Basic plots with Matplotlib

INTERMEDIATE PYTHON



Hugo Bowne-Anderson
Data Scientist at DataCamp

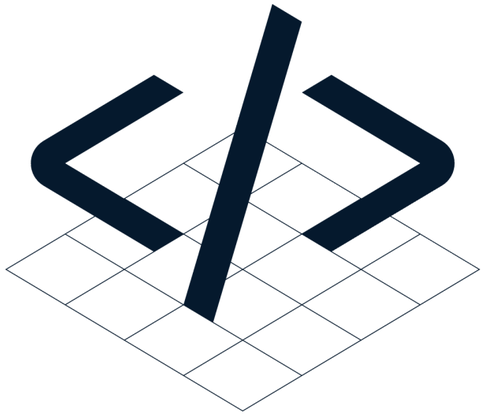
datacamp

Basic plots with Matplotlib

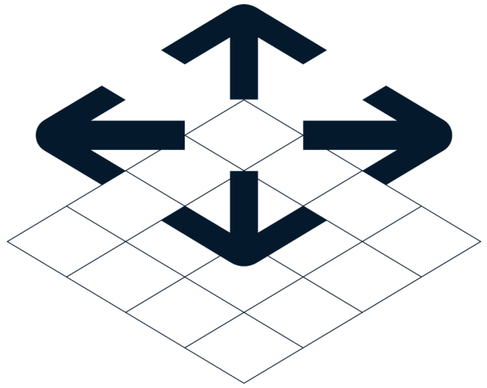
- Visualization



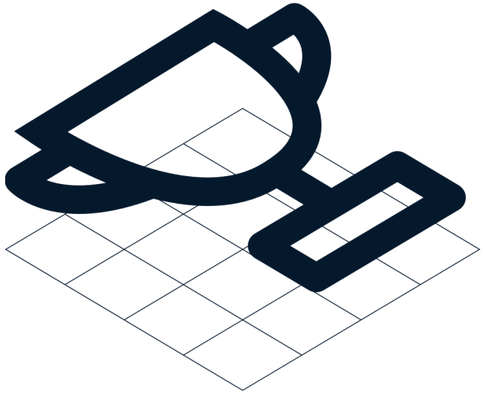
- Data Structure



