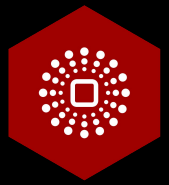
OOPs and Numpy



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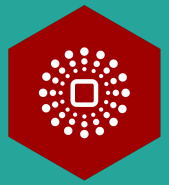
Object oriented programming



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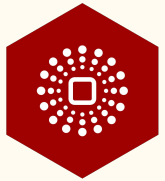
Basic foundations

- Python is a multi-paradigm language (supports different programming approaches)
- Objects contain both attributes and behaviour. (eg. a Human object would contain the attributes name, gender, height and would contain the behaviours including run, walk, sing dance etc.)



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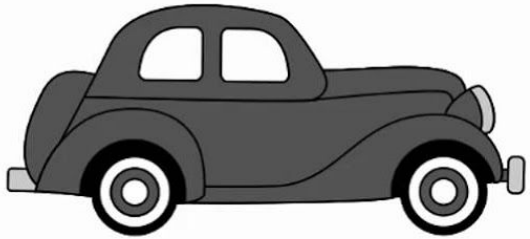
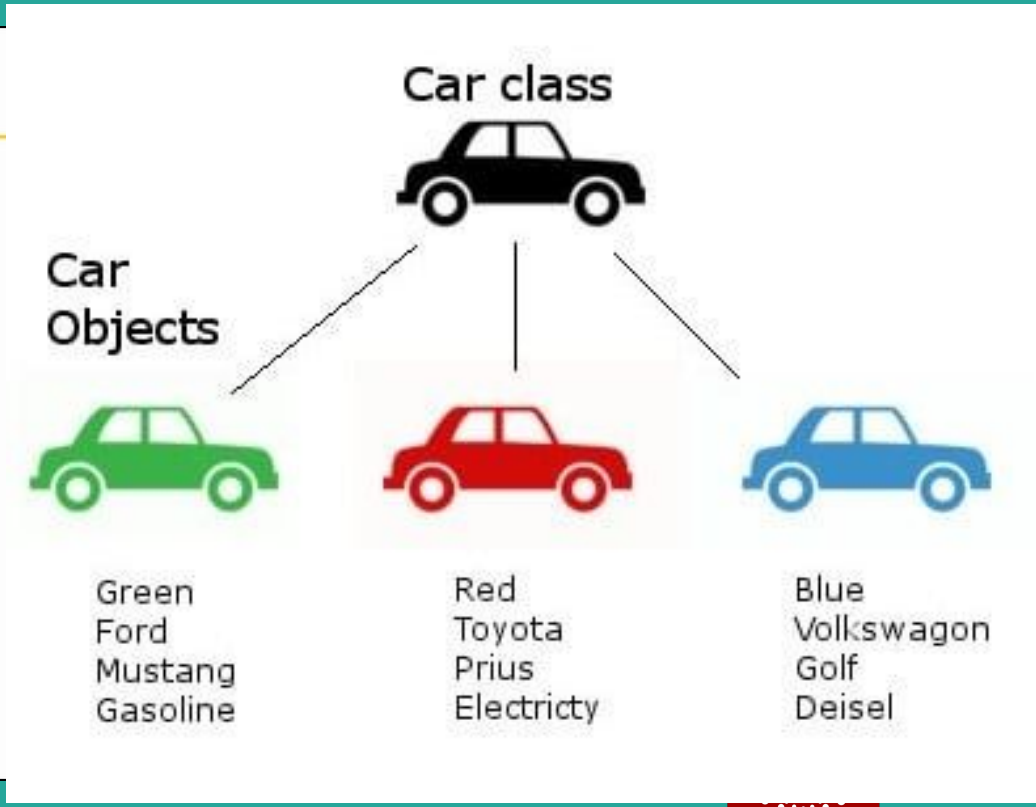
OBJECT-ORIENTED PROGRAMMING

Properties
Make
Model
Color
Year
Price



Methods
Start
Drive
Park



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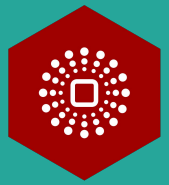

