

Basic plots with Matplotlib

INTERMEDIATE PYTHON



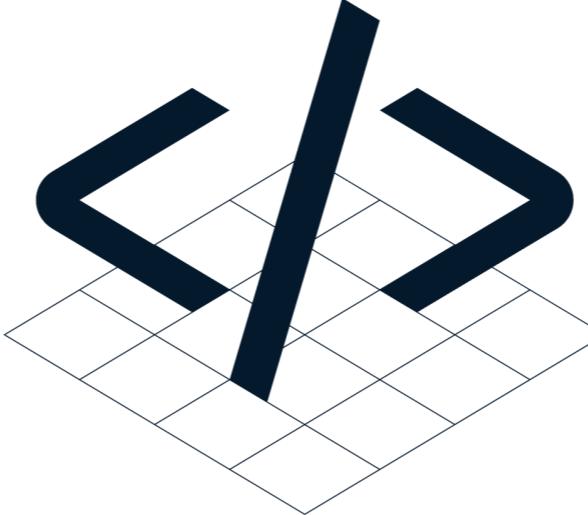
Hugo Bowne-Anderson
Data Scientist at DataCamp

Basic plots with Matplotlib

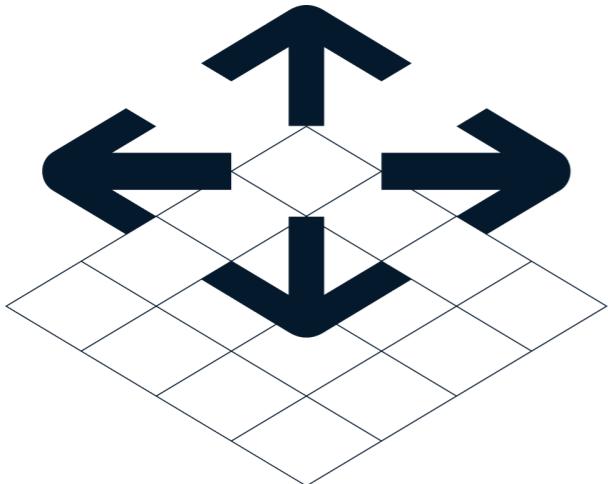
- Visualization



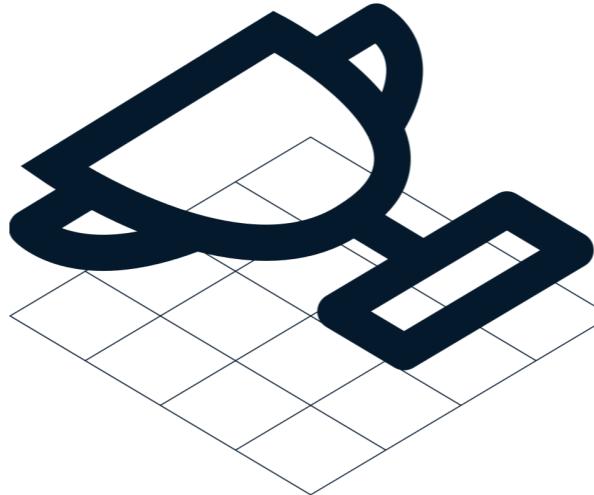
- Data Structure



- Control Structures

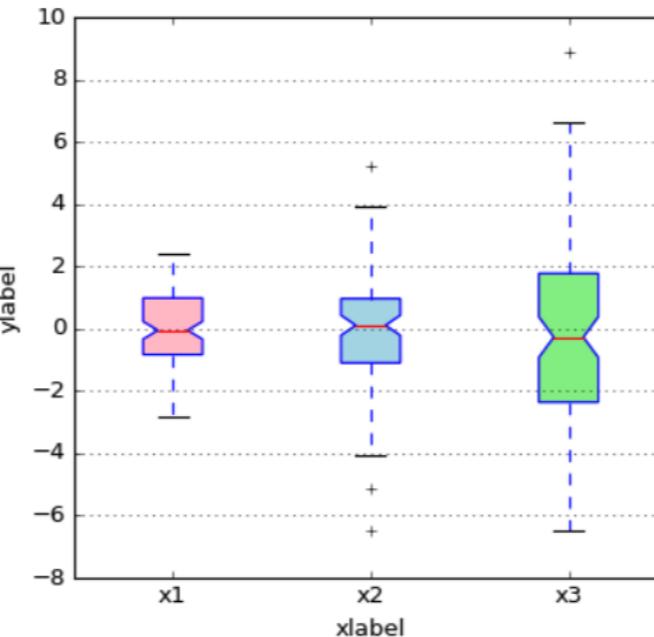
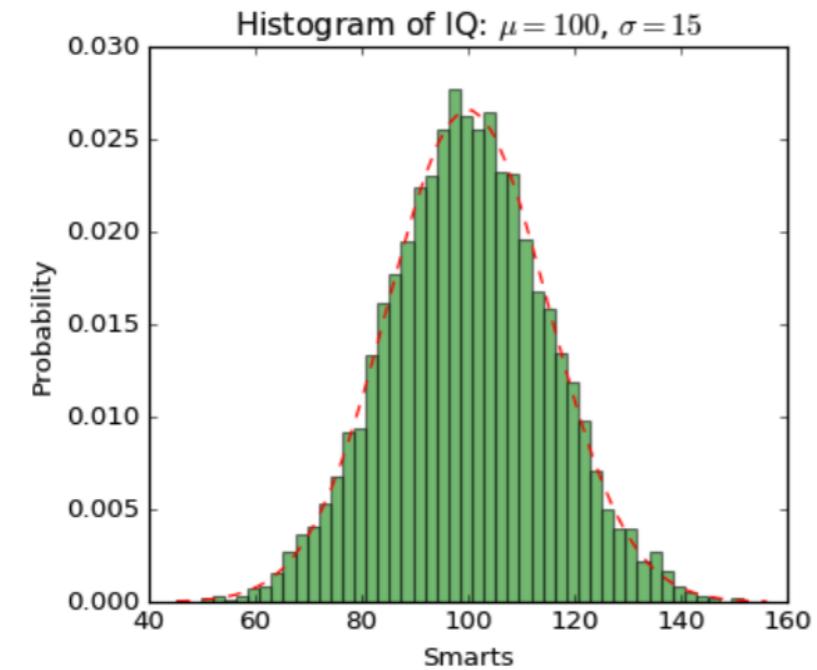