- Control Structures

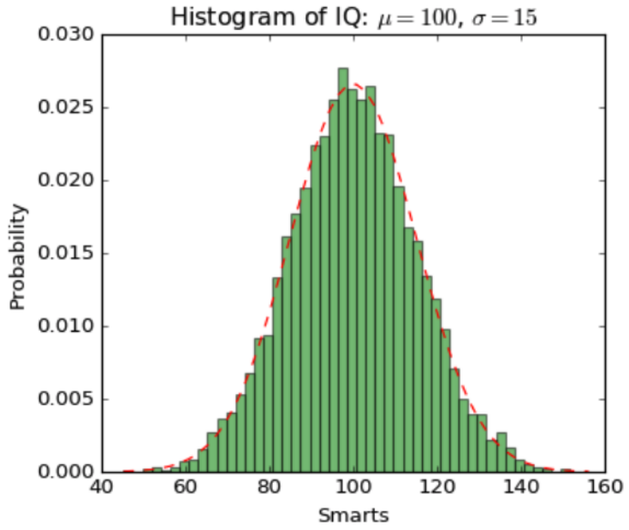


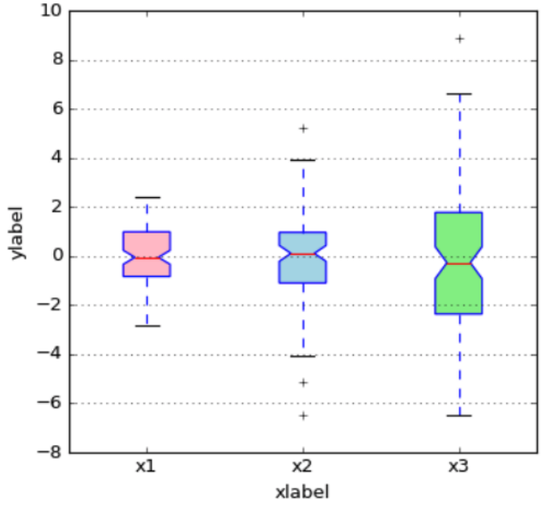
- Case Study

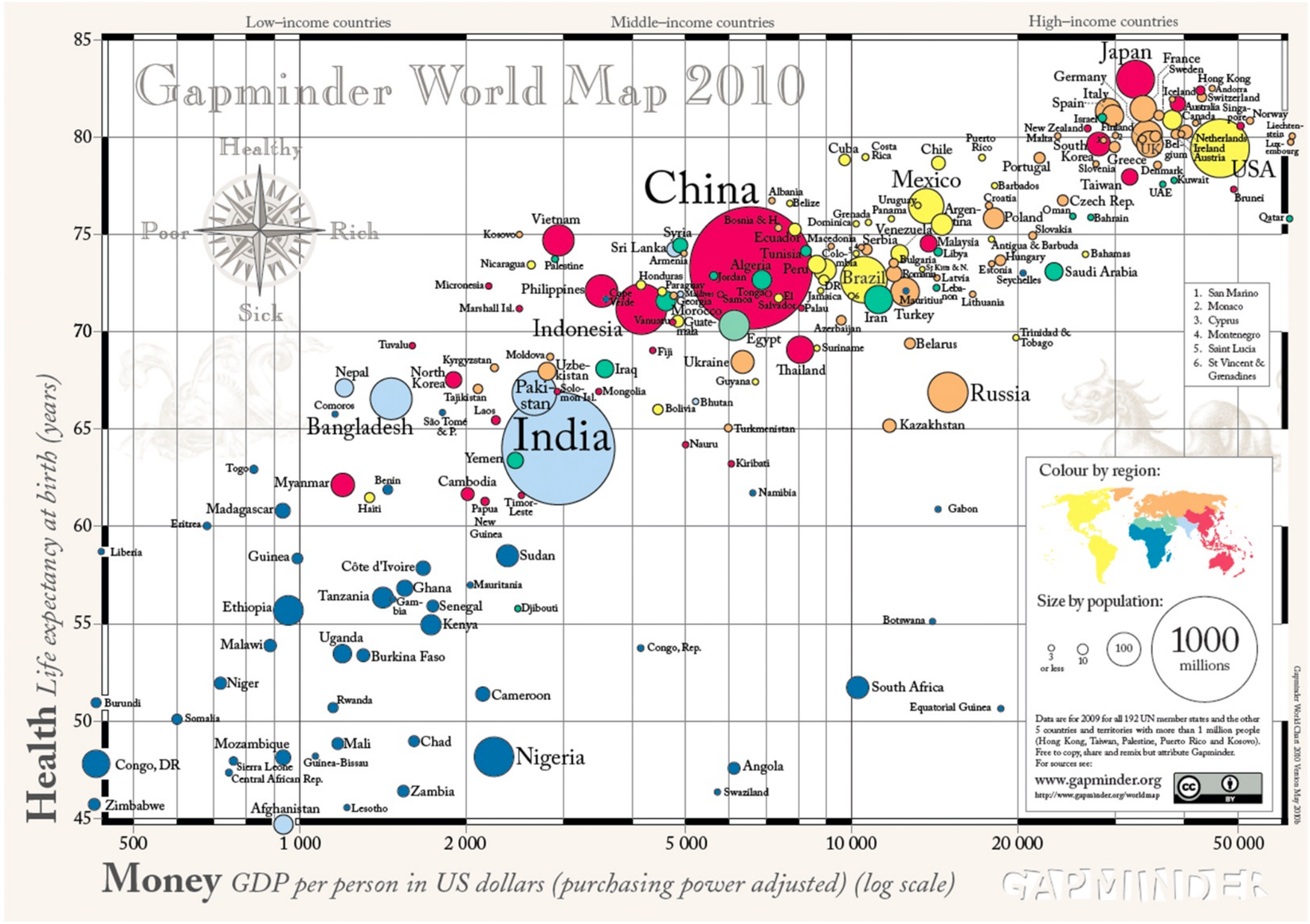


Data visualization

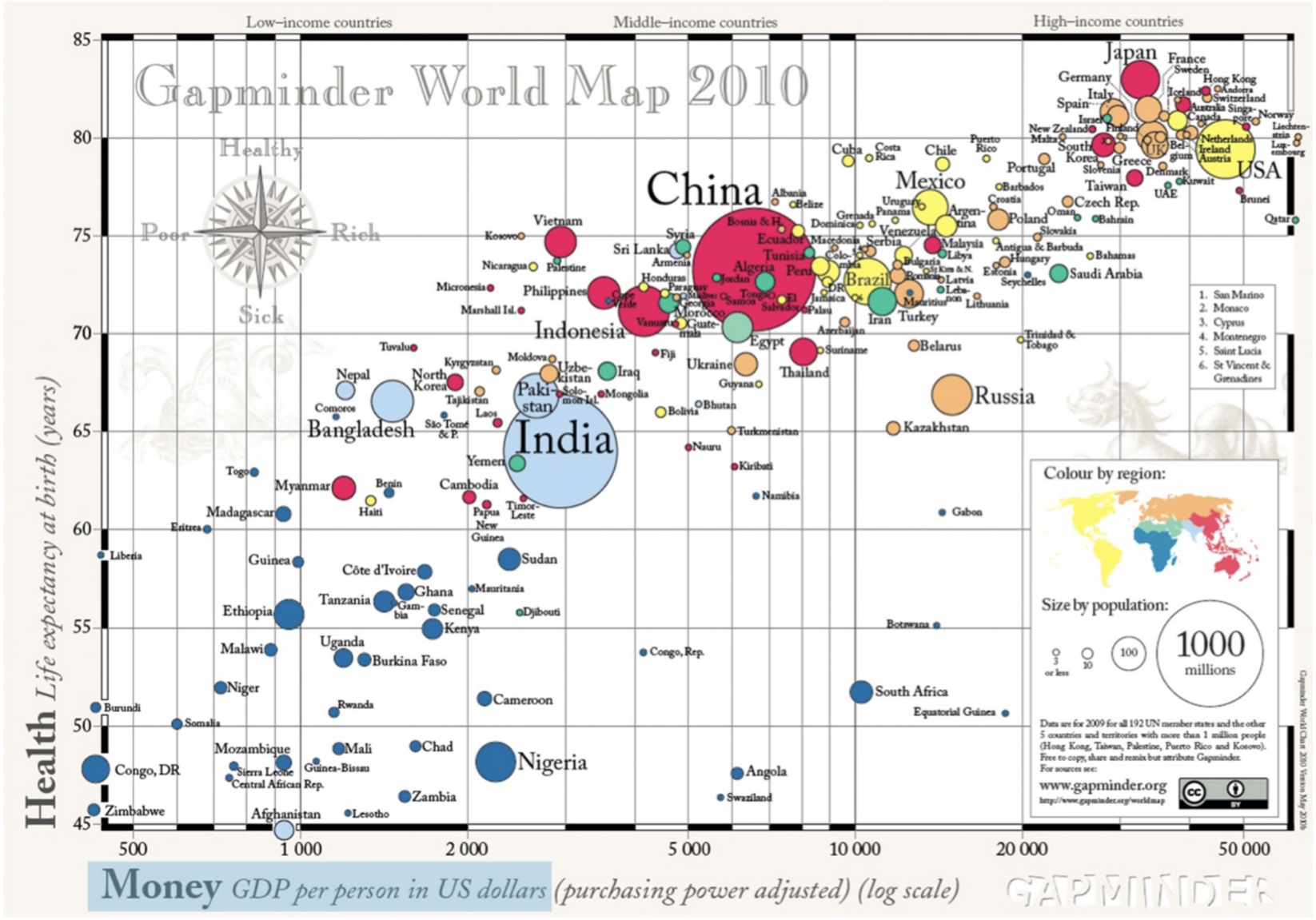
- Very important in Data Analysis
  - Explore data
  - Report insights



