prerequisites

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1 Jupyter notebook

- Why to use it in Data Science ($\neq$ Programming)
- Cell structure
- Documentation
- Shortcuts
  - `ENTER`, `ESC` focus or unfocus the current cell
  - `CTRL+ENTER`,`SHIFT+ENTER` execute current cell, execute current cell and move to next cell
  - `X`, `V` cut and paste cell
  - `A`, `B` insert cell above and belove the current cell
  - `M` merge two cells
  - `SHIFT+MINUS` split cell at cursor position

2 Python syntax

- Indentation
- `for` loop
- `while` loop
- defining a function
- `print( )` function
- `help( )` function
- What is PIP?

3 Numpy

```
import numpy as np
```

Working with arrays

- Slice a matrix
  - Select column
  - First n elements / last n elements
  - Every i elements
  - Find elements that satisfy certain criteria, `where( )` function

- `shape( )` function
- `reshape( )` function
- `flatten()` function
- `zeros( )` and `ones( )` function
- `linspace( )` function
- `meshgrid( )` function
- `dot( )` product, `matmul( )` function
- Random number generation
  - Uniform
  - Gaussian
  - Integer random numbers

4 Matplotlib

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

Plots

- Histogram 1d $\{x\}$
- Histogram 2d $\{x, y\}$
- Plot a 1d function $\{x, f(x)\}$
- Plot a 2d function $\{x, y, f(x, y)\}$
  - Color plot
  - Three-dimensional plot
- Subplots