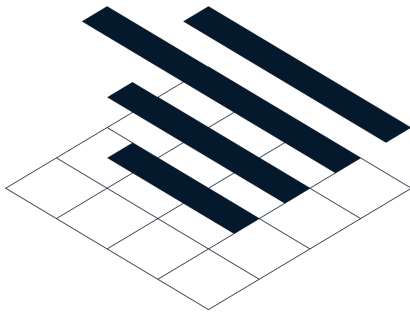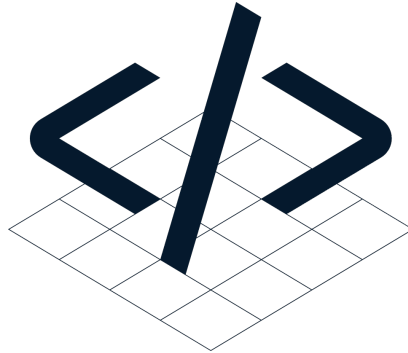# Basic plots with Matplotlib

INTERMEDIATE PYTHON

Hoai Thuan TRAN
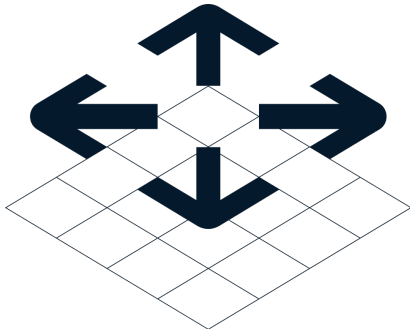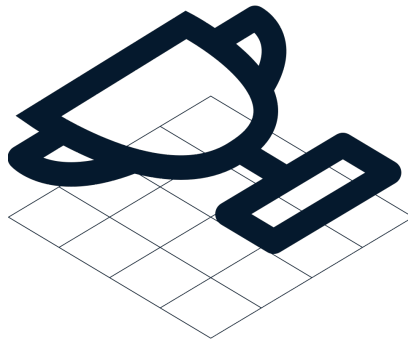Gia Dinh University

Basic plots with Matplotlib

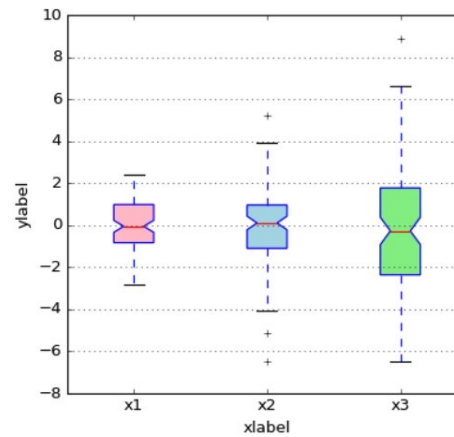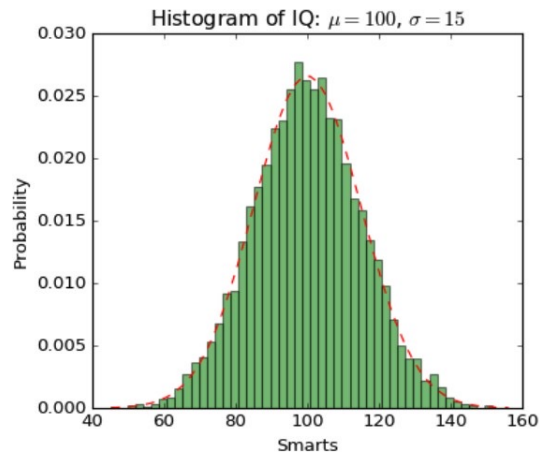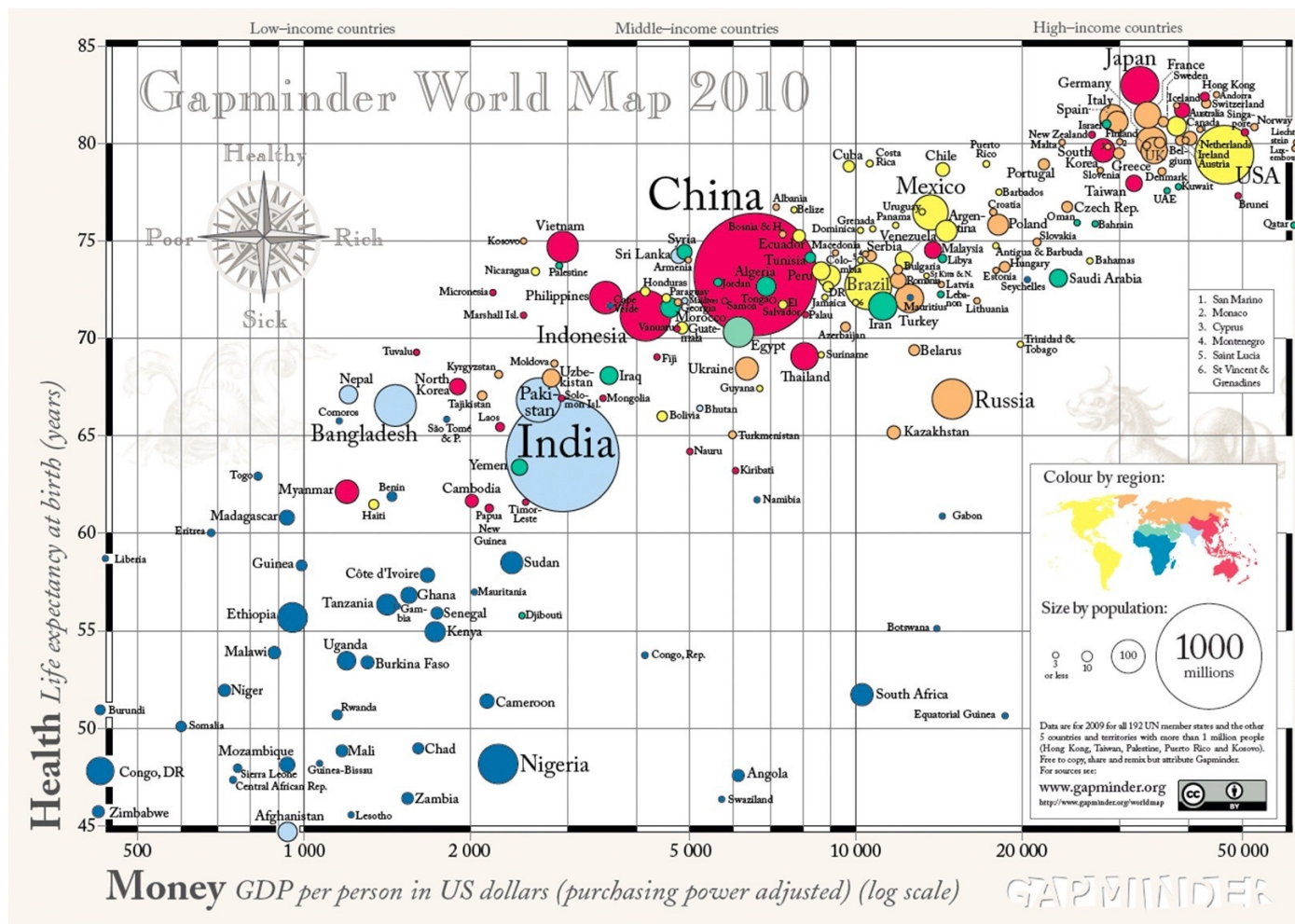- Visualization