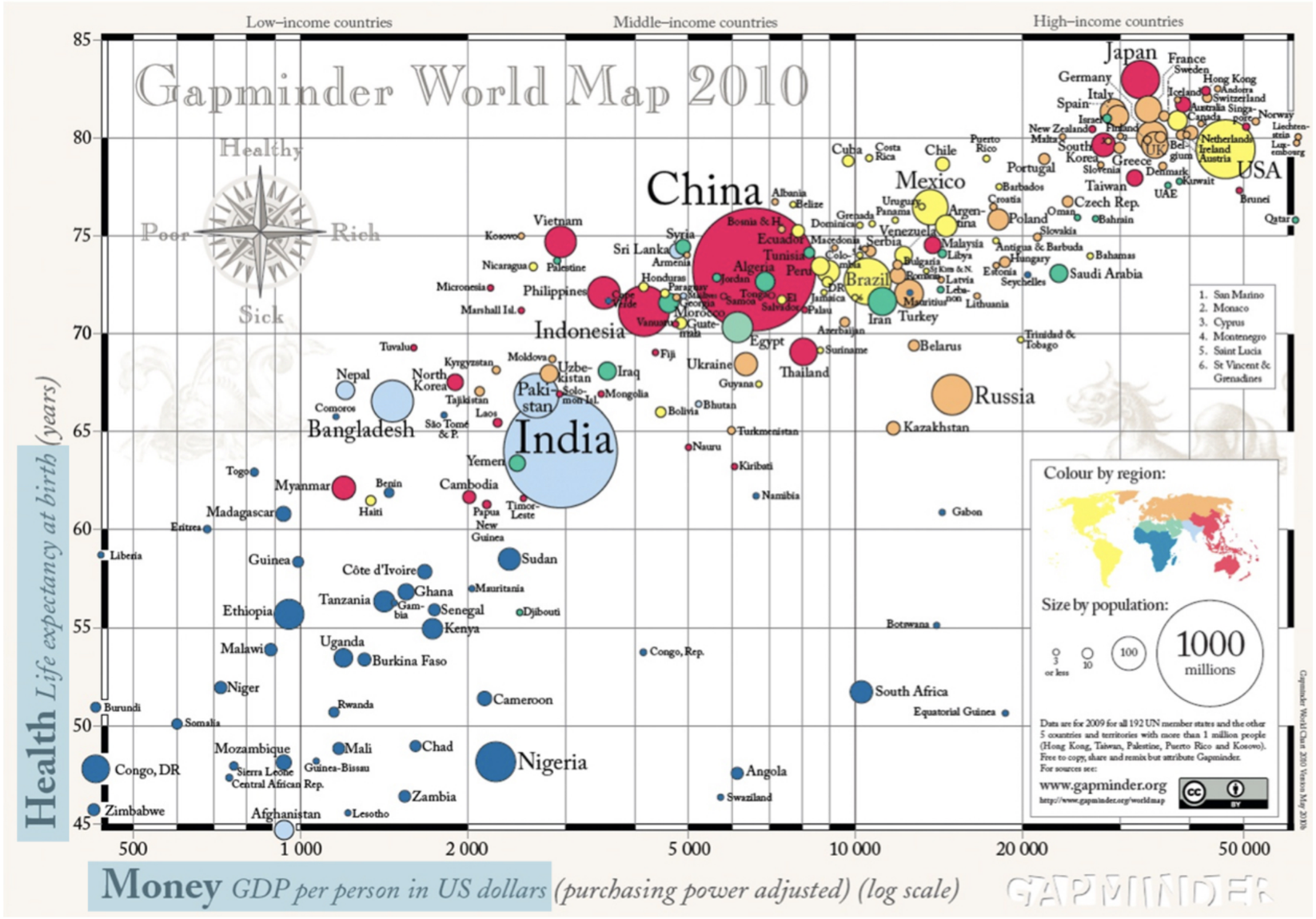




[1] Source: GapMinder, Wealth and Health of Nations



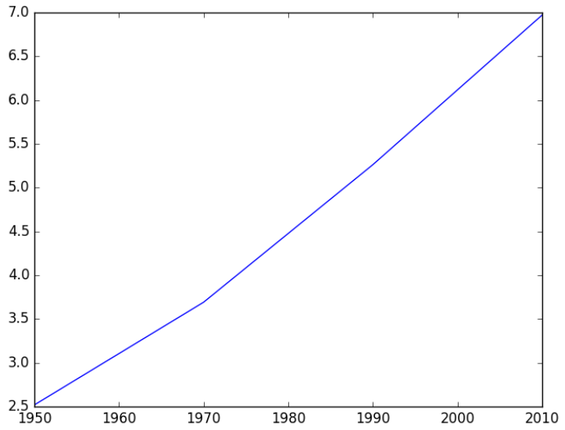
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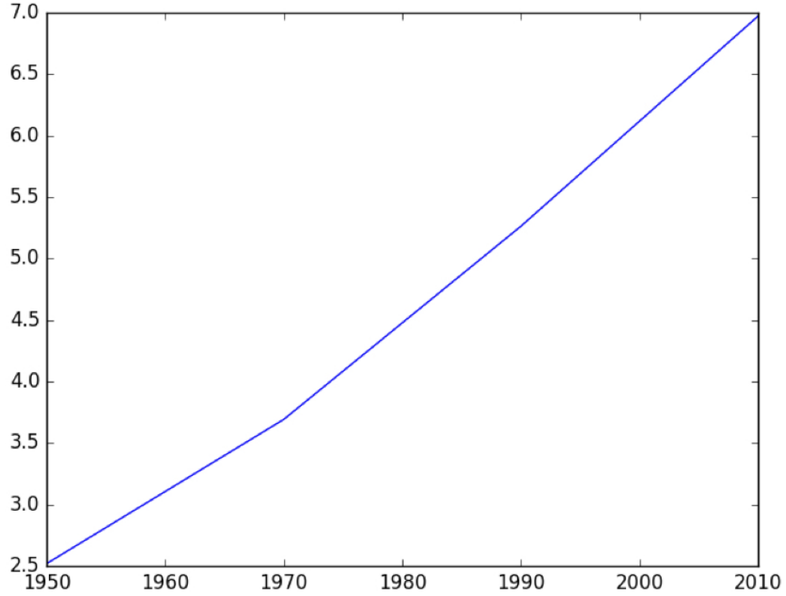
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Matplotlib

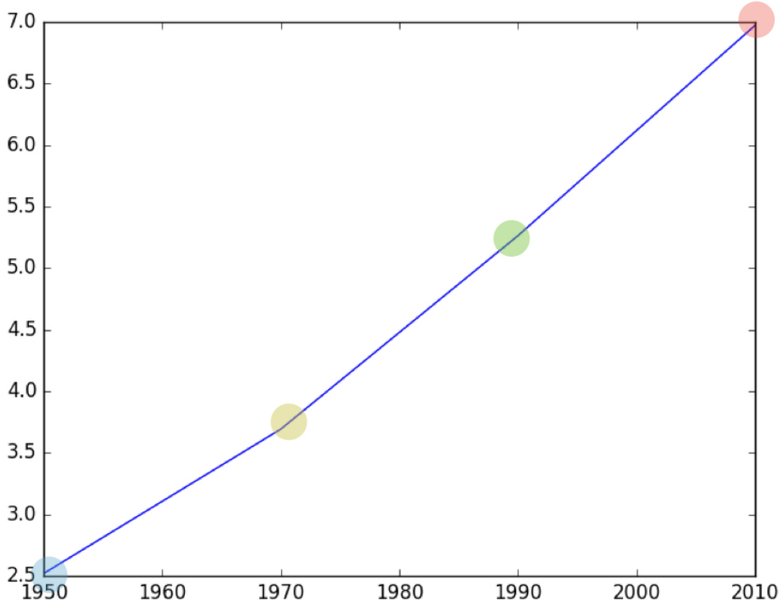
```
import matplotlib.pyplot as plt
year = [1950, 1970, 1990, 2010]
pop = [2.519, 3.692, 5.263, 6.972]
plt.plot(year, pop)
plt.show()
```



Matplotlib



Matplotlib



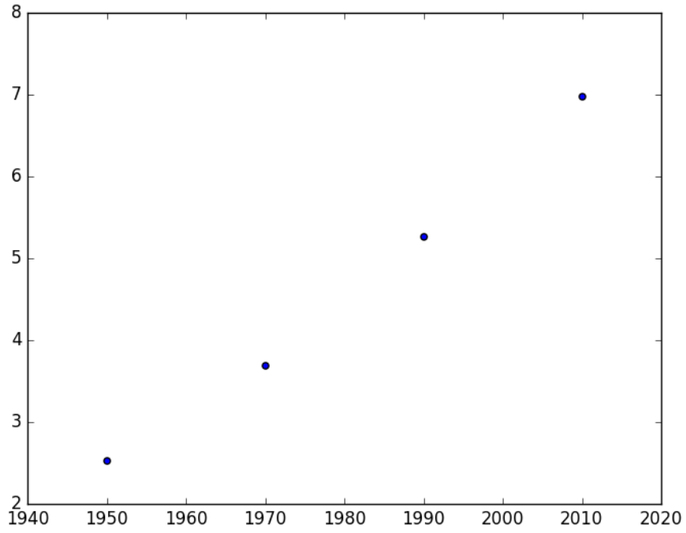

```
year = [1950 , 1970 , 1990 , 2010]
pop  = [2.519, 3.692, 5.263, 6.972]
```

Scatter plot

```
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()
```

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!