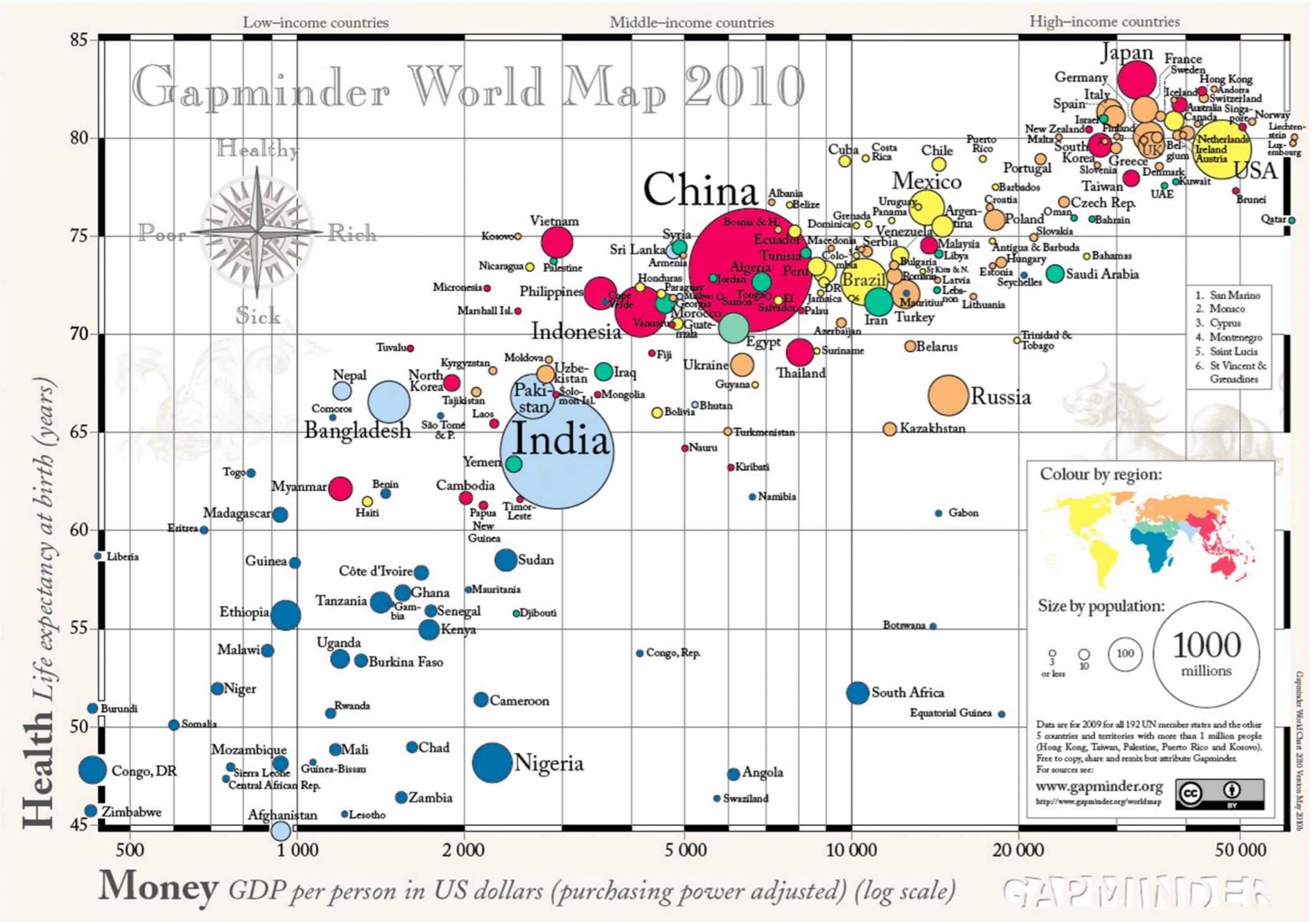
- Case Study



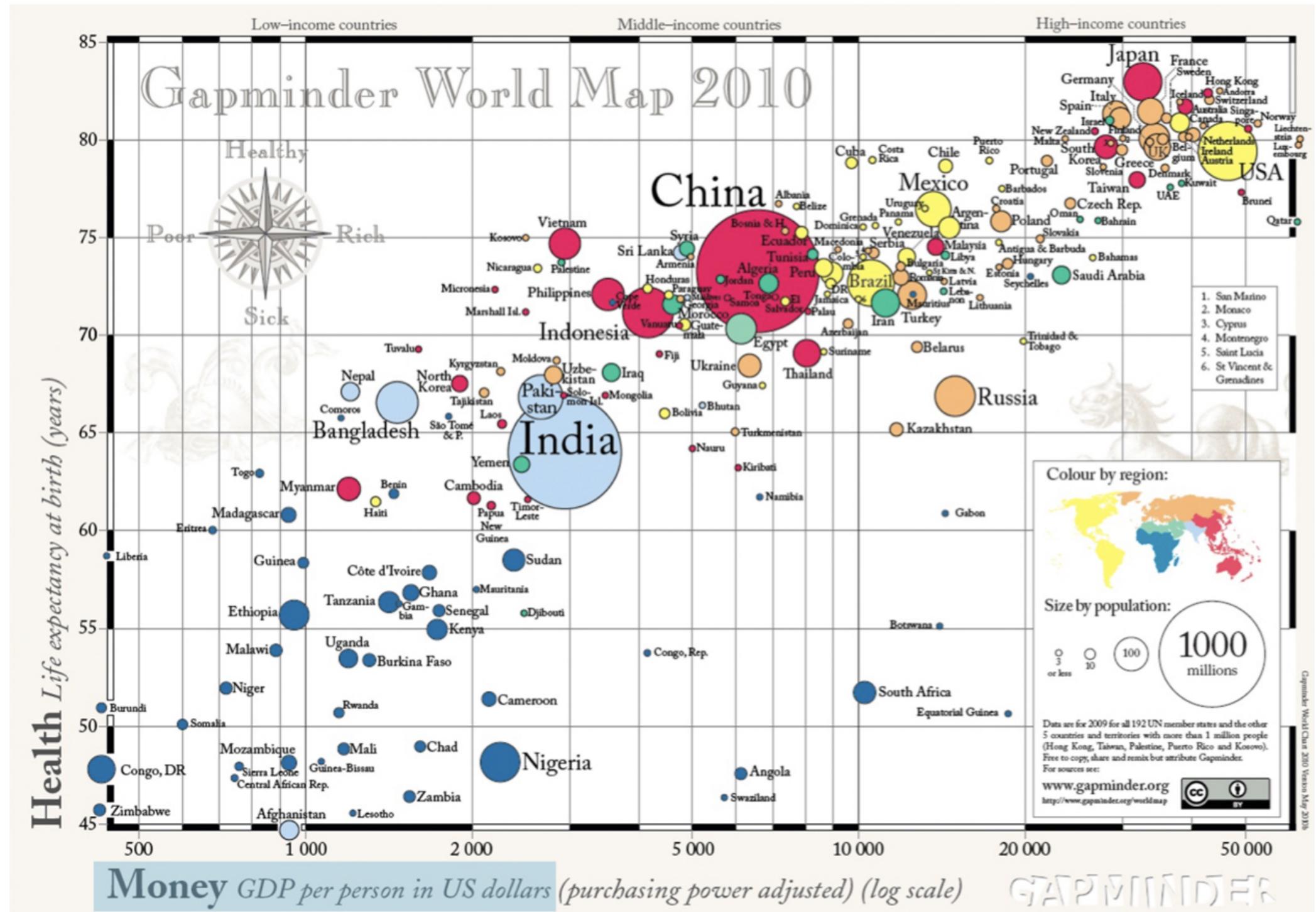
Data visualization

- Very important in Data Analysis
 - Explore data
 - Report insights

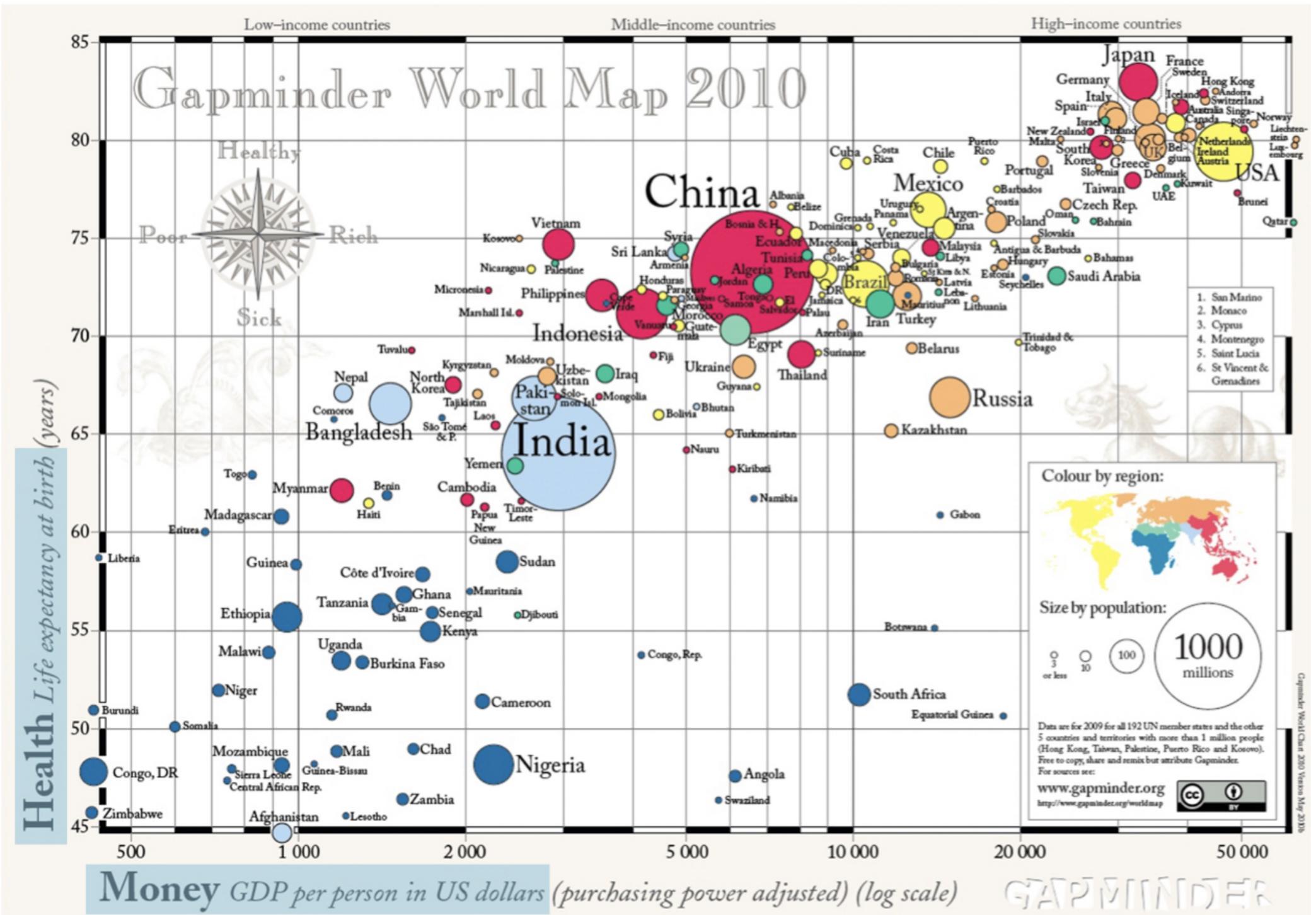




¹ Source: GapMinder, Wealth and Health of Nations



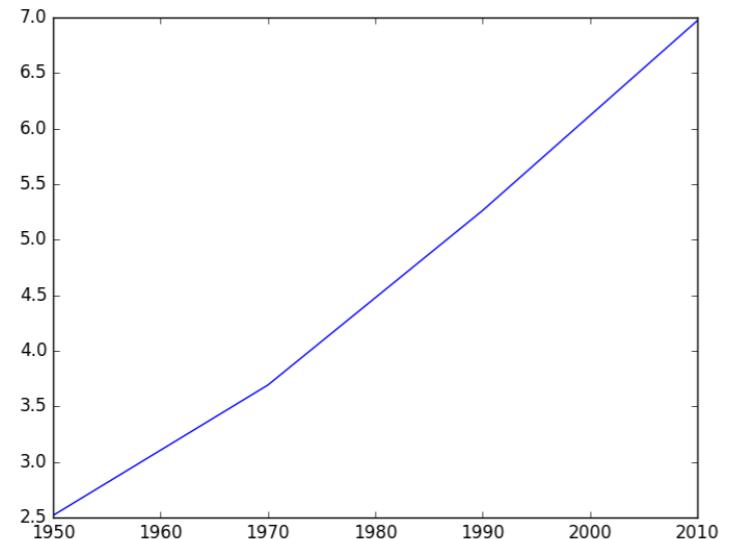
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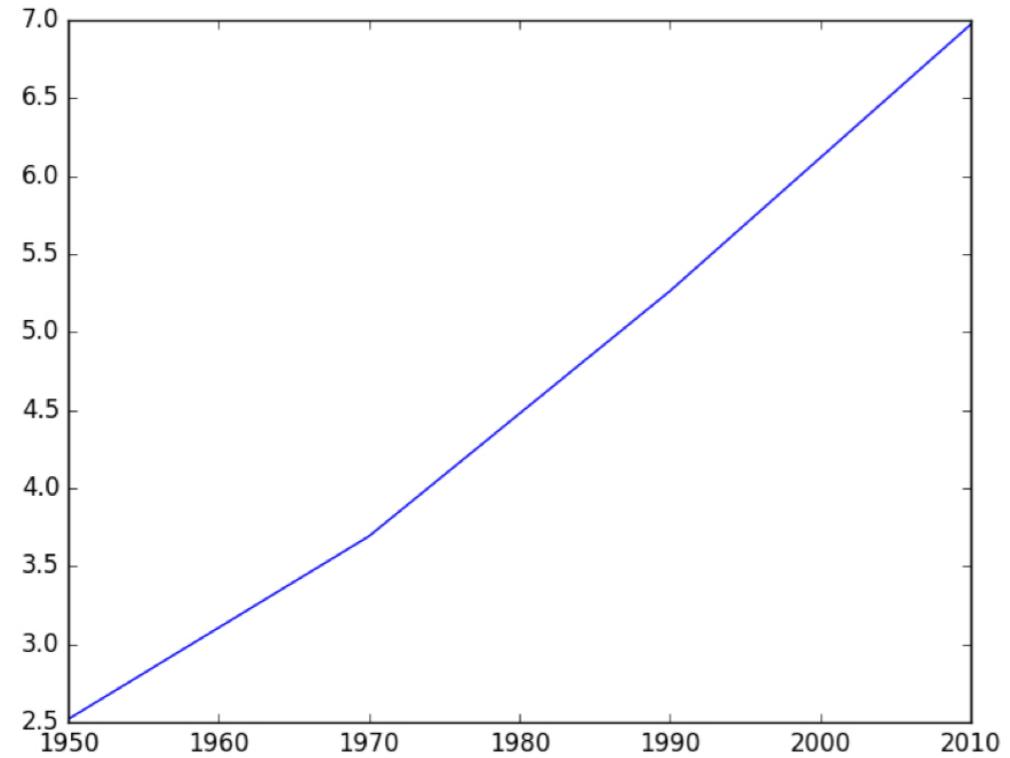
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Matplotlib

