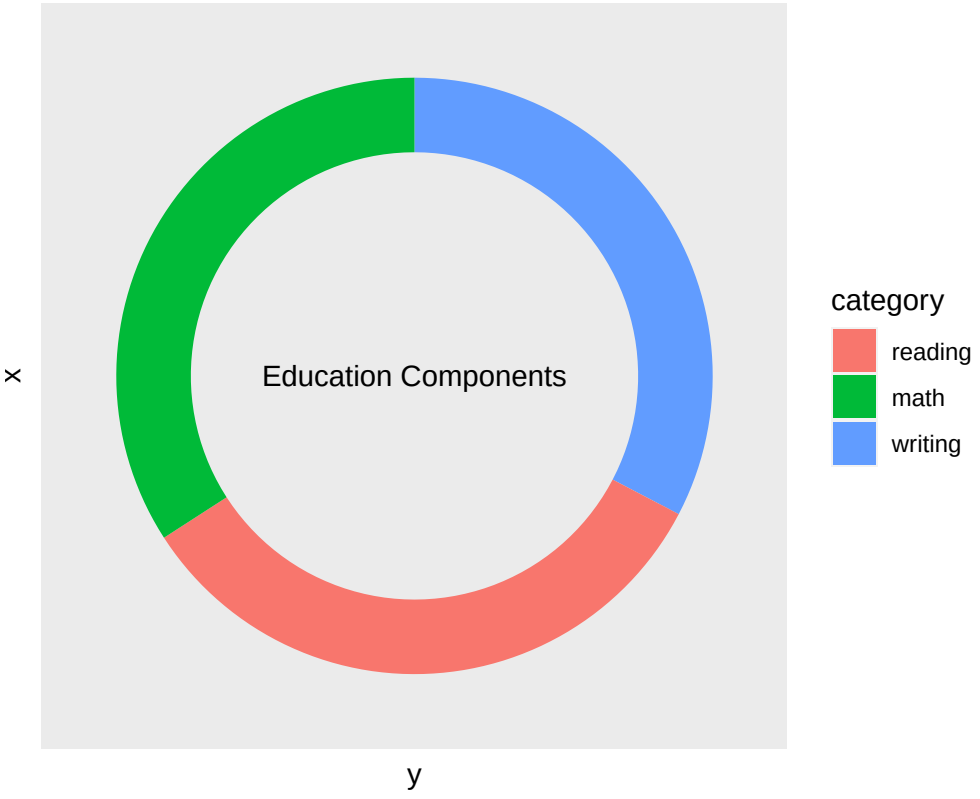
Plot2: Box Plot



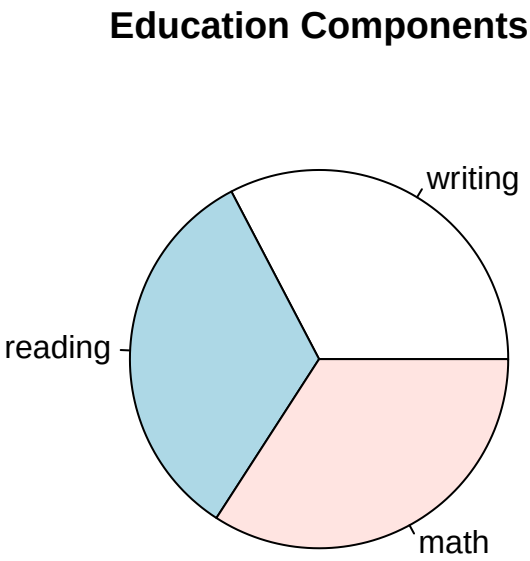
Plot3: Bullet Chart



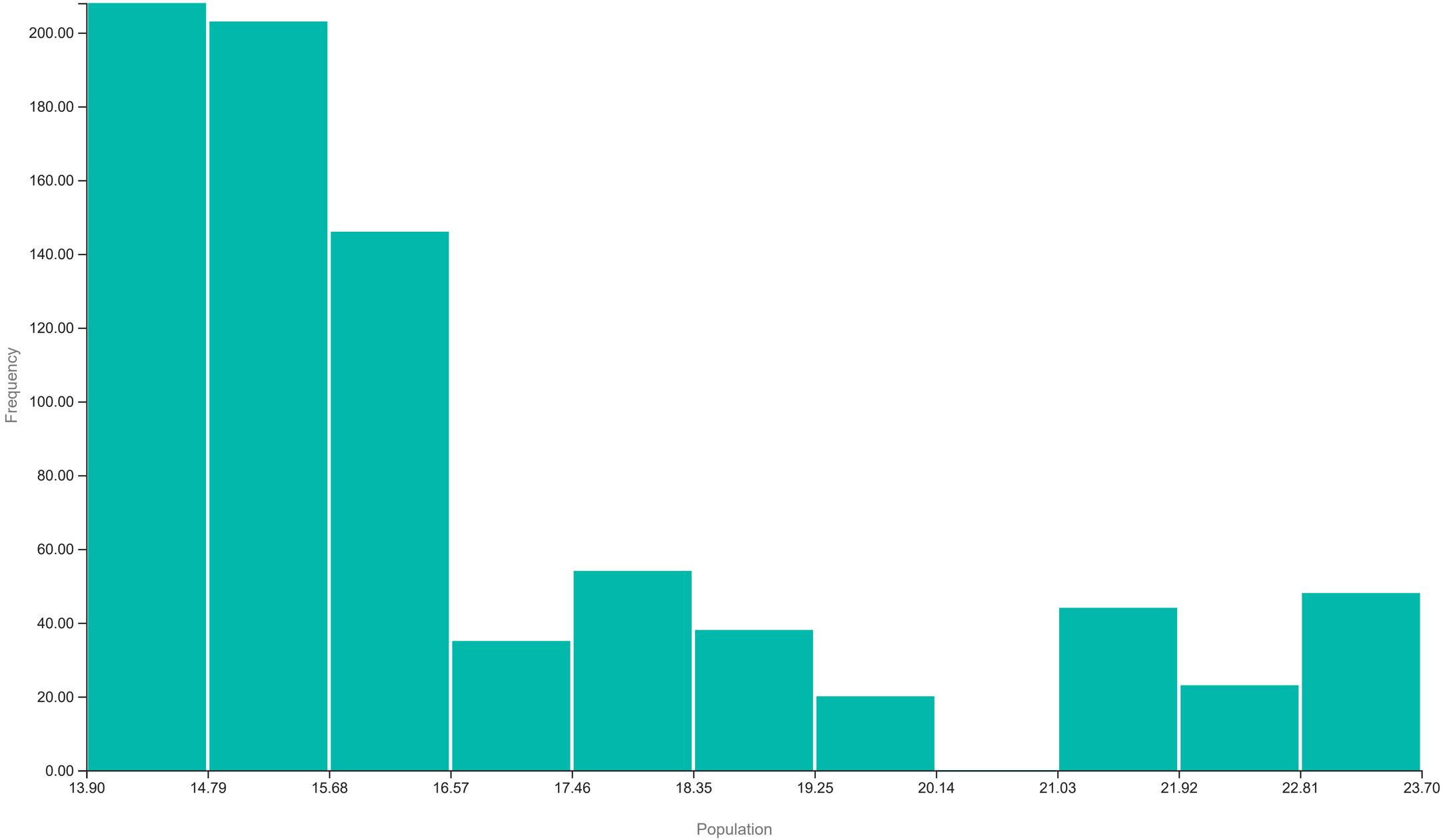
Plot4: Donut Chart



Plot5: Pie Chart

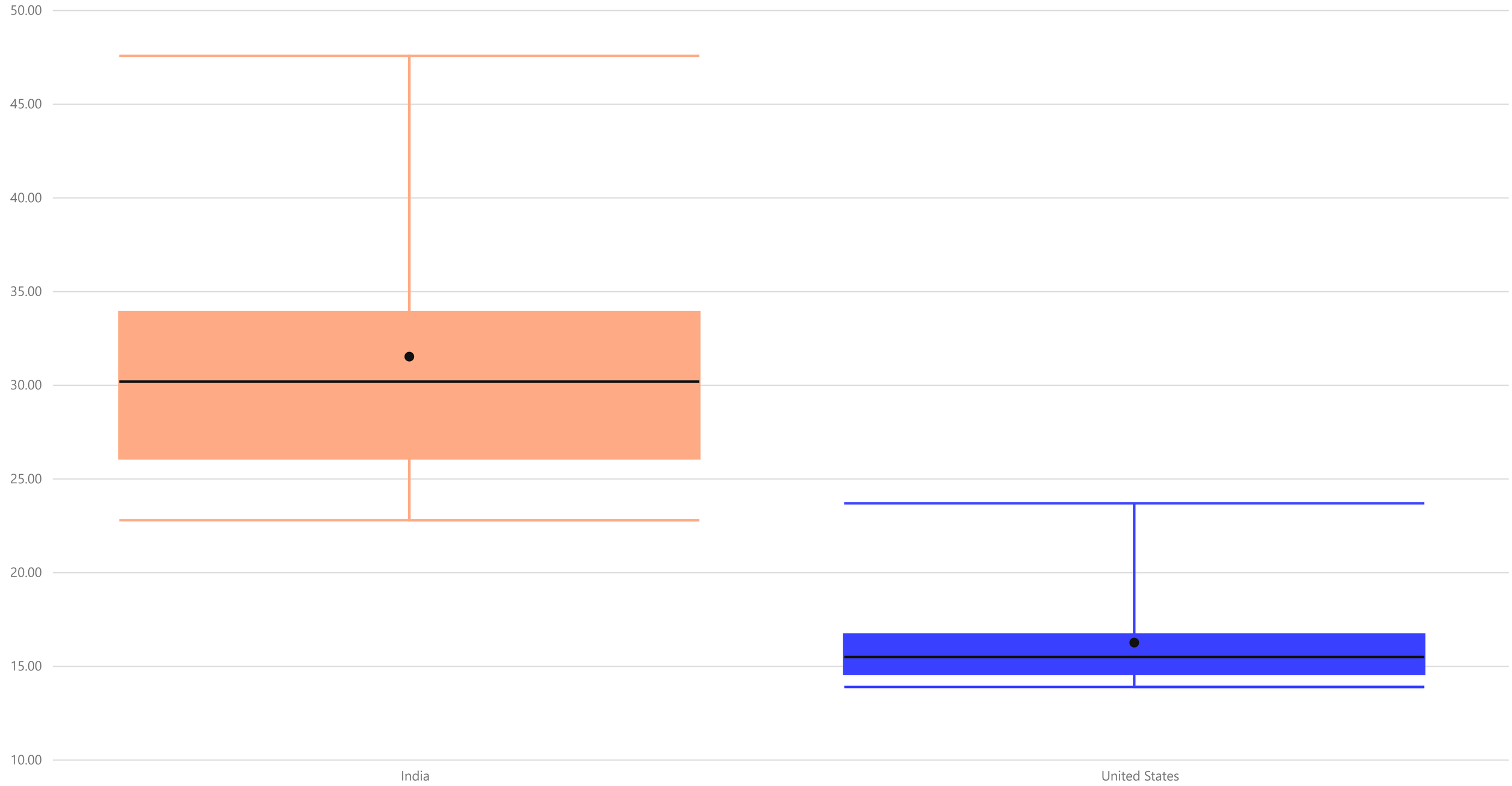


USA Population Rate Changes