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Histogram

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Data Scientist at DataCamp

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Histogram

- Explore dataset
- Get idea about distribution

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Histogram

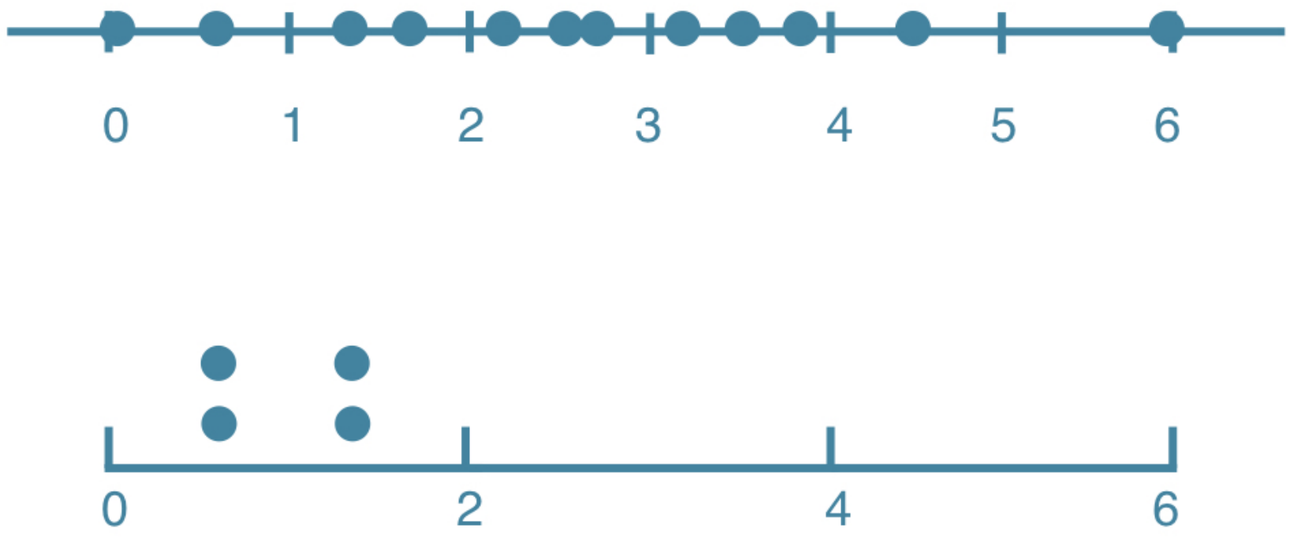
- Explore dataset
- Get idea about distribution