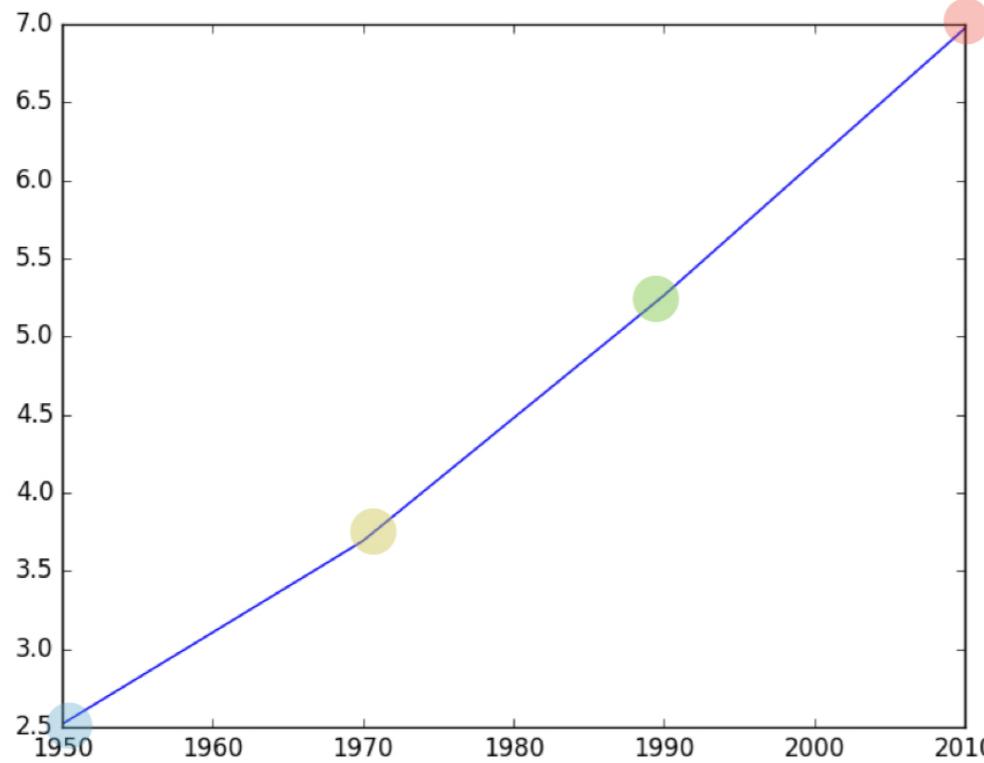
```
import matplotlib.pyplot as plt  
year = [1950, 1970, 1990, 2010]  
pop = [2.519, 3.692, 5.263, 6.972]  
plt.plot(year, pop)  
plt.show()
```



Matplotlib



Matplotlib



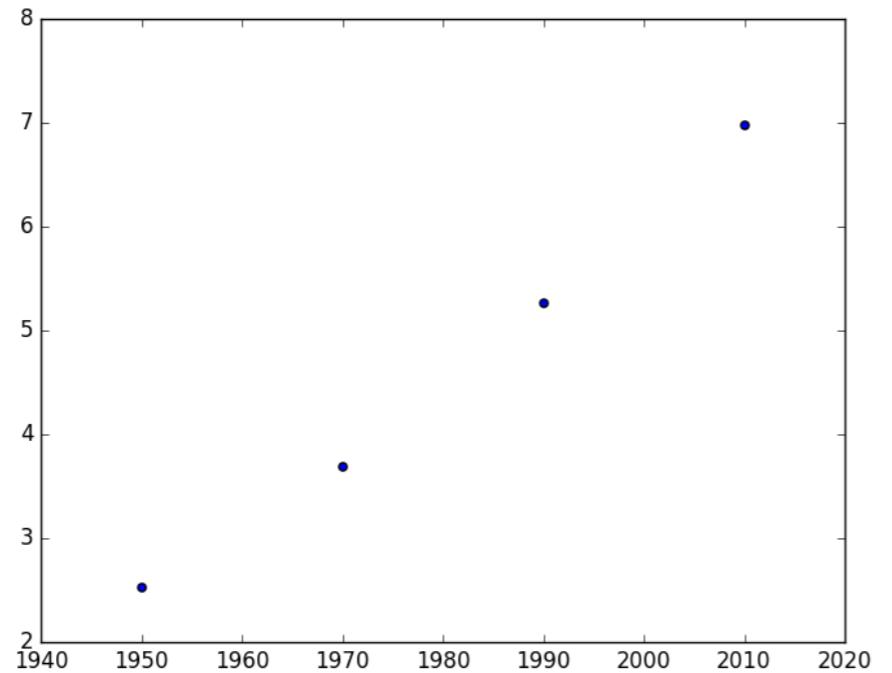
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Scatter plot

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```

Scatter plot

```
import matplotlib.pyplot as plt  
year = [1950, 1970, 1990, 2010]  
pop = [2.519, 3.692, 5.263, 6.972]  
plt.scatter(year, pop)  
plt.show()
```



Let's practice!

INTERMEDIATE PYTHON

Histogram

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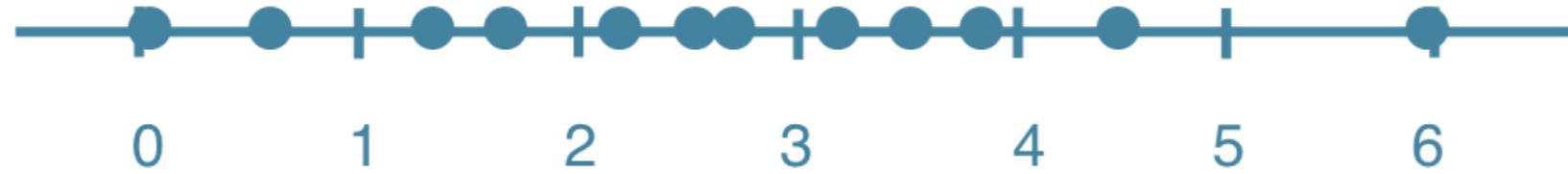
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Histogram