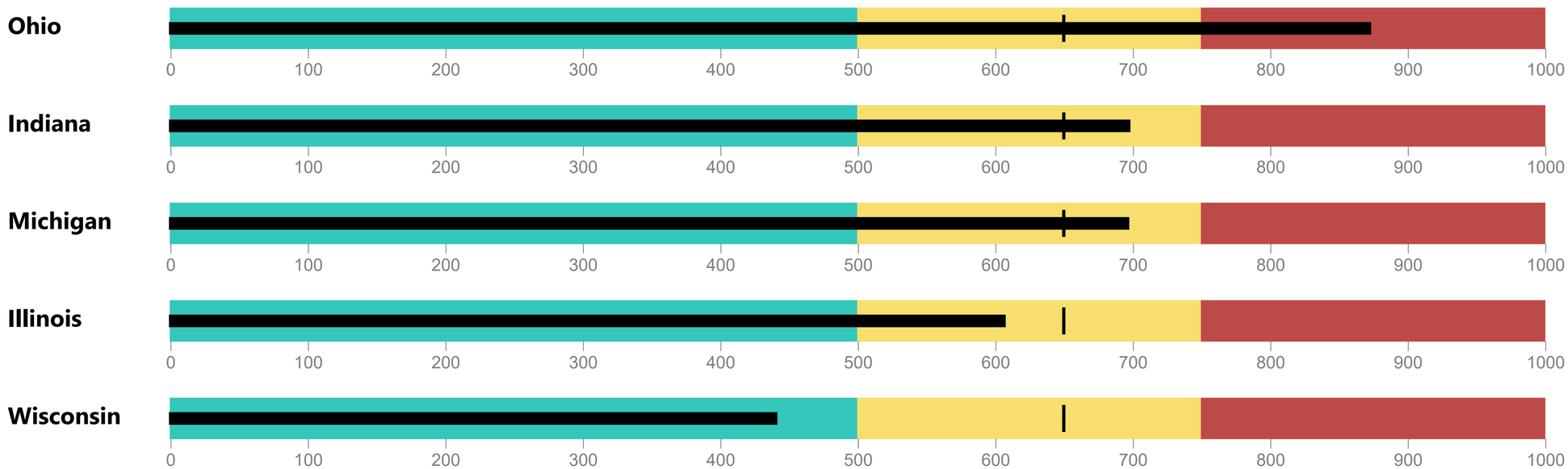


Ceiling value of population has been used to reduce the number of groups

Population sampled over all years for India and USA

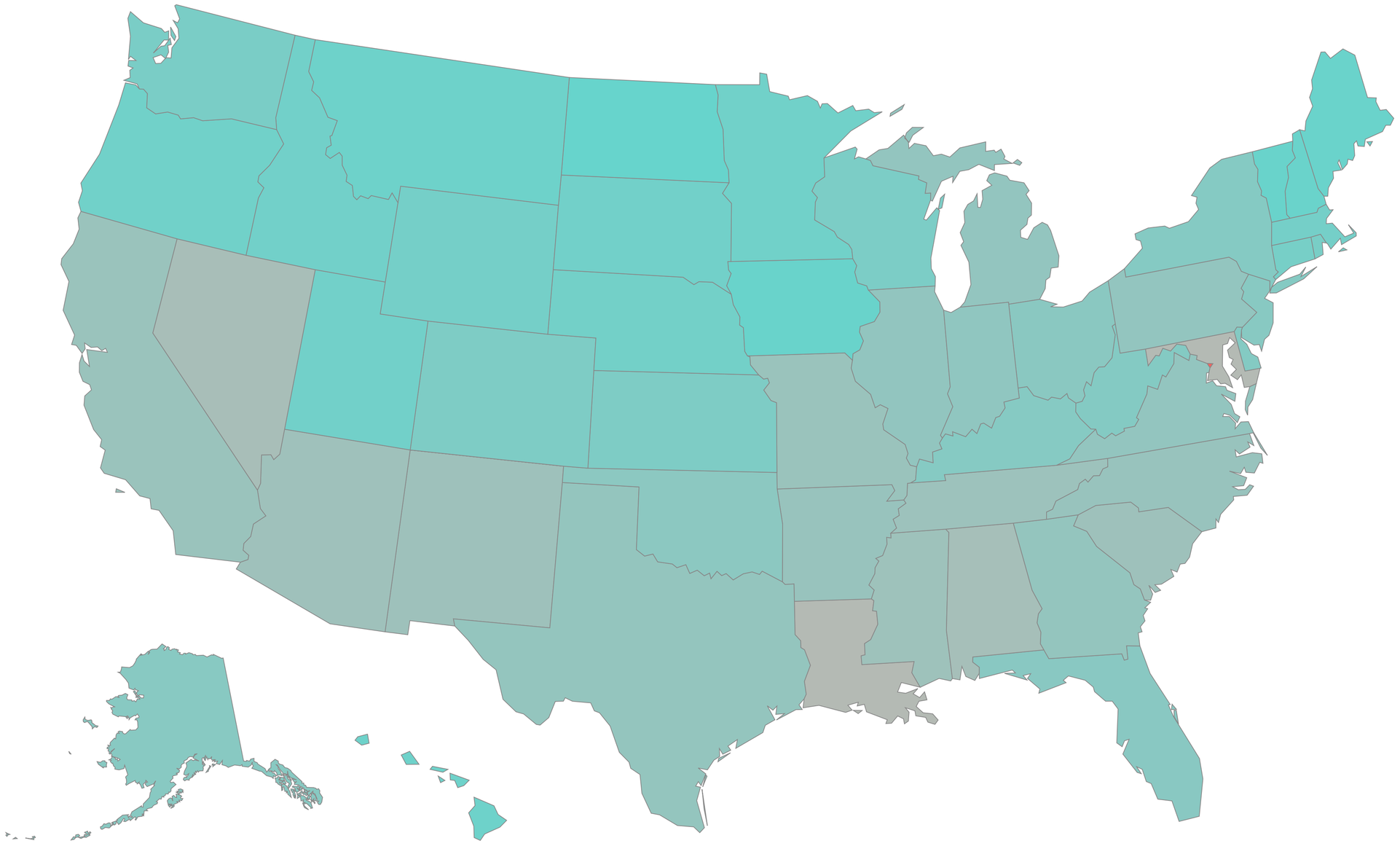


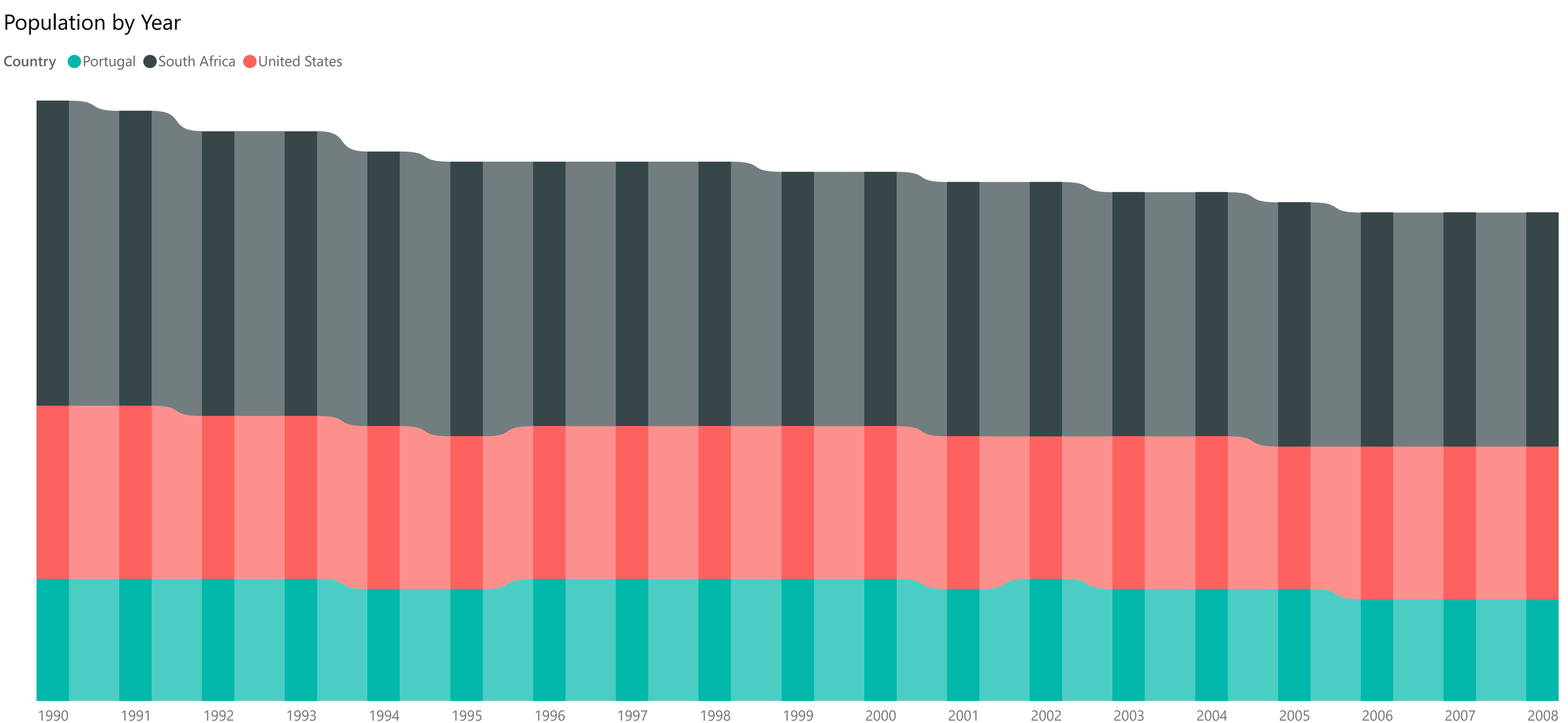
Theft Crime comparison in East North Central States of USA



Ohio, Indiana, Michigan and Illinois are the four East North Central states of USA, chosen for the bullet chart, to keep the visualization limited. The green bar shows number of burglary incident marked as 'Safe', yellow represents 'Moderate' and red represents 'Unsafe'. The tick mark is the targeted theft crime index and the black bar is the actual. The further away the bar is from the tick, towards the green part, the safer.

Count of murder crimes by State





Population and population changes over year - Comparison between Portugal, South Africa and USA for the period of 1990 to 2008

This visual does not support exporting.

Correlation of robbery and murder plotted in a hex bin scatter chart where each hexagon shows in density by color intensity