- Data Structure

- Control Structures

- Case Study

Data visualization
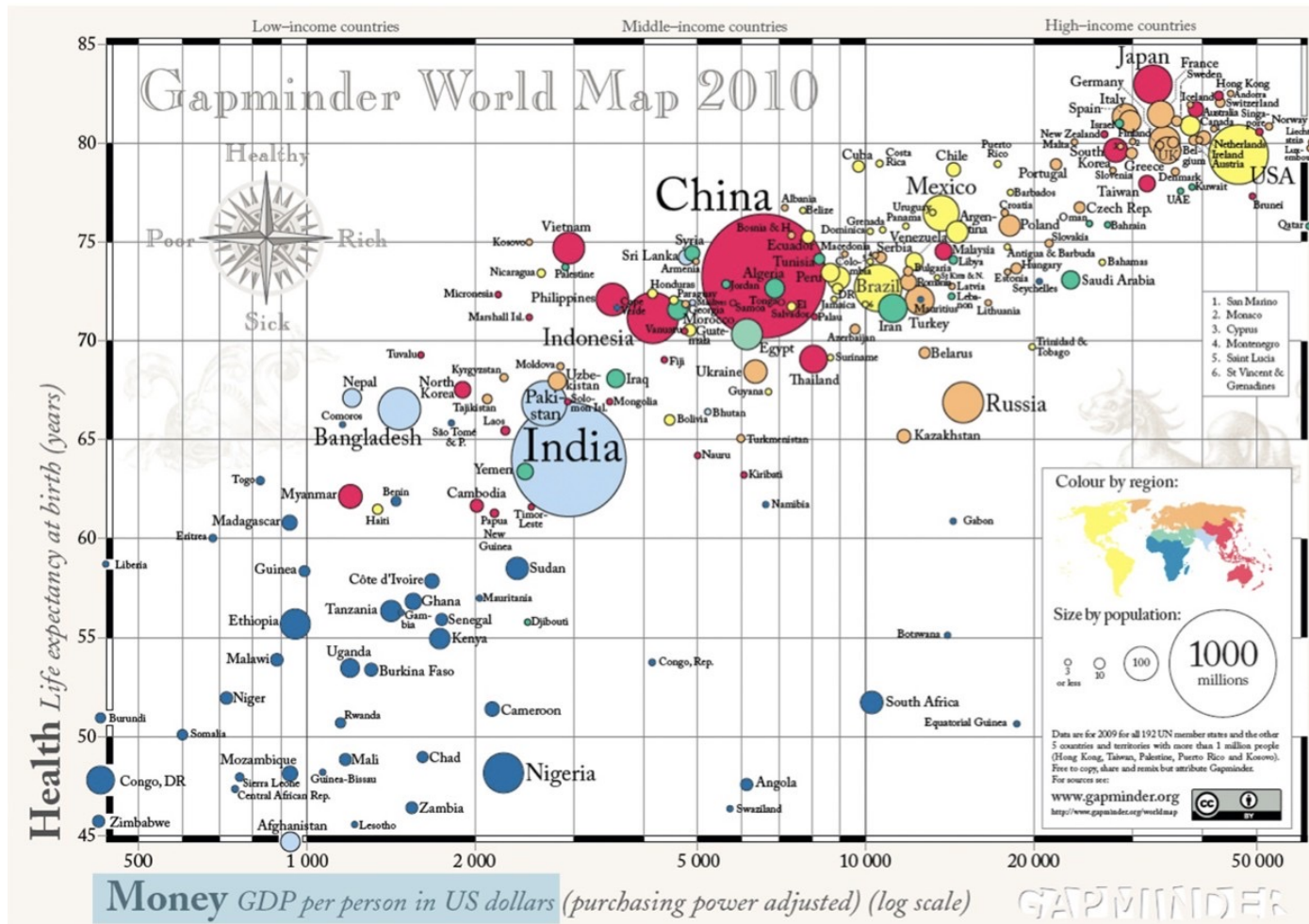
- Very important in Data Analysis
  - Explore data