- Explore dataset
- Get idea about distribution

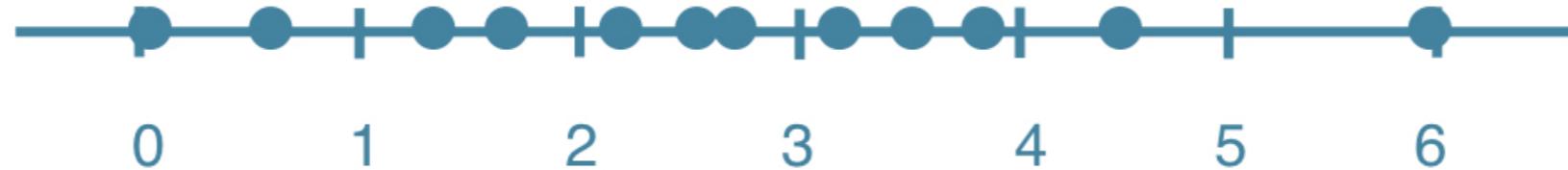
Histogram

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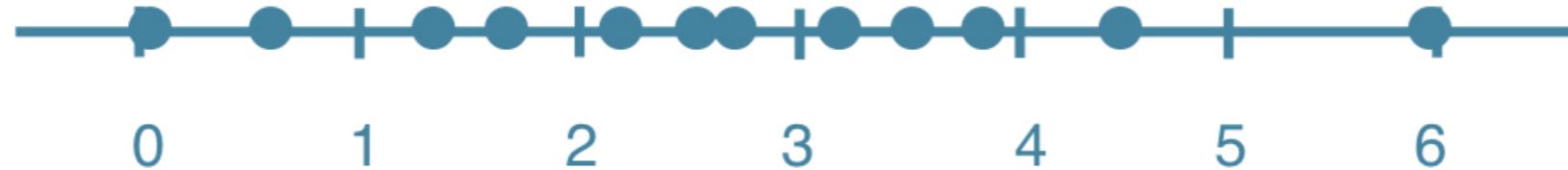
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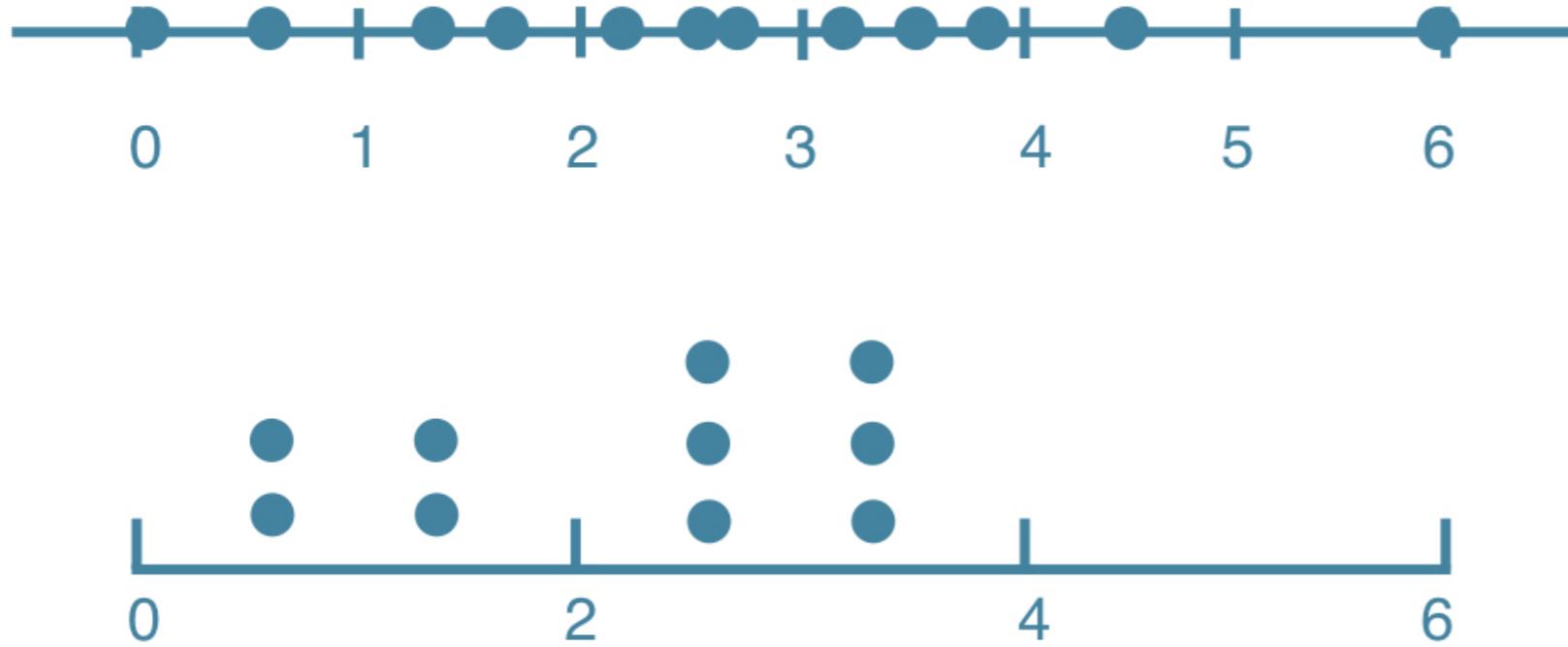
Histogram

- Explore dataset
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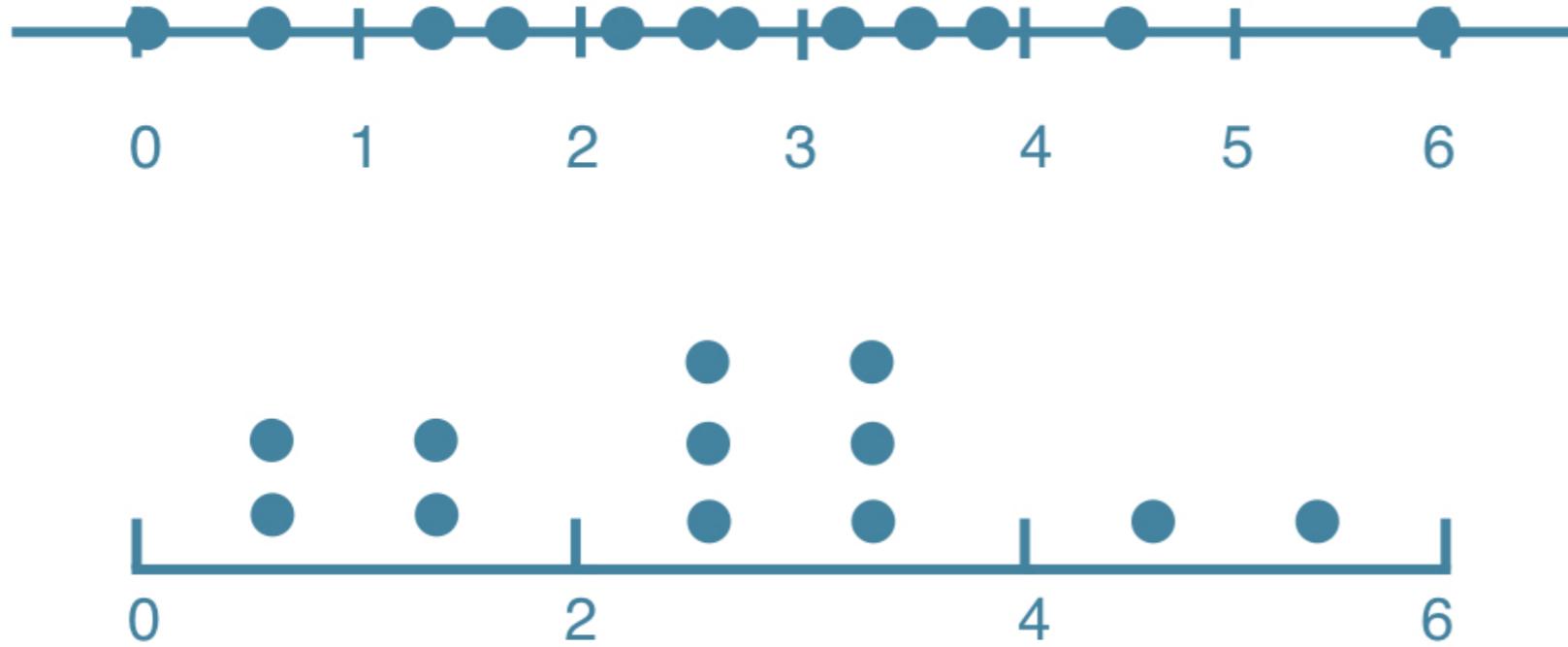
Histogram

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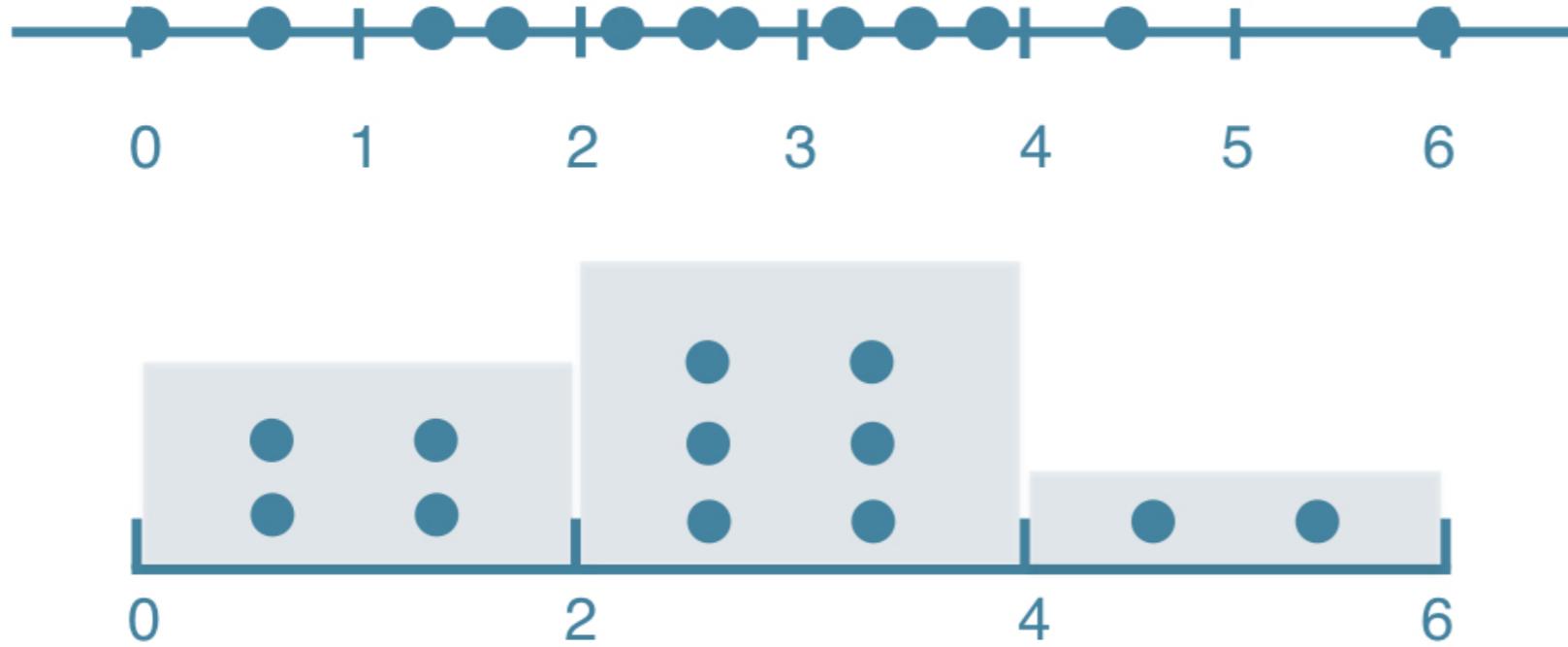
Histogram

- Explore dataset
- Get idea about distribution



Histogram

- Explore dataset
- Get idea about distribution



Matplotlib

```
import matplotlib.pyplot as plt
```

```
help(plt.hist)
```

Help on function hist in module matplotlib.pyplot:

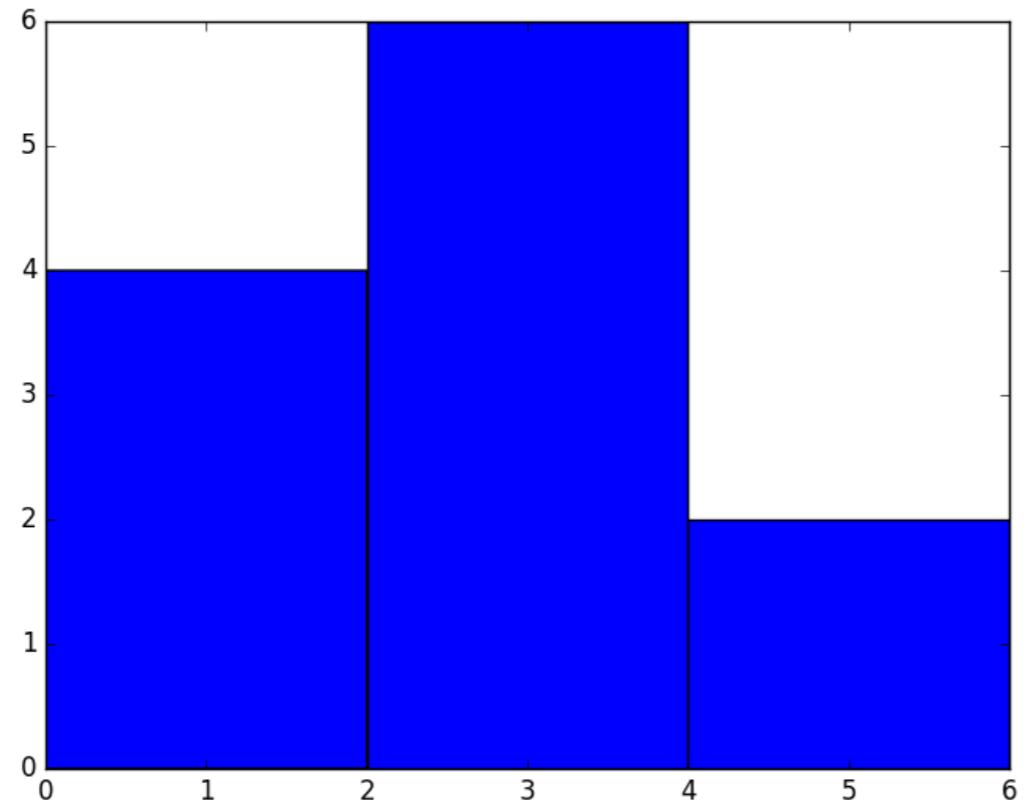
```
hist(x, bins=None, range=None, density=False, weights=None,  
cumulative=False, bottom=None, histtype='bar', align='mid',  
orientation='vertical', rwidth=None, log=False, color=None,  
label=None, stacked=False, *, data=None, **kwargs)
```

Plot a histogram.

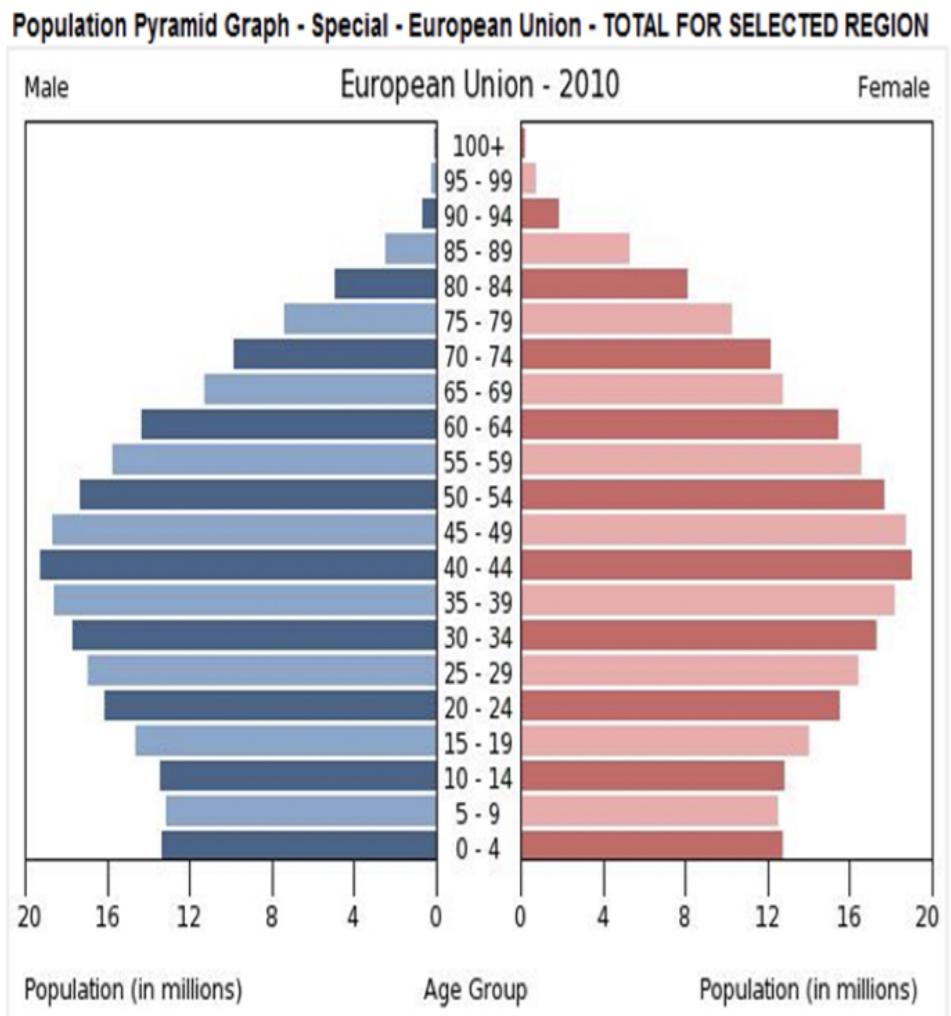
Compute and draw the histogram of `*x*`. The return value is a tuple `(*n*, *bins*, *patches*)` or `([*n0*, *n1*, ...], *bins*, [*patches0*, *patches1*, ...])` if the input contains multiple data.

Matplotlib example

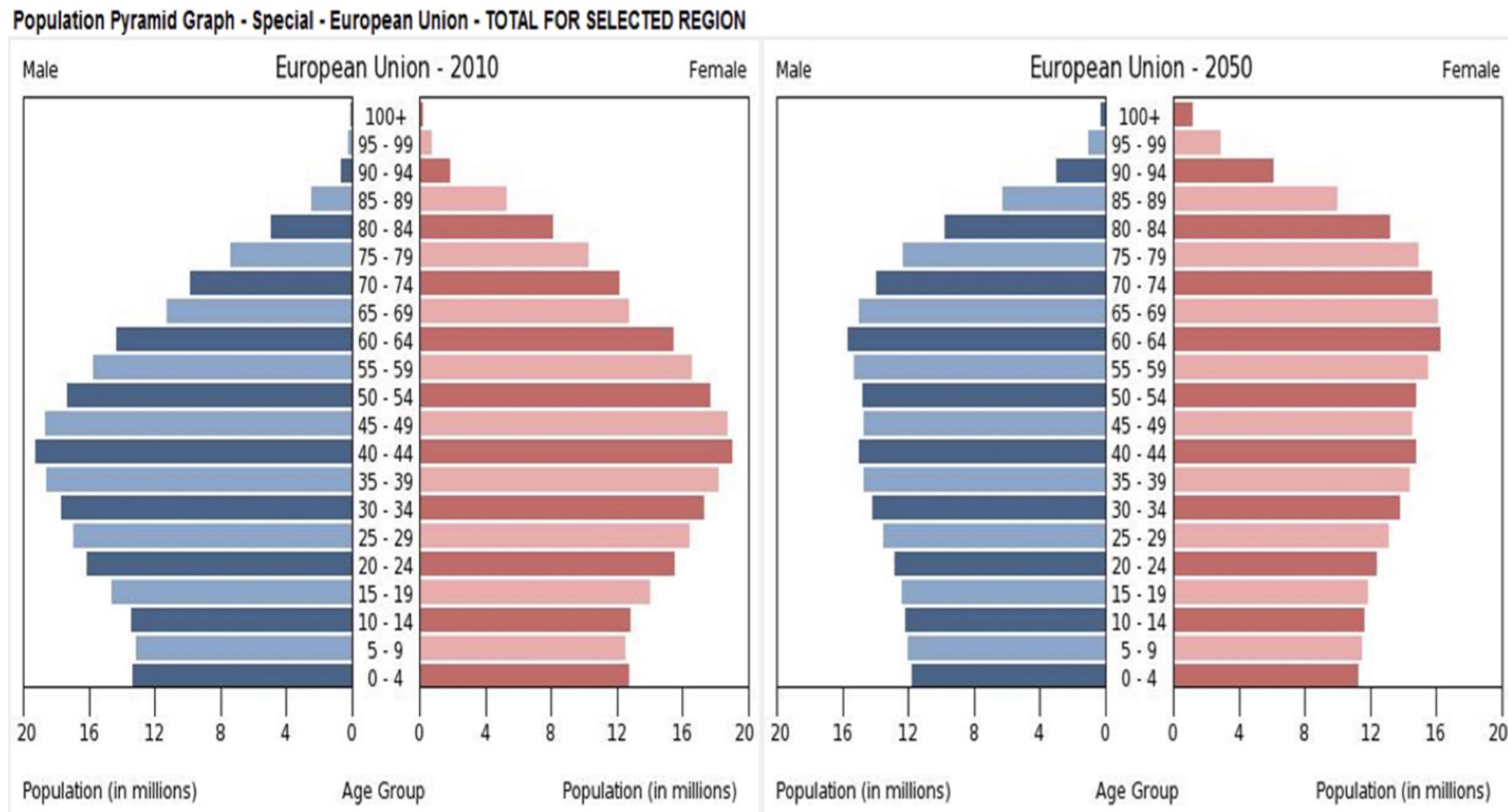
```
values = [0,0.6,1.4,1.6,2.2,2.5,2.6,3.2,3.5,3.9,4.2,6]
plt.hist(values, bins=3)
plt.show()
```



Population pyramid



Population pyramid



Let's practice!