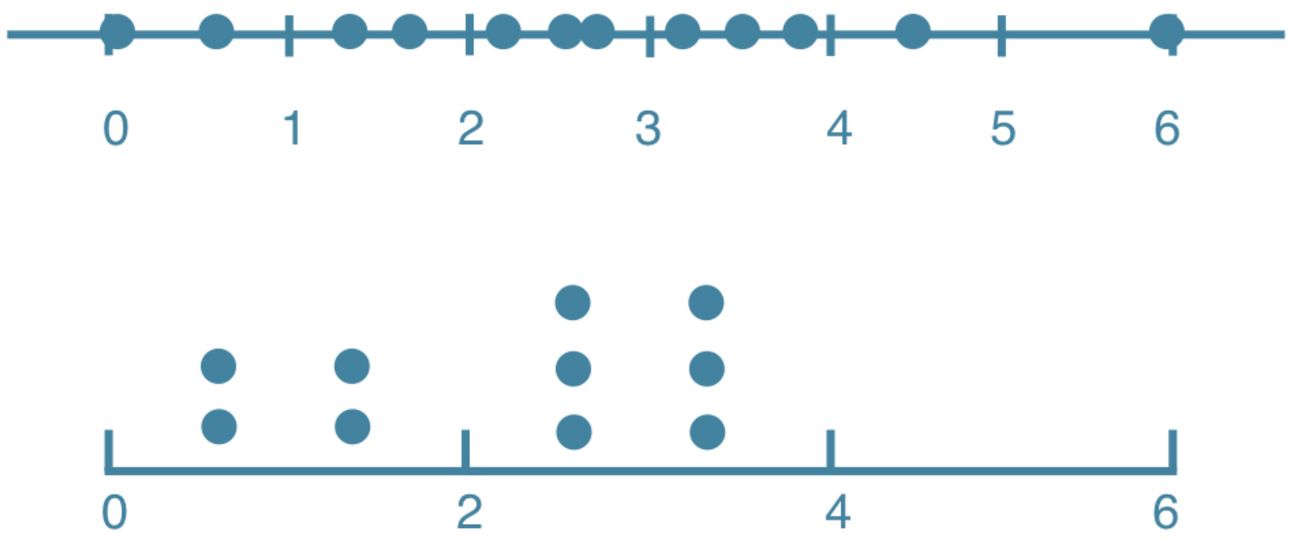
Histogram

- Explore dataset
- Get idea about distribution



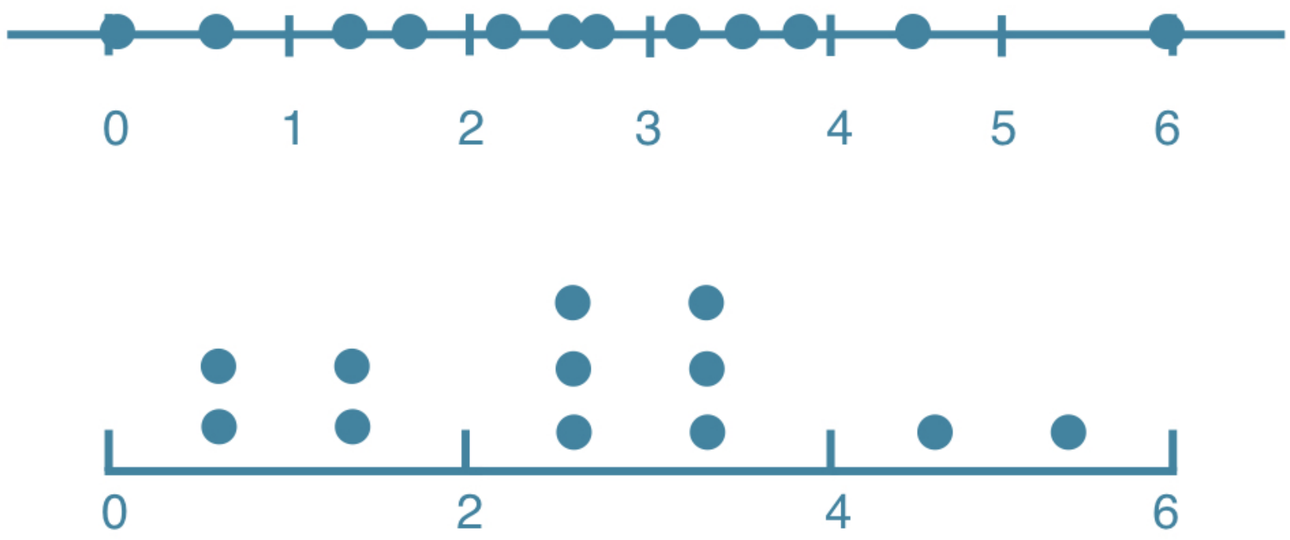
Histogram

- Explore dataset
- Get idea about distribution



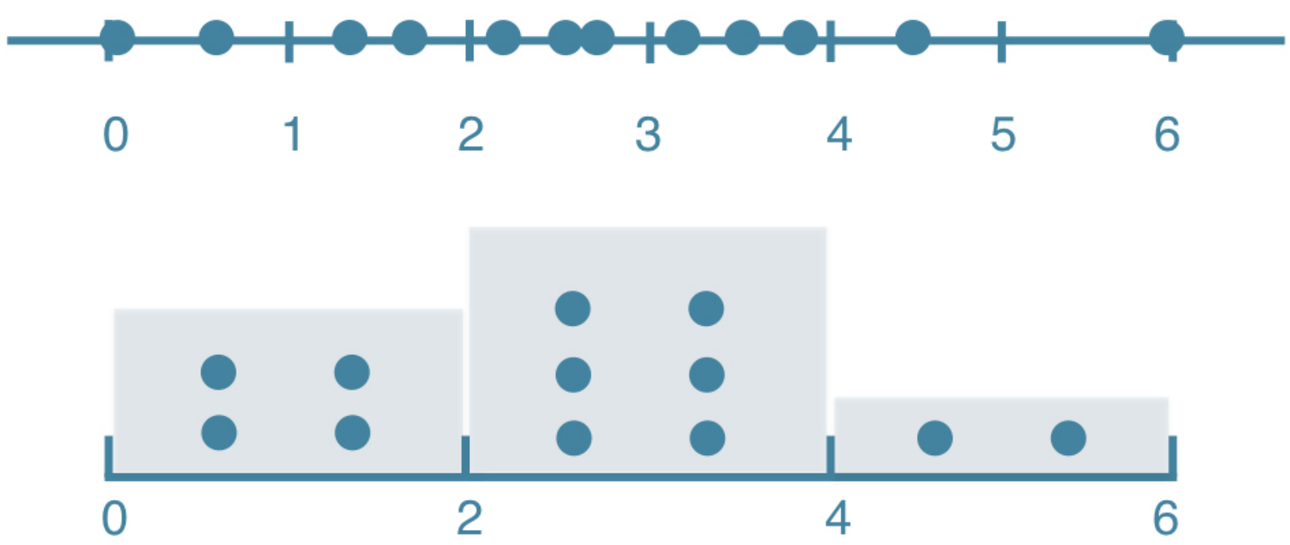
Histogram

- Explore dataset
- Get idea about distribution



Histogram

- Explore dataset
- Get idea about distribution



Matplotlib

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

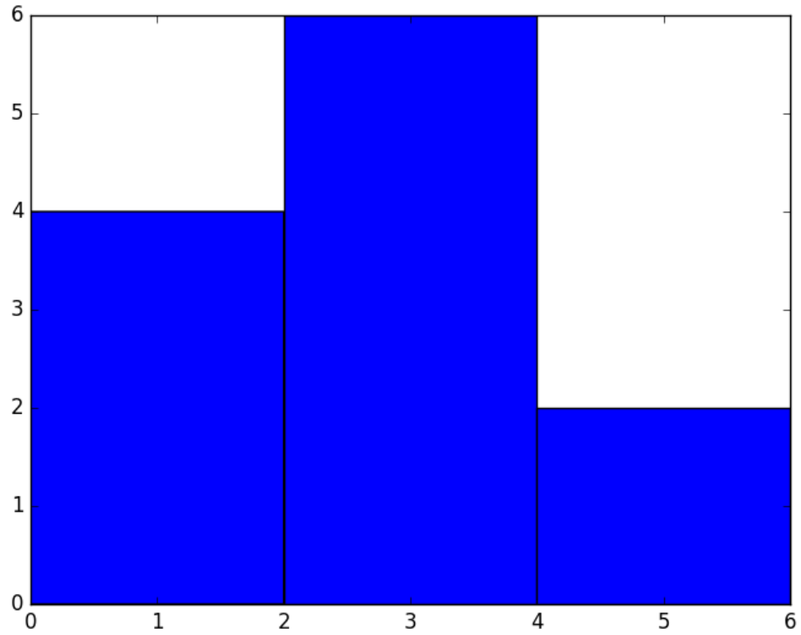
```
help(plt.hist)
```

```
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.

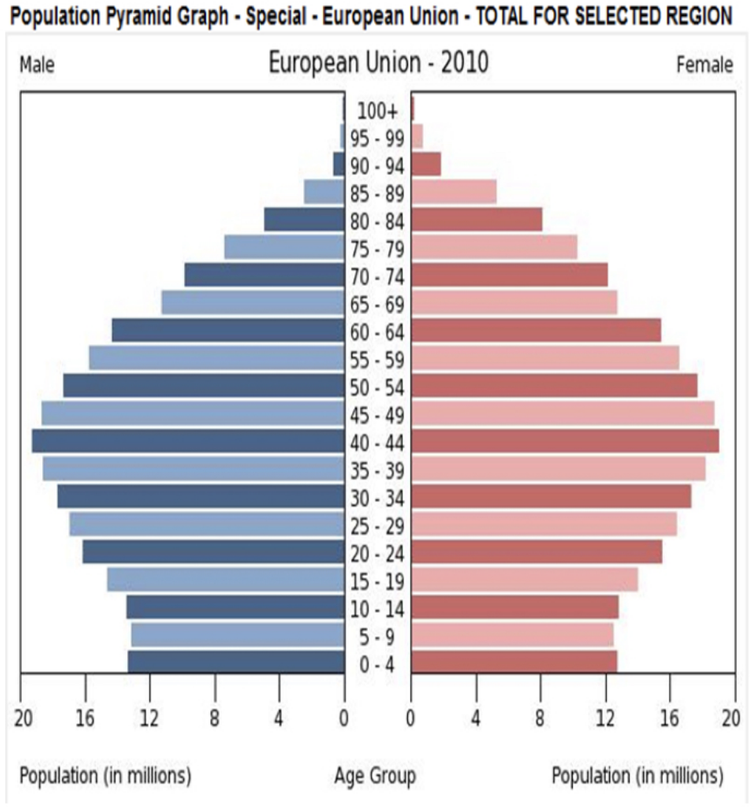
    Compute and draw the histogram of *x*.  The return value is a
    tuple (*n*, *bins*, *patches*) or ([*n0*, *n1*, ...],
    *bins*, [*patches0*, *patches1*, ...]) if the input contains
    multiple data.
```