  - Report insights

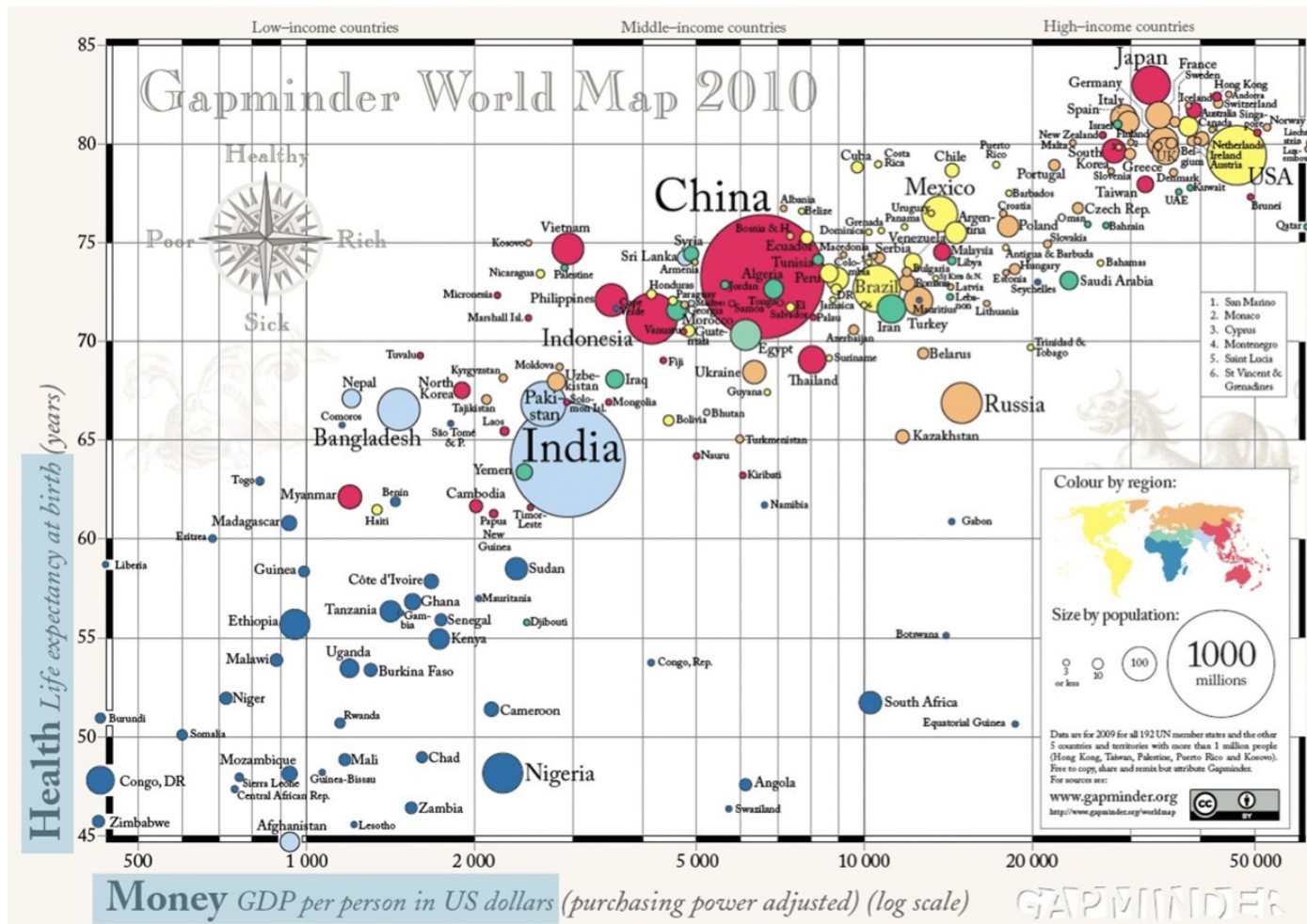¹Source: GapMinder, Wealth and Health of Nations

¹Source: GapMinder, Wealth and Health of Nations

¹Source: GapMinder, Wealth and Health of Nations

Matplotlib

```python
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]
```

Scat er plot

```python
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()
```