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Customization

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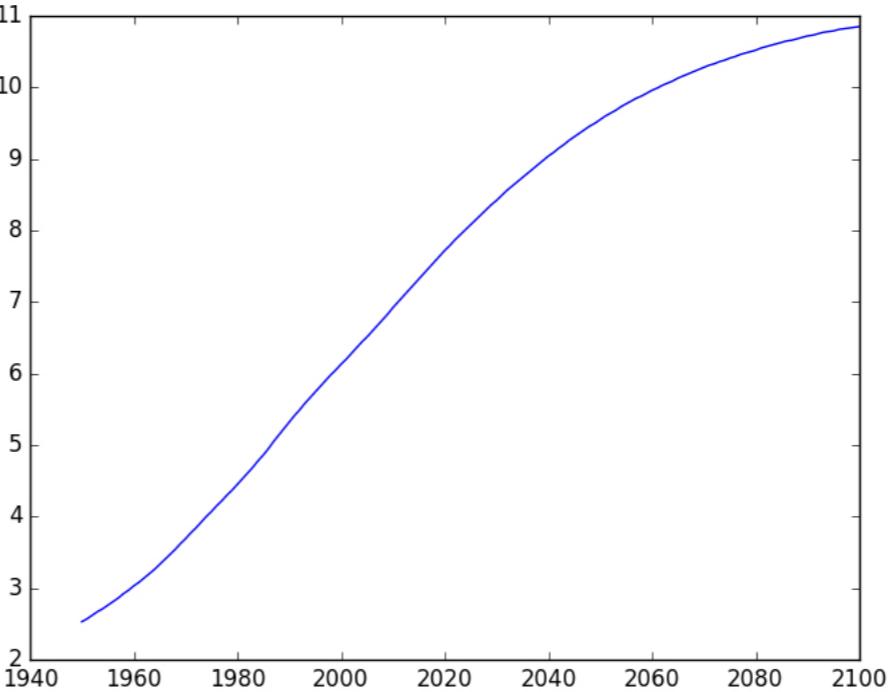
Data visualization

- Many options
 - Different plot types
 - Many customizations
- Choice depends on
 - Data
 - Story you want to tell

Basic plot

population.py

```
import matplotlib.pyplot as plt  
year = [1950, 1951, 1952, ..., 2100]  
pop = [2.538, 2.57, 2.62, ..., 10.85]  
  
plt.plot(year, pop)  
  
plt.show()
```



`plt.clf() # to clean up the plot`

Axis labels

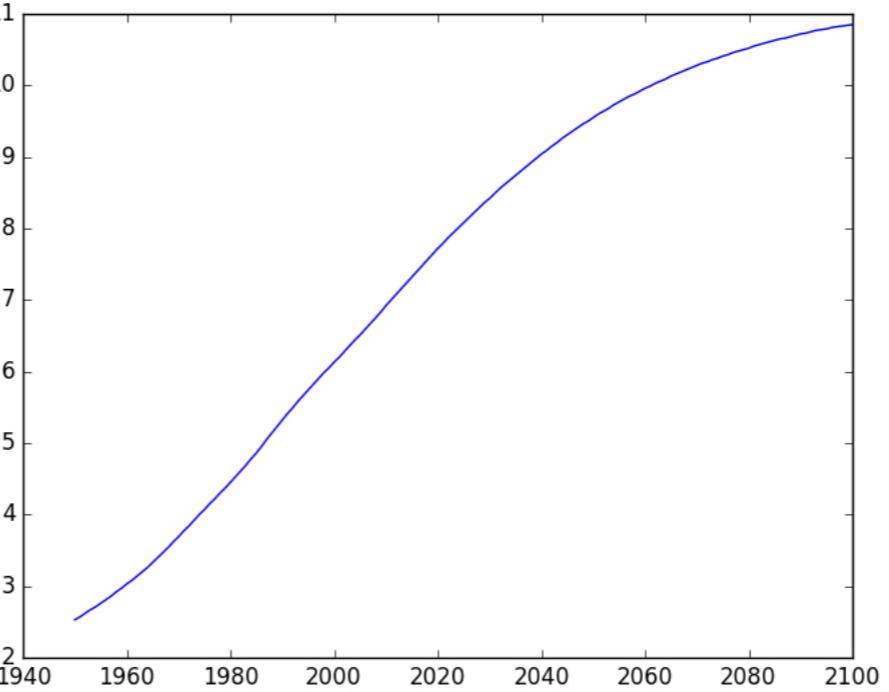
population.py

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import matplotlib.pyplot as plt
year = [1950, 1951, 1952, ..., 2100]
pop = [2.538, 2.57, 2.62, ..., 10.85]

plt.plot(year, pop)

plt.xlabel('Year')
plt.ylabel('Population')

plt.show()
```



Axis labels

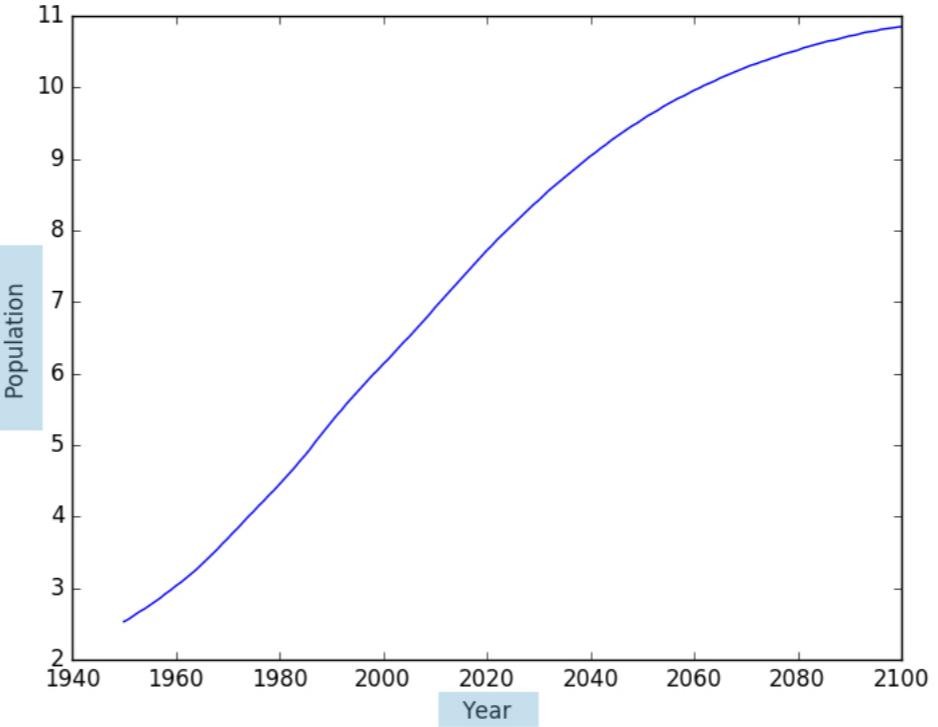
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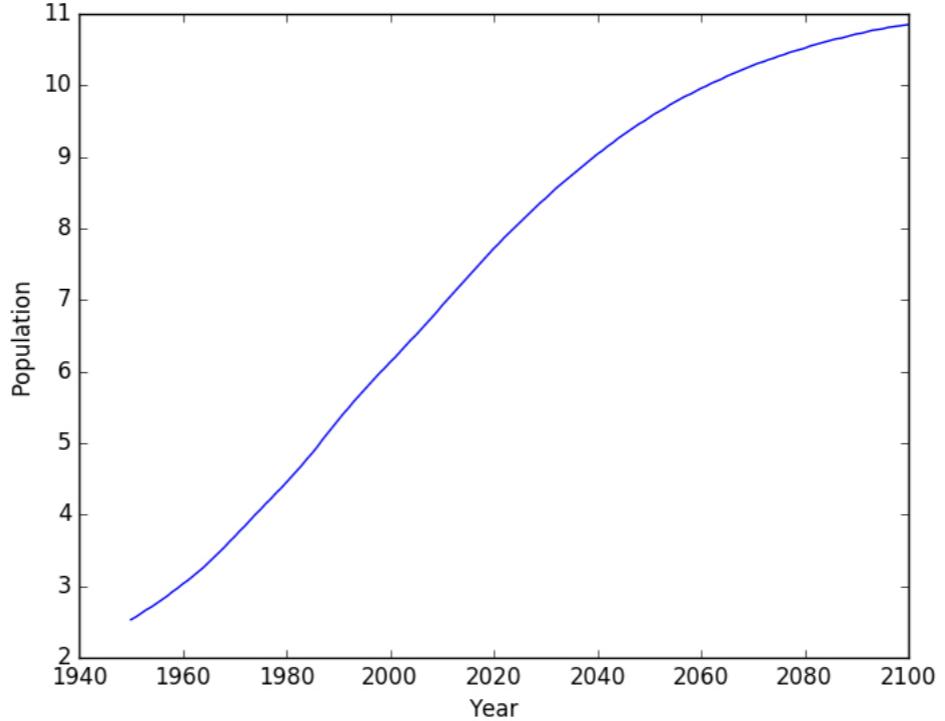
plt.show()
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Title

population.py

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plt.plot(year, pop)  
  
plt.xlabel('Year')  
plt.ylabel('Population')  
plt.title('World Population Projections')  
  
plt.show()
```