Matplotlib example

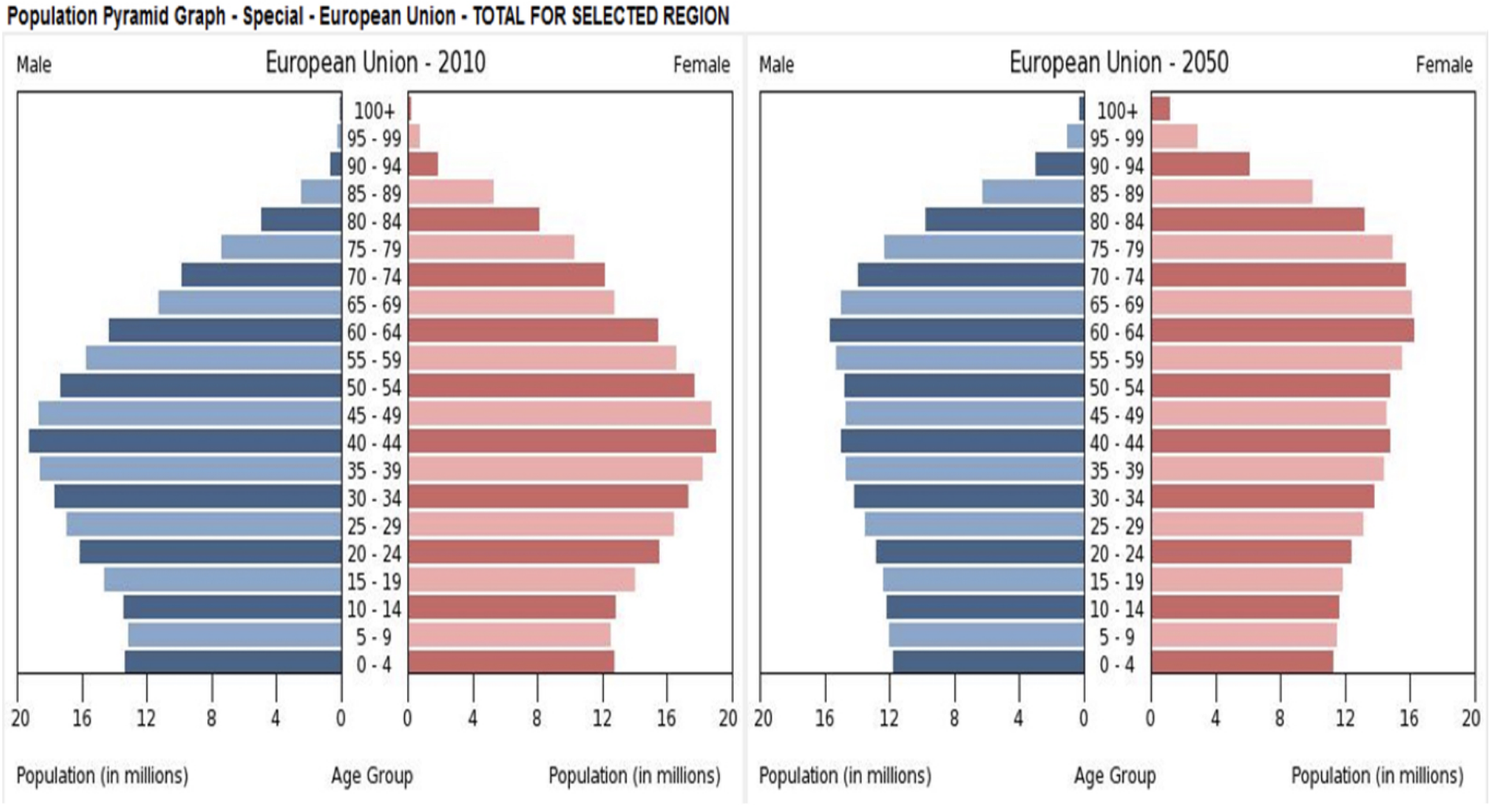
```
values = [0,0.6,1.4,1.6,2.2,2.5,2.6,3.2,3.5,3.9,4.2,6]
plt.hist(values, bins=3)
plt.show()
```



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

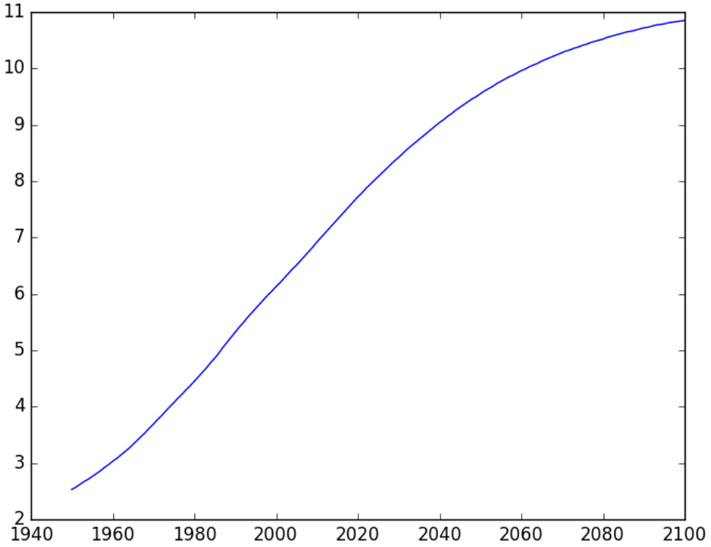
Basic plot

`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()
```



Axis labels

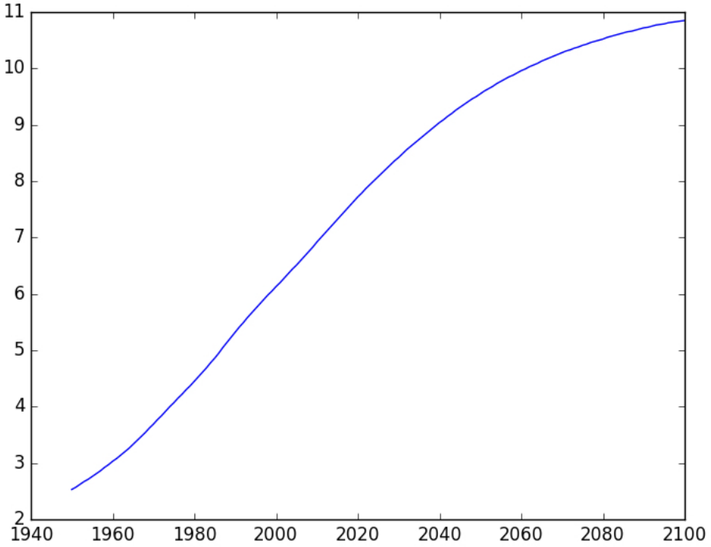
`population.py`

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

plt.plot(year, pop)

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

plt.show()
```



Axis labels

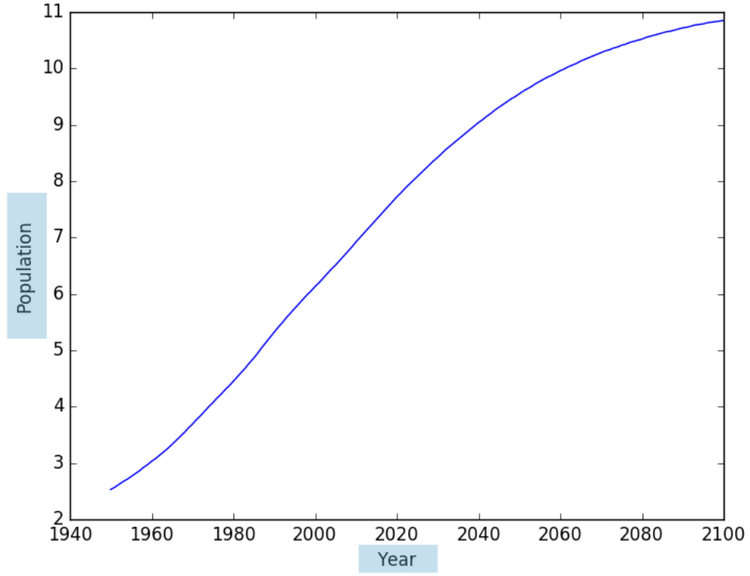
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plt.plot(year, pop)