Scat er plot

```python
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()
```
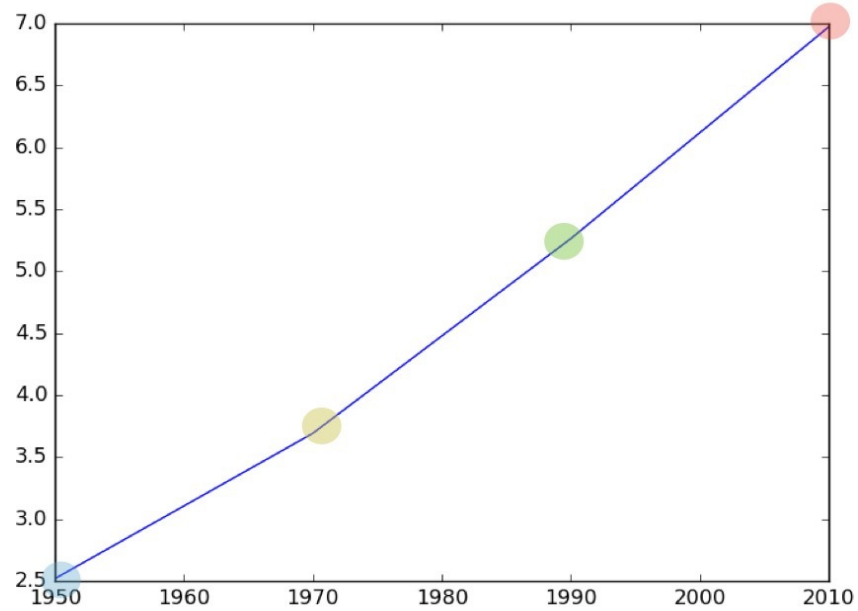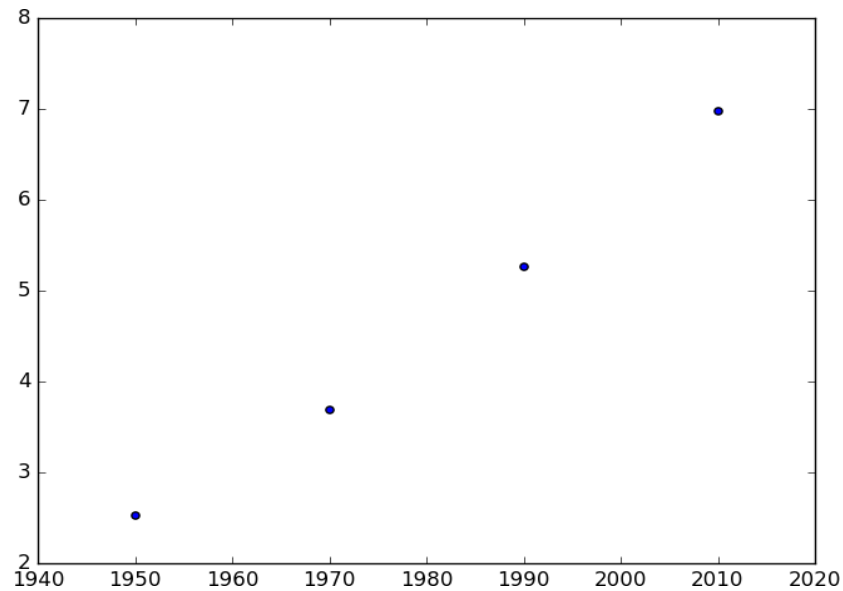
Let's practice!

INTERMEDIATE PYTHON

Histogram

INTERMEDIATE PYTHON

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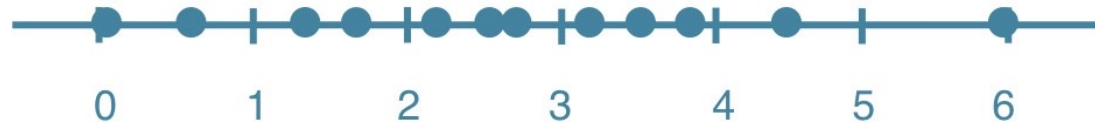Gia Dinh University