Title

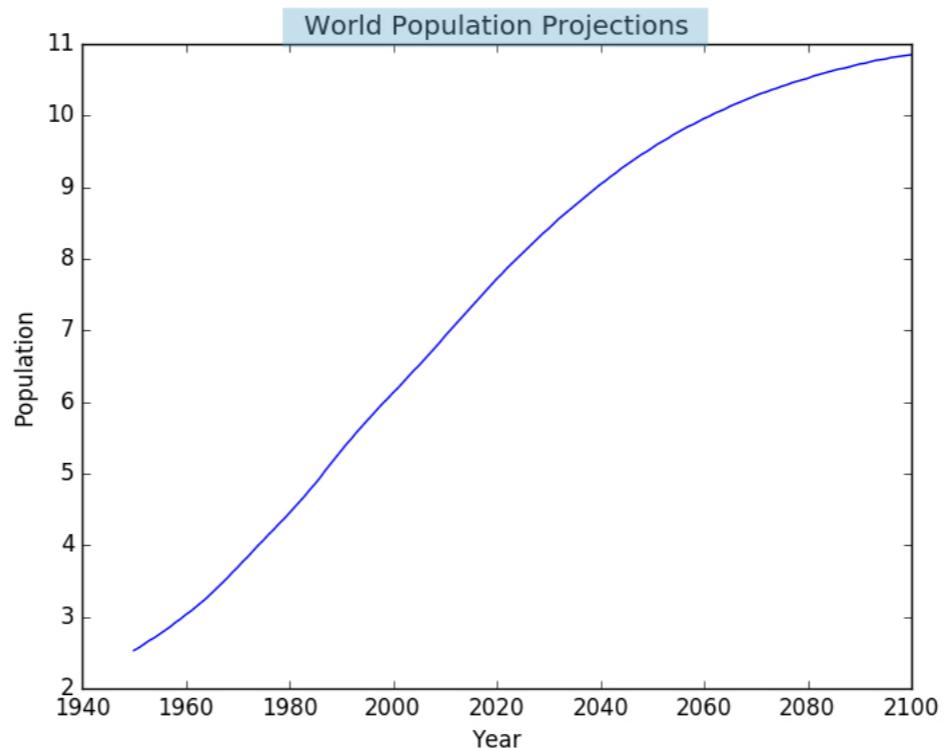
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Ticks

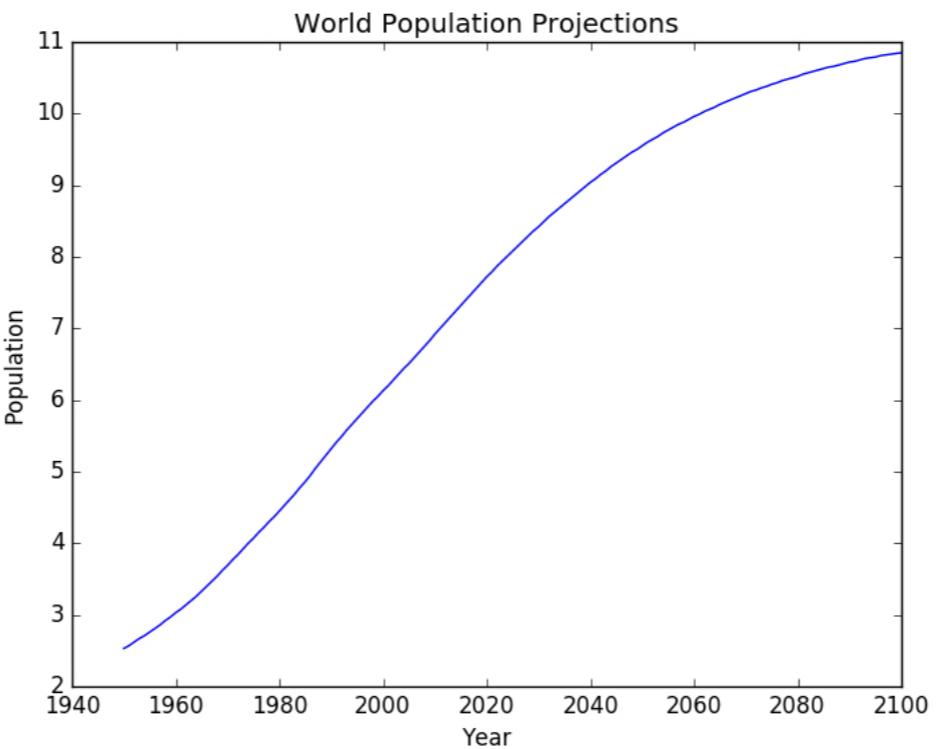
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plt.xlabel('Year')
plt.ylabel('Population')
plt.title('World Population Projections')
plt.yticks([0, 2, 4, 6, 8, 10])

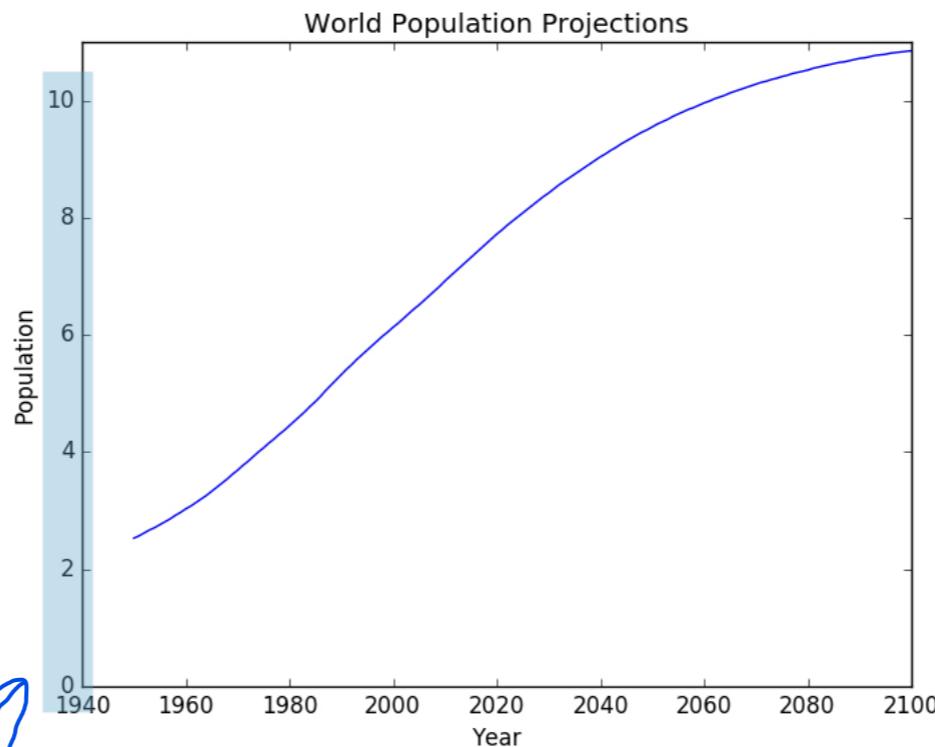
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Ticks

population.py

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plt.show()
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Ticks (2)

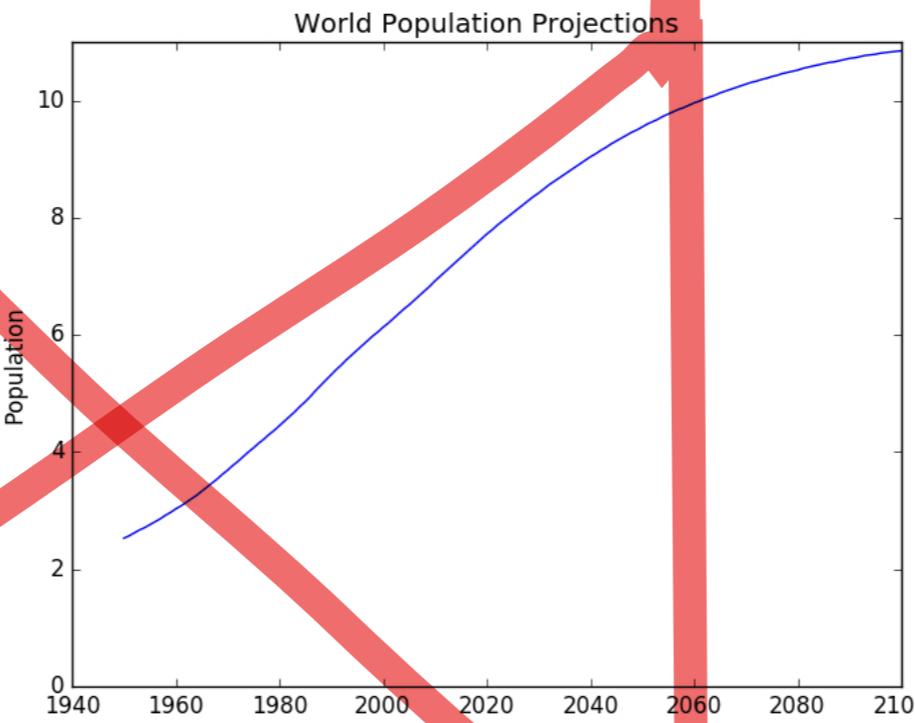
population.py

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plt.plot(year, pop)

plt.xlabel('Year')
plt.ylabel('Population')
plt.title('World Population Projections')
plt.yticks([0, 2, 4, 6, 8, 10],
           ['0', '2B', '4B', '6B', '8B', '10B'])

plt.show()
```



Ticks (2)

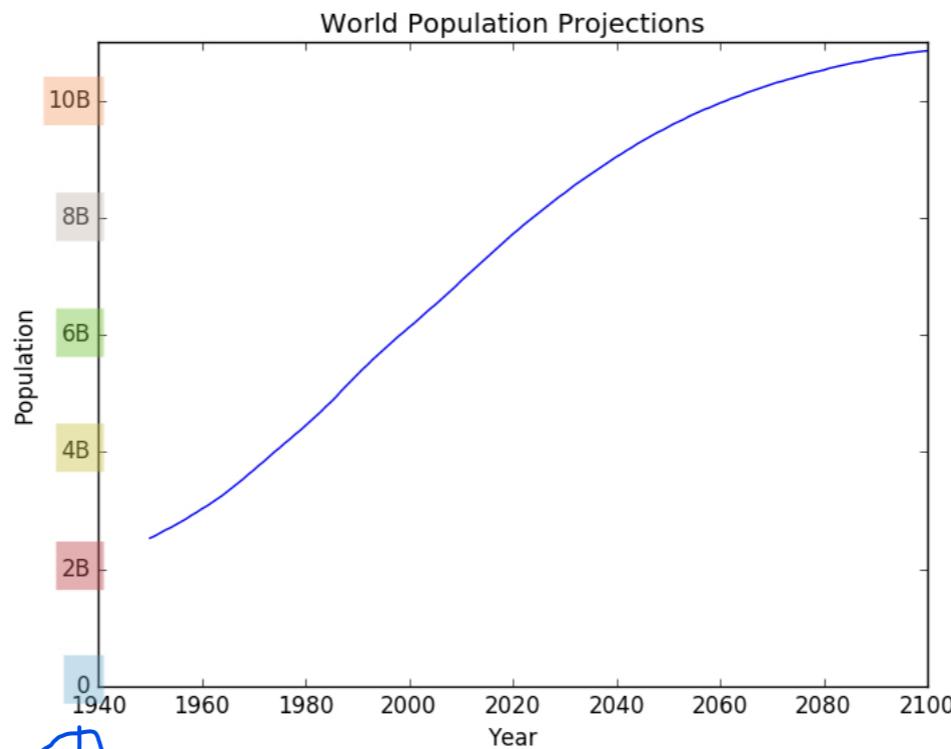
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plt.show()
```