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

plt.show()
```



Title

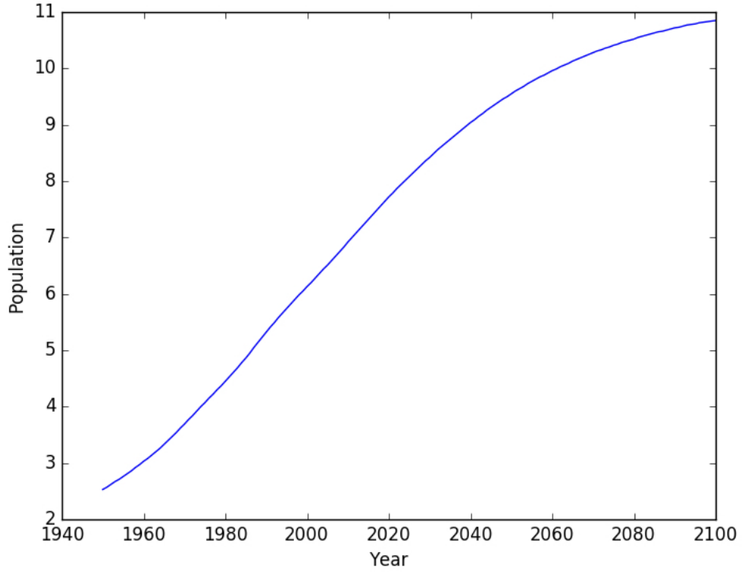
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pop = [2.538, 2.57, 2.62, ..., 10.85]

plt.plot(year, pop)

plt.xlabel('Year')
plt.ylabel('Population')
plt.title('World Population Projections')

plt.show()
```



Title

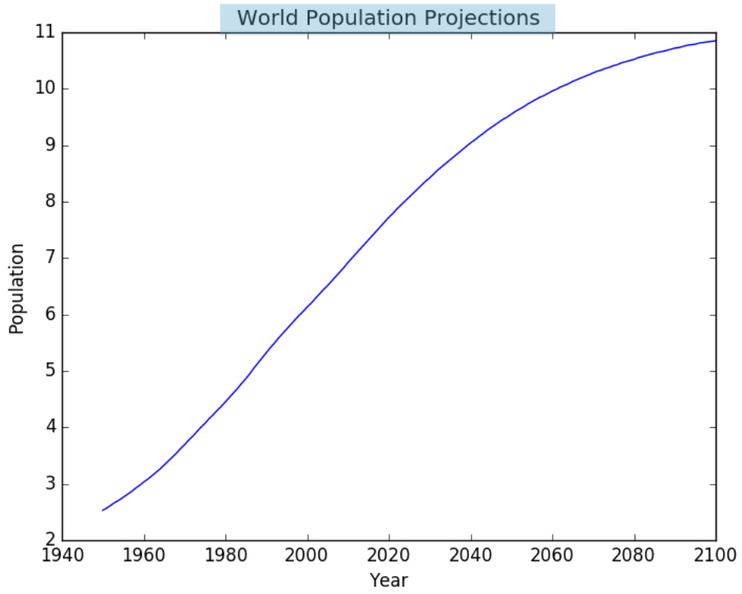
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Ticks

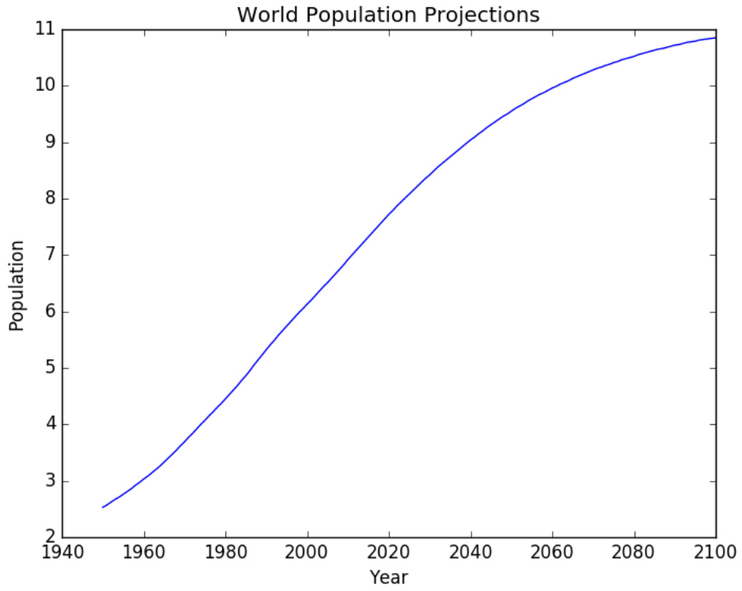
`population.py`

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

plt.show()
```



Ticks

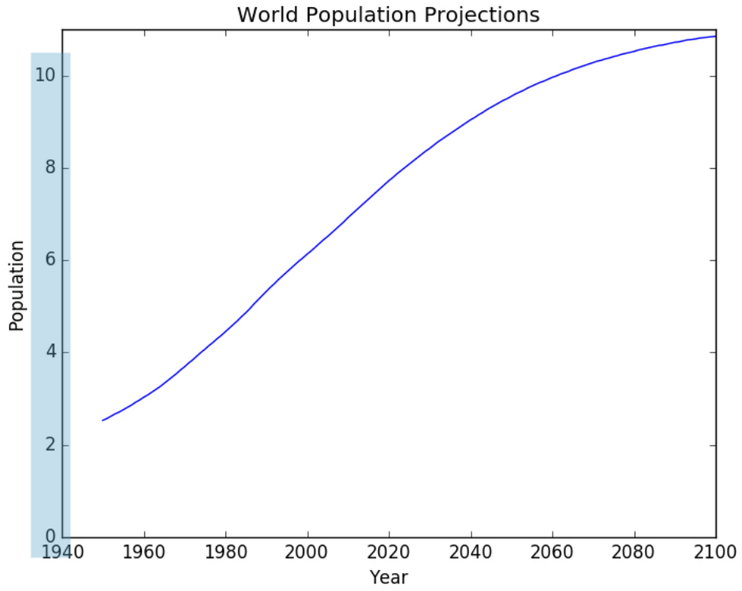
population.py

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plt.plot(year, pop)

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plt.show()
```



Ticks (2)

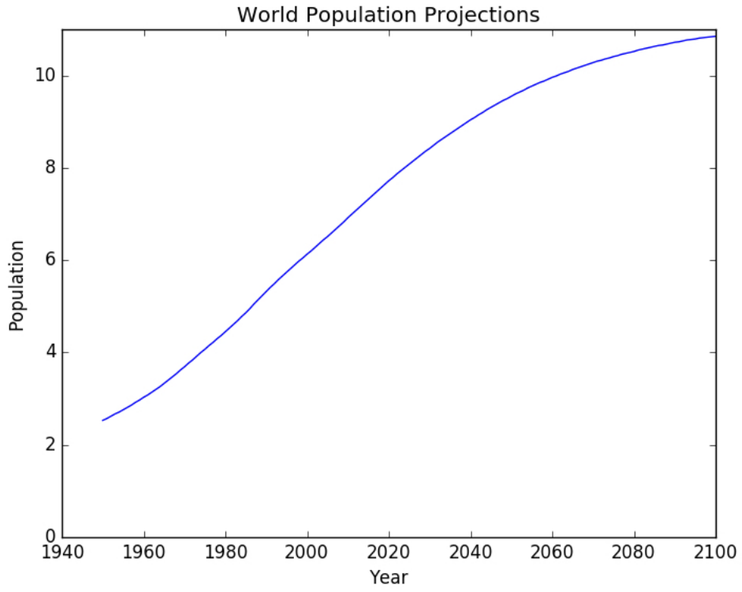
`population.py`

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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)