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

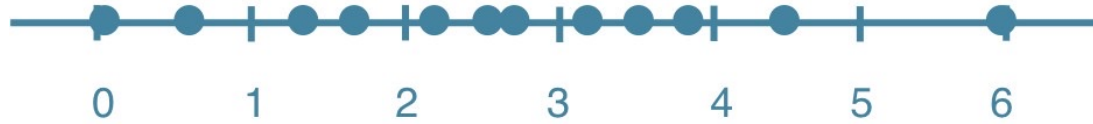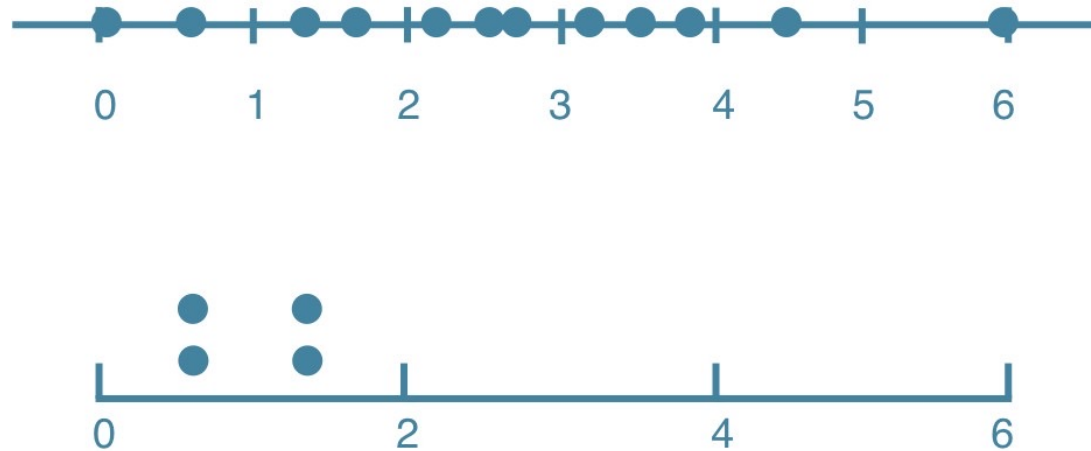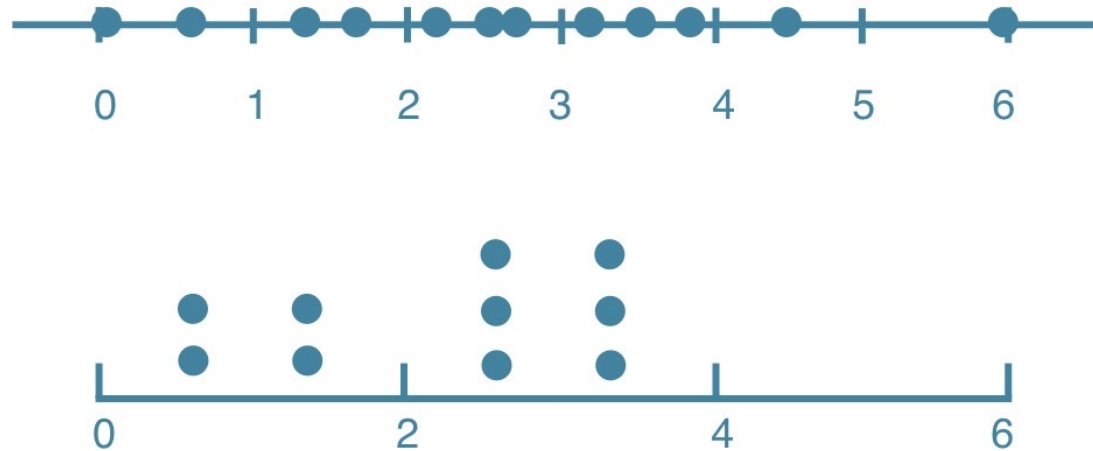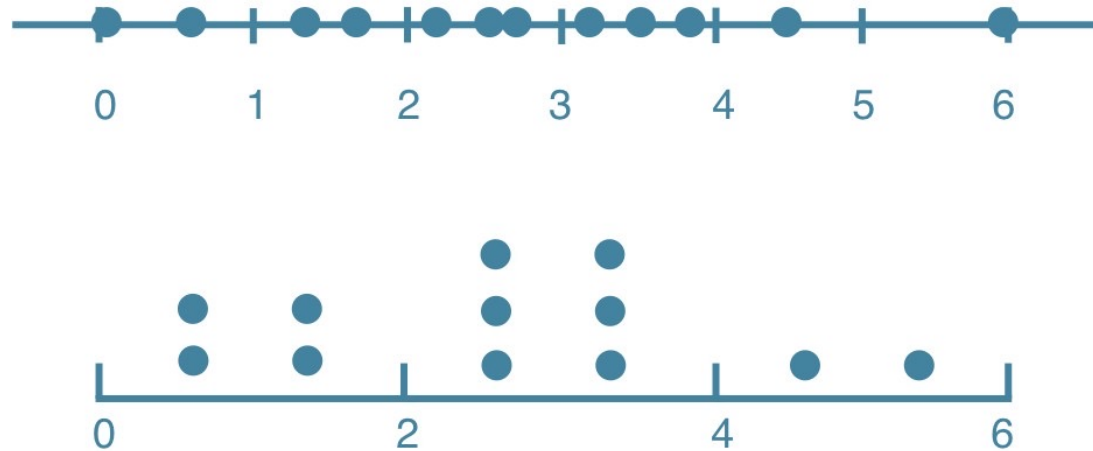# Histogram

- Explore dataset
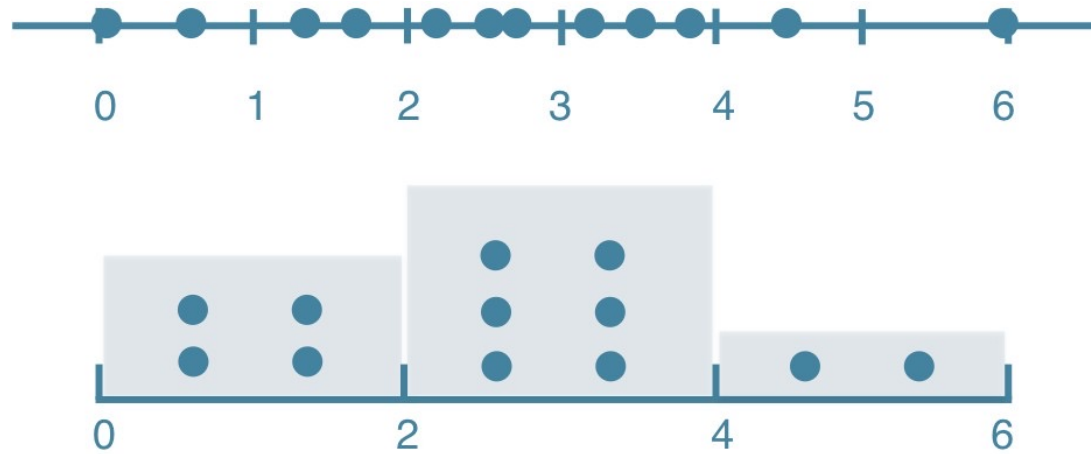
- Get idea about distribution