Add historical data

population.py

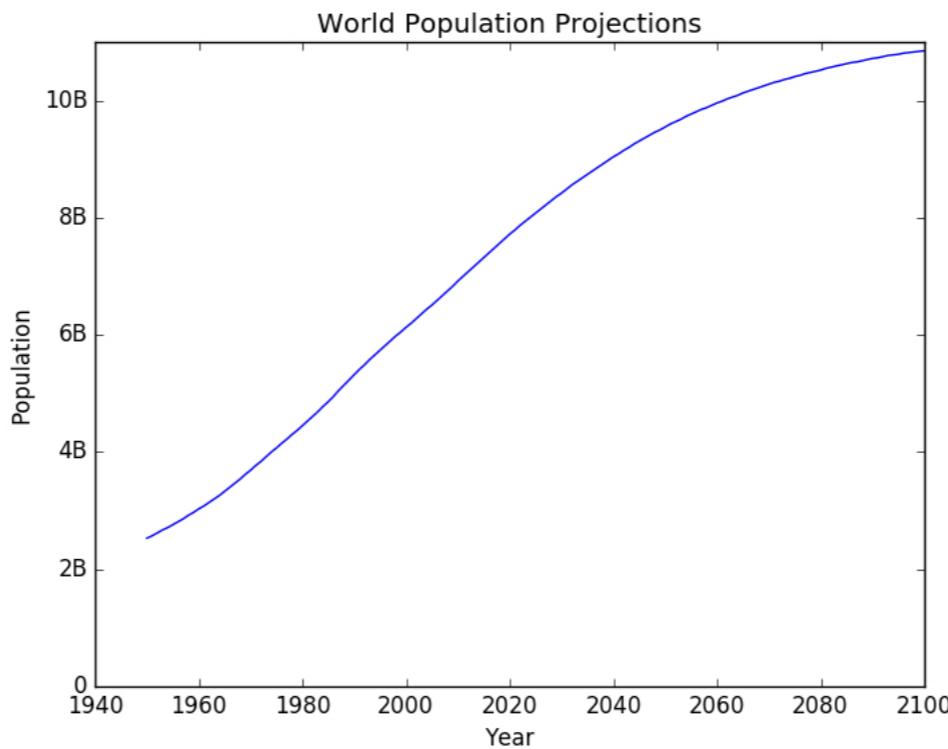
```
import matplotlib.pyplot as plt
year = [1950, 1951, 1952, ..., 2100]
pop = [2.538, 2.57, 2.62, ..., 10.85]

# Add more data
year = [1800, 1850, 1900] + year
pop = [1.0, 1.262, 1.650] + pop

plt.plot(year, pop)

plt.xlabel('Year')
plt.ylabel('Population')
plt.title('World Population Projections')
plt.yticks([0, 2, 4, 6, 8, 10],
           ['0', '2B', '4B', '6B', '8B', '10B'])

plt.show()
```



```
plt.xticks([1000,10000,100000], ['1k','10k','100k'])
```

use : help(plt.scatter)

```
plt.scatter(gdp_cap, life_exp, s = np_pop) # plt.scatter(x-cord,y-cord,s=size of each point )
```

np_pop is a numpy array of population

Add historical data

population.py

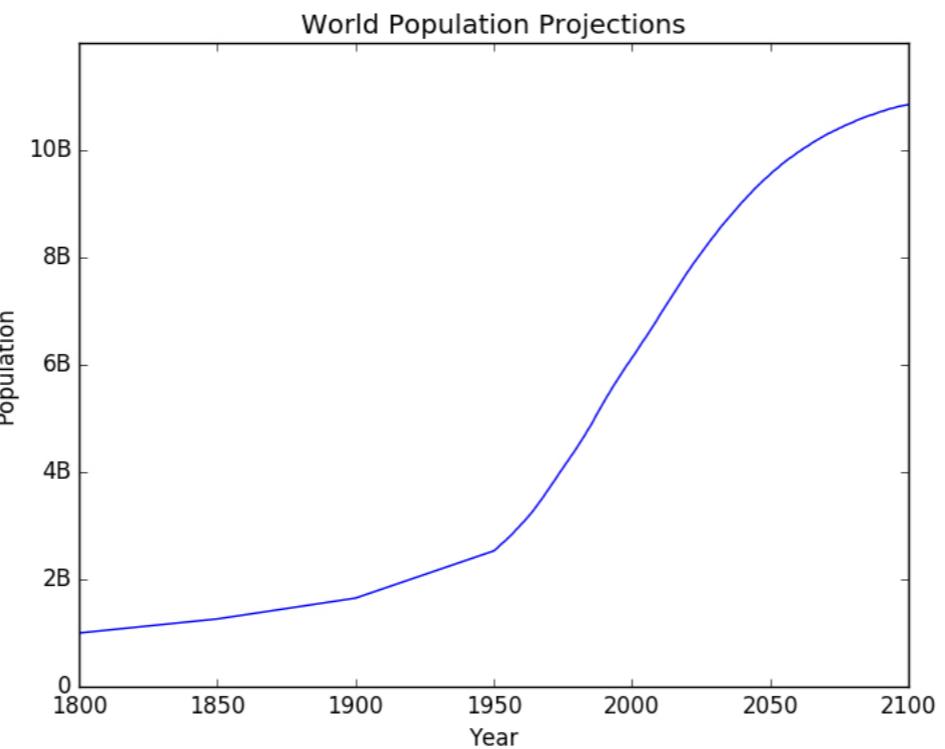
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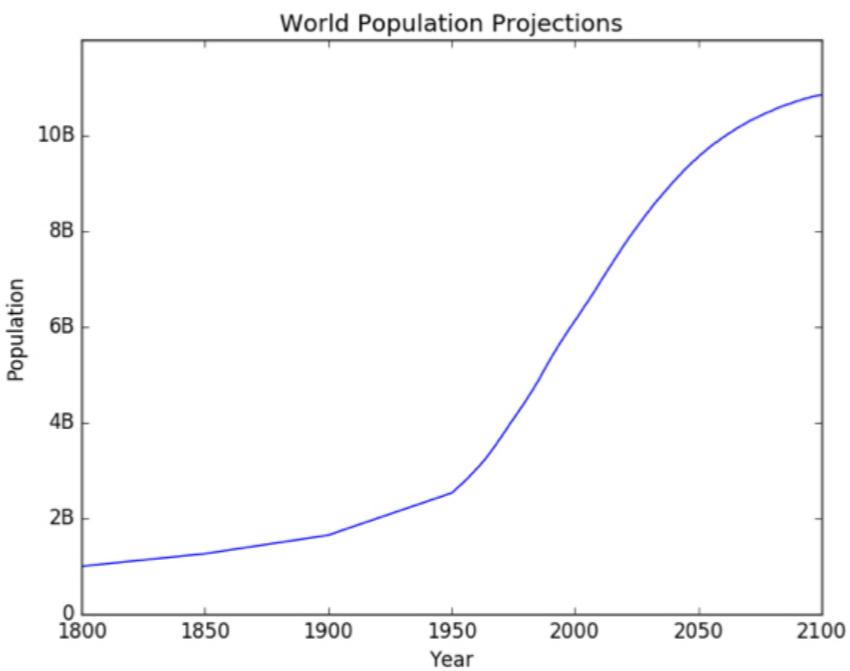
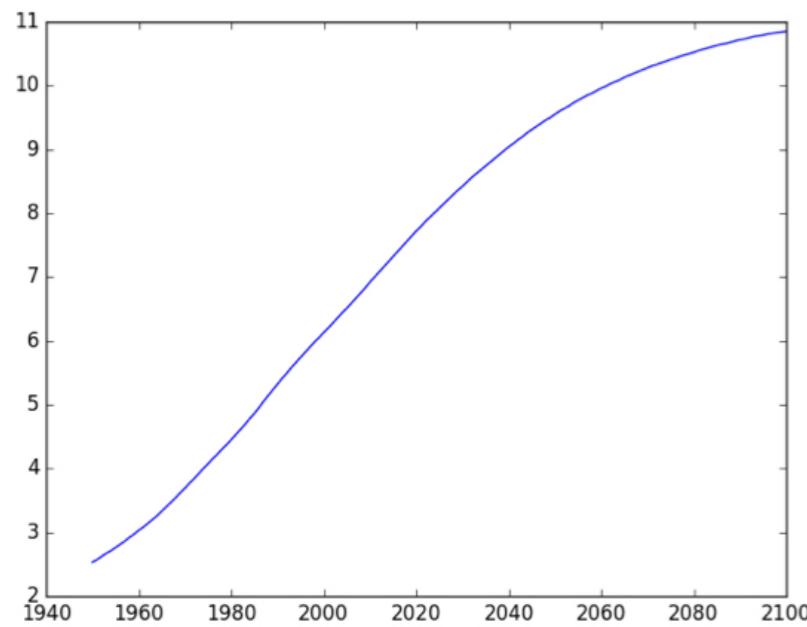
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plt.show()
```



Before vs. after



Let's practice!

INTERMEDIATE PYTHON