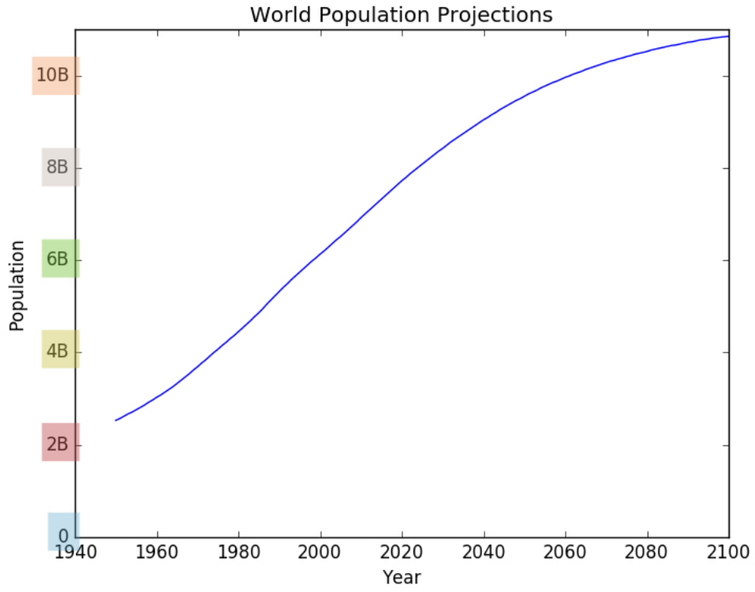
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plt.show()
```



Add historical data

`population.py`

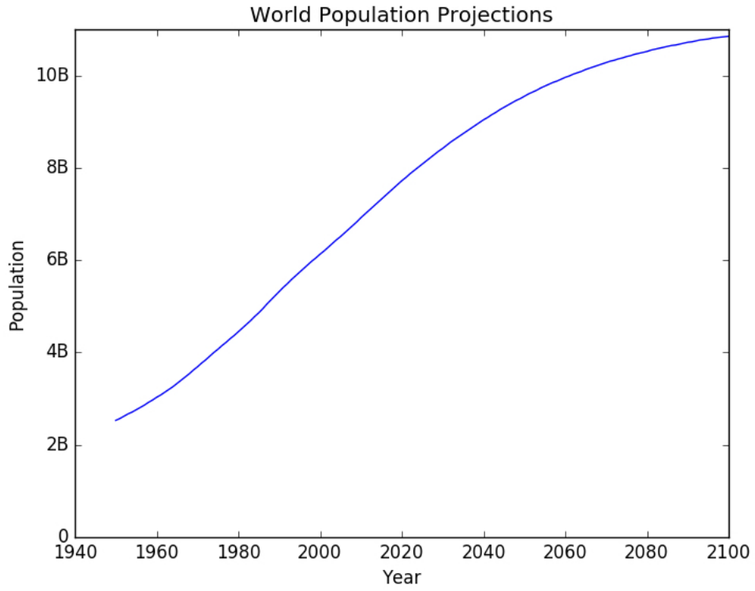
```
import matplotlib.pyplot as plt
year = [1950, 1951, 1952, ..., 2100]
pop = [2.538, 2.57, 2.62, ..., 10.85]

# 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()
```



Add historical data

`population.py`

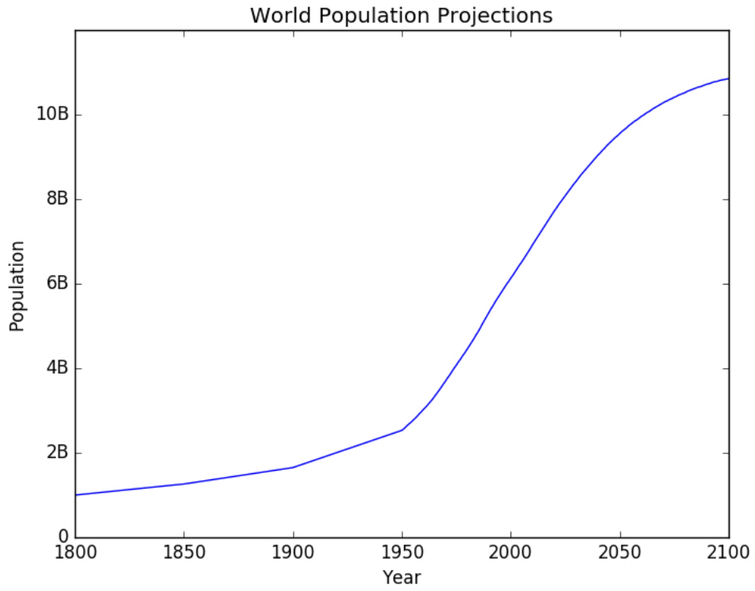
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import matplotlib.pyplot as plt
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pop = [2.538, 2.57, 2.62, ..., 10.85]

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

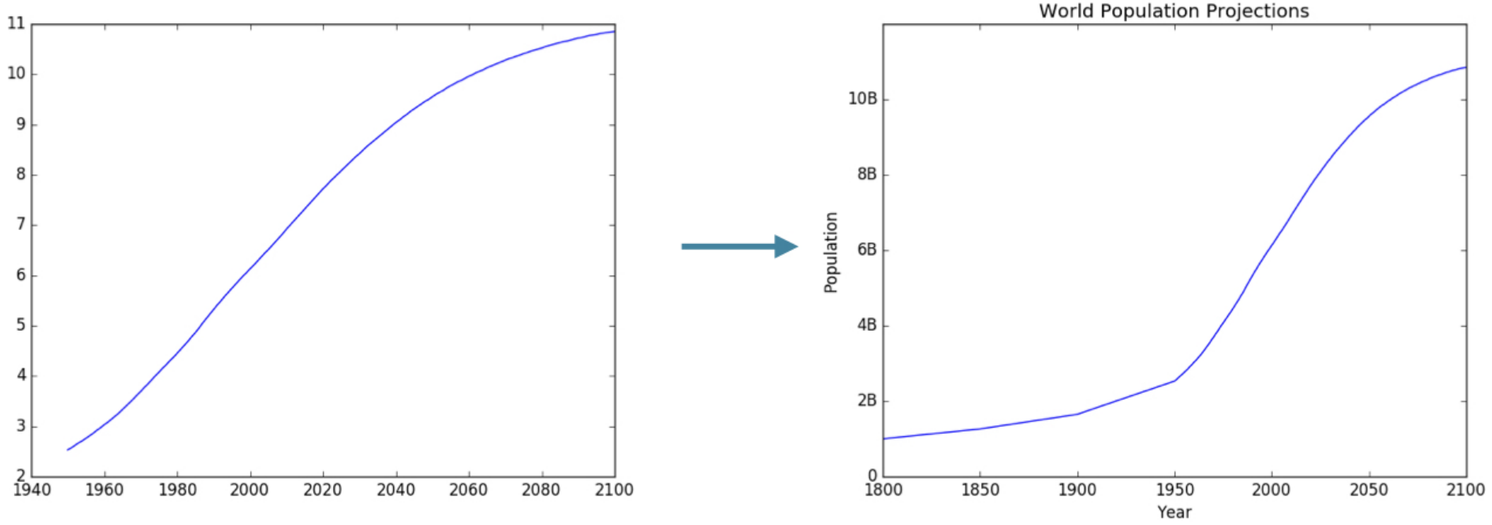
plt.plot(year, pop)

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



Before vs. after



Let's practice!

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