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()
```
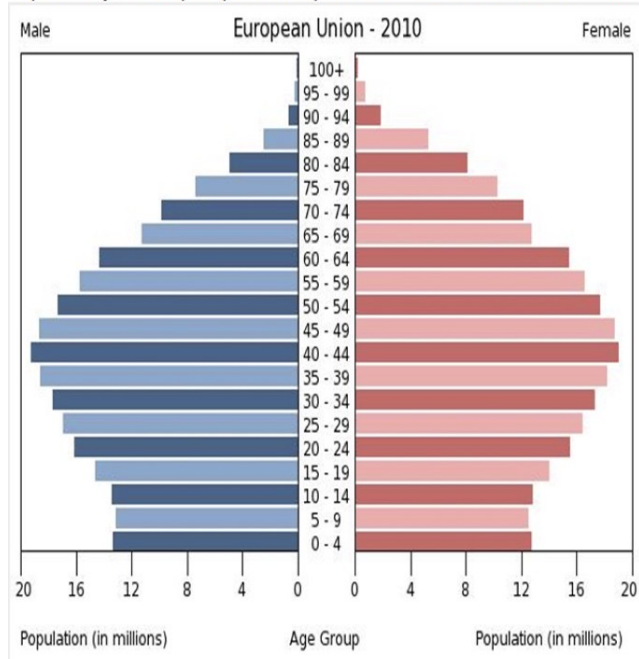
Population pyramid

Population pyramid

Population Pyramid Graph - Special - European Union - TOTAL FOR SELECTED REGION

Let's practice!

INTERMEDIATE PYTHON

Customization

INTERMEDIATE PYTHON

Hoai Thuan TRAN
Gia Dinh University

Data visualization

- Many options
  - Different plot types

  - Many customizations

- Choice depends on
  - Data

  - Story you want to tell

Basic plot

`population.py`

```python
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.show()
```
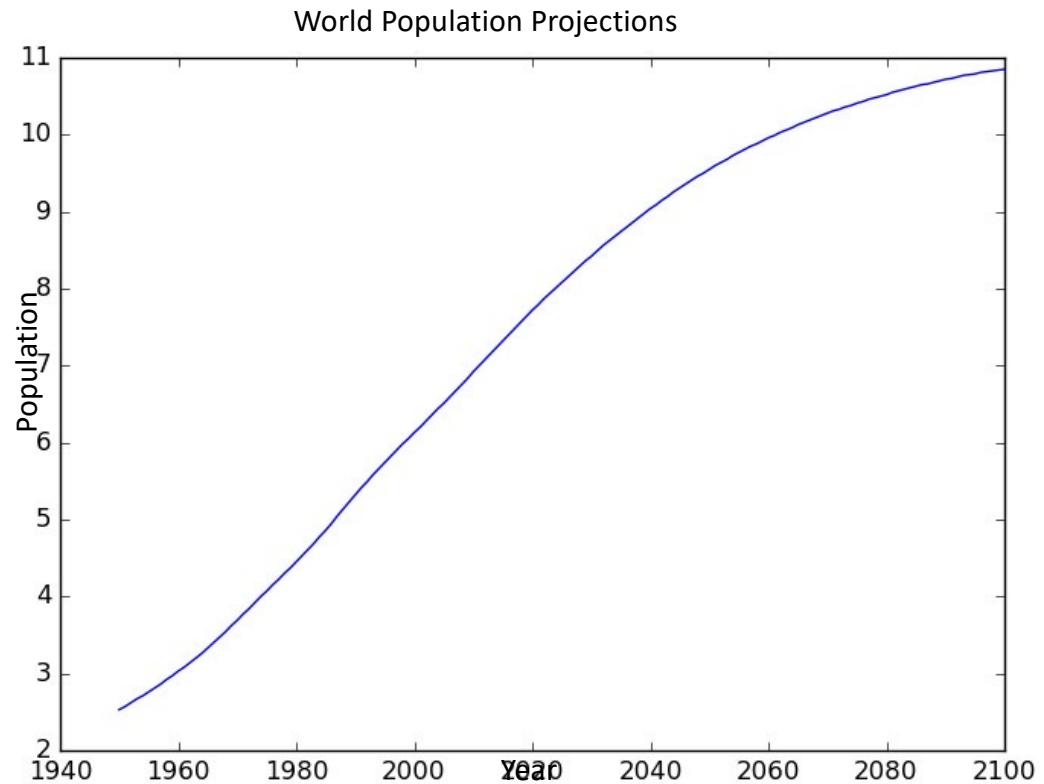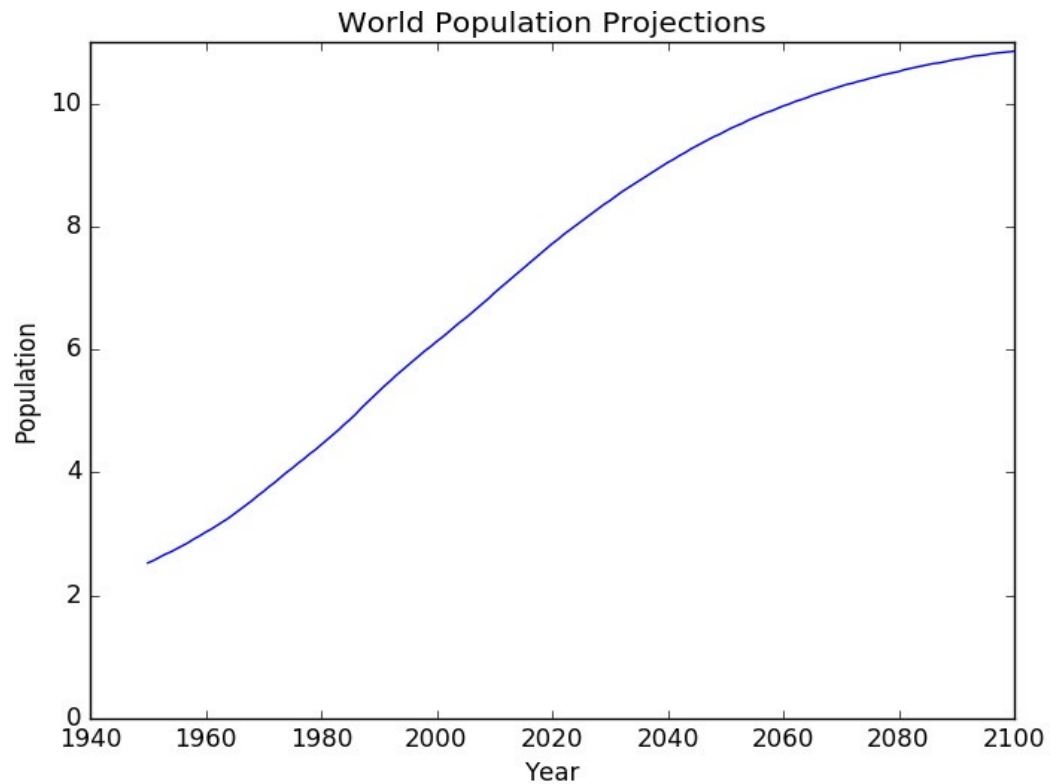
Basic plot

`population.py`

