# PYTHON FUNDAMENTALS:

## Data Types:

- 'Hello world': str,
- None: NoneType,
- 15: int,
- 20.14: float,
- function,
- (1, 'b', 3, 5): tuple
  `/* immutable, can contain mixed data types, written between parentheses ()  */`
- [1, 'b', 3, 5]: list
  `/* mutable (add by append() function), can contain mixed data types, written between square brackets  [] */`
- {'name': 'Asmaa', 'surname': 'Mirkhan'}: dictionary
  `/* labeled list, no order, similar to JSON */`

## Classes:

Note: Objects do not have private or protected members.

Constructor: (Syntax: __init__) it is not necessary

**Map Function:**

Function signature: map(function, iterable , …)

Note: Useful for analysis.

# BASIC DATA PROCESSING WITH PANDAS:

`/* loc and iloc for row based querying and square brackets [] for column based querying */`

## Series in pandas:

Between list and dictionary, sorted but has keys(labeled), labels are indices starting from 0 and the last key is dtype key (data type).

## Data Frames in pandas:

Briefly, it is a two-dimensional series.

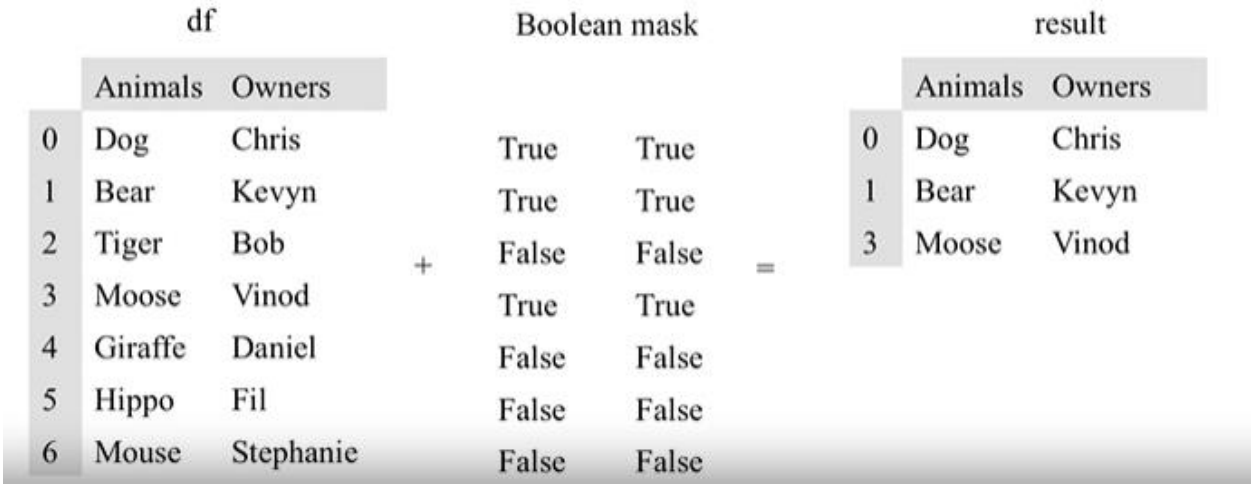
`/* like SQL database tables*/`

# BASIC DATA PROCESSING WITH PANDAS:

## Boolean Masking:

Useful for removing unwanted data

e.g




- Data frames offer functions like SQL queries such as join, groupby,…

## Scales in pandas:

- **Ratio Scale**
  - Units are equally spaced
  - Math. ops. are valid
  - Ex: height, weight
- **Interval Scale**
  - Units are equally spaced
  - No true zero
  - Ex: temperature scale
- **Ordinal Scale**
  - Order is important
  - Not evenly spaced
  - Common in machine learning
  - Ex: letter grades (AA, BA, ..)
- **Nominal Scale**
  - Like categories, order is not important
  - Ex: Teams of sports

# STATISTICAL ANALYSIS:

**Distribution:** Set of all possible random variables (Flipping coins)
(a shape that describes the probability of a value being pulled when we sample a population)

```
/*
  - Binomial Distribution:
    N trials of binary experiment
  - Uniform Distribution:
    Random variable takes same value (does not change)
  - Normal (Gaussian) Distribution:
    Has to symmetric curves */
/* Expected value:
The mean of the random variable if we did an infinite number
of trials*/
```

Variance: a measure of how broadly values of samples are spread out from the mean.

**Characteristics of a distribution:**

- **Central tendency**
  Measures: mode, median or mean.
  About really where the bulk probability is in the distribution.
- **Variability:**
  Measures: standard deviation (which is a measure of how different each item in our sample is from the mean), interquartile range.

**Kurtosis** (the shape of the tales): negative value means that the curve is slightly more flat than a normal distribution and positive value means that the curve is more peaky than a normal distribution.