```python
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()
```
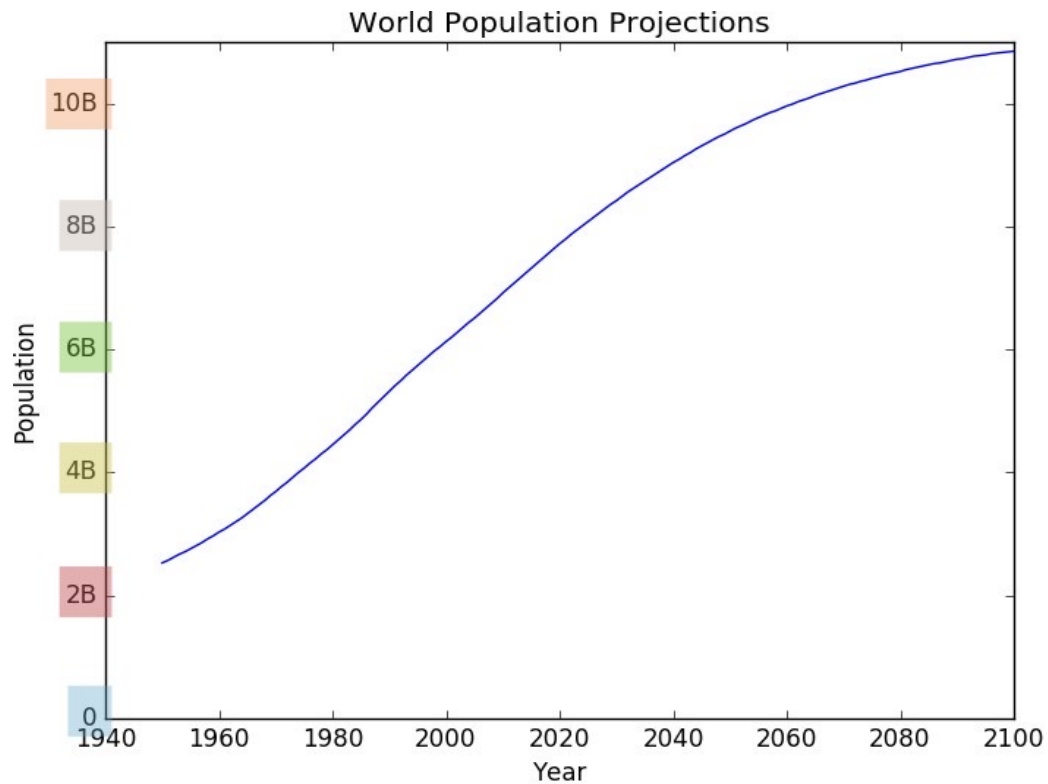
Basic plot

`population.py`

```python
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],
           ['0', '2B', '4B', '6B', '8B', '10B'])



plt.show()
```

Basic plot

population.py
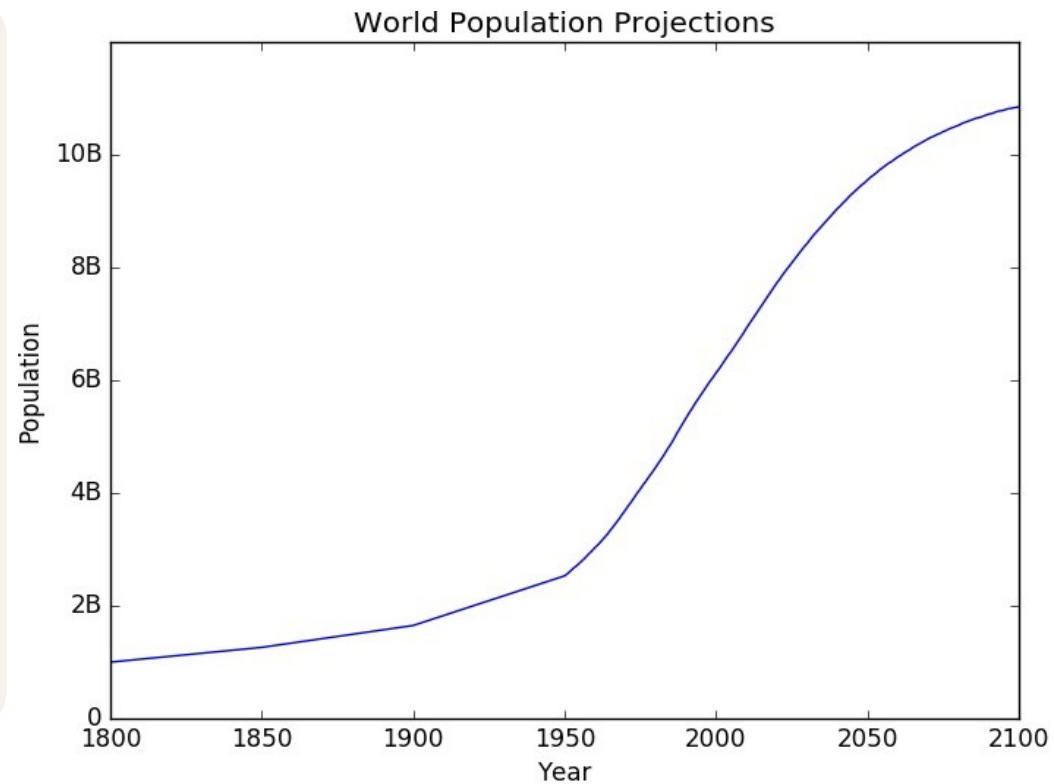
```python
import matplotlib.pyplot as plt

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()
```
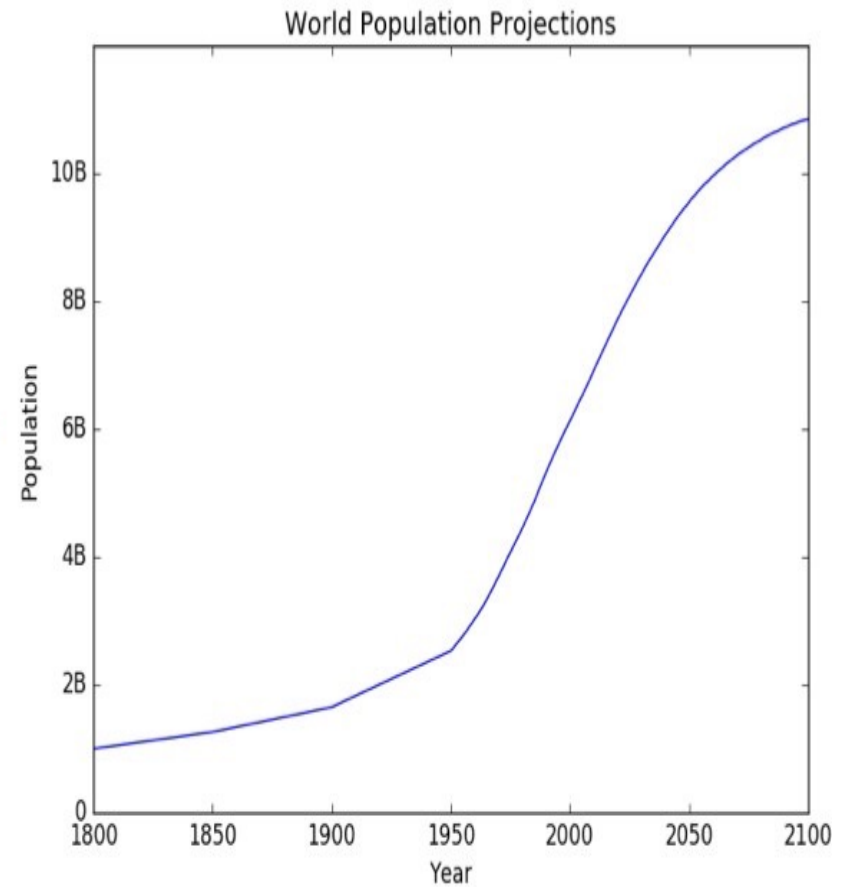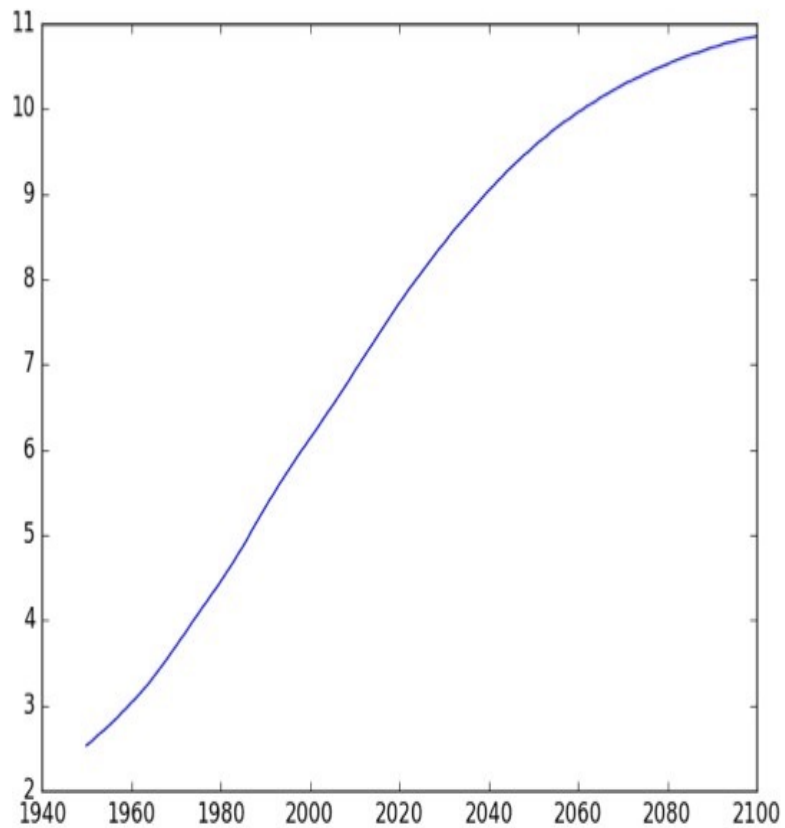
Before vs. after

Let's practice!

INTERMEDIATE PYTHON