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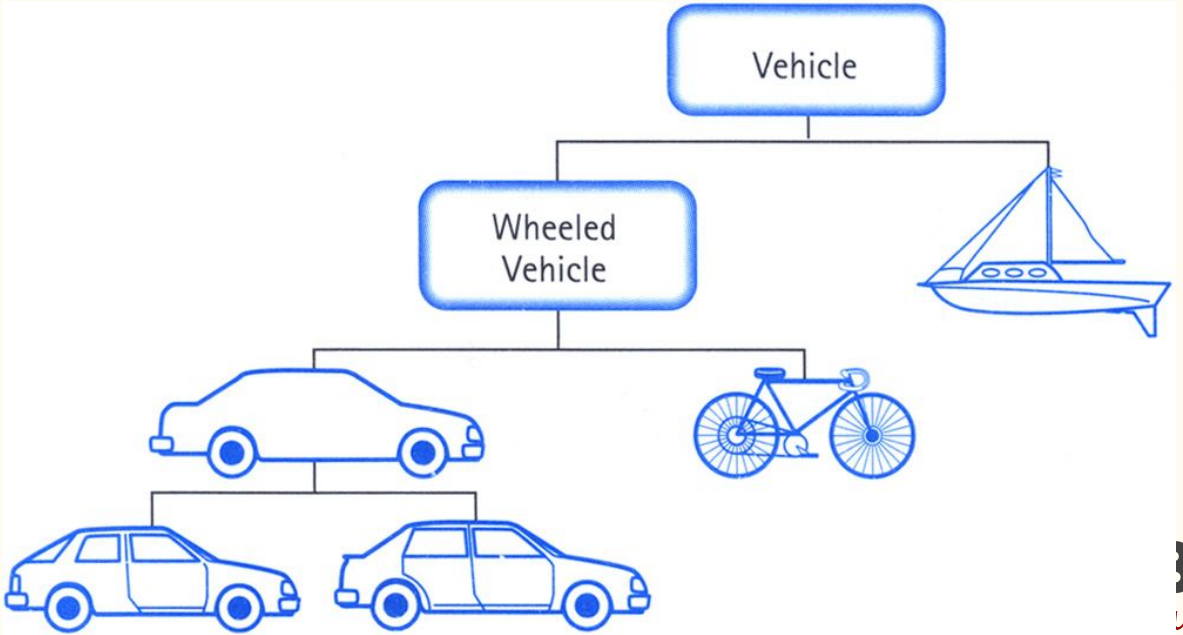
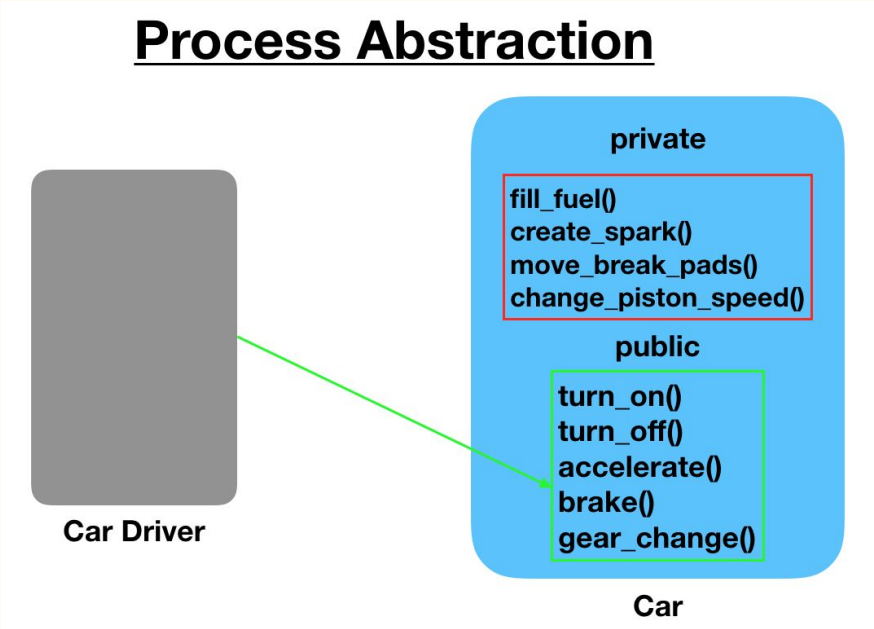
Basic OOP principles

- Encapsulation - data inside the object should only be accessed through the object's methods.
- Inheritance



- Abstraction - providing only the essential information to the user and hiding the actual implementation
- Polymorphism - A concept of using common operation in different ways for different data input. (ex print() function can print any data type)



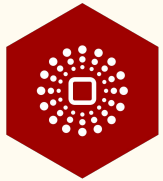
Procedural vs OOPs

Procedural

- Step-by-step approach
- Program is a list of procedures to run (functions, global variable etc.)

OOPs

- Uses classes and objects to create models
- Objects (instances of classes) contain methods and data



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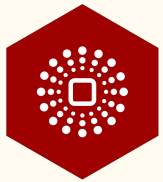
Advantages of OOPs

- Easier to maintain large codebase
- Better models the real world
- Enables code reuse
- Better than modules because the data is also joined with



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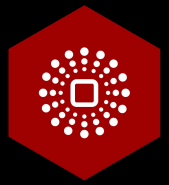
Python Classes



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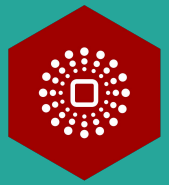

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Numpy

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What is NumPy?

- A python module that adds support for multi-dimensional arrays
- Much much faster than native python
- It is implemented in C and Fortran so when calculations are vectorized (formulated with vectors and matrices), performance is very good.
- NumPy arrays are like Python's built-in list type, but NumPy arrays provide much more efficient storage and data operations as the arrays grow larger in size

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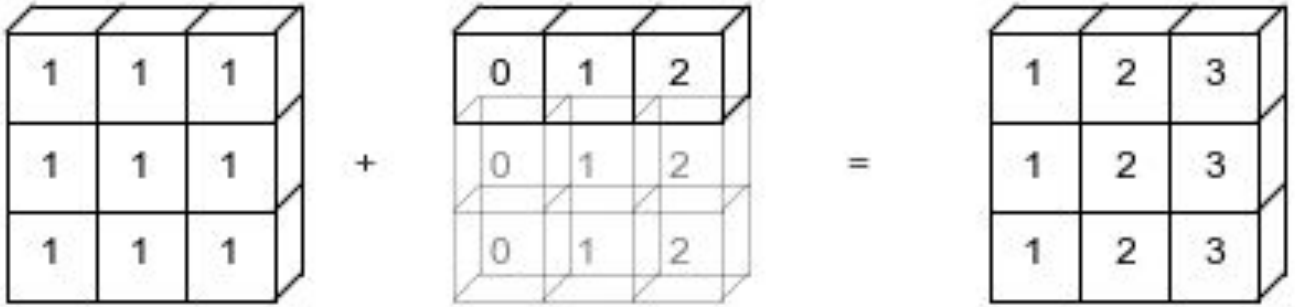
Implementation	Elapsed Time
Pure Python with list comprehensions	18.65s
NumPy	0.32s
TensorFlow on CPU	1.20s

`np.arange(3)+5`

`np.ones((3,3))+np.arange(3)`



`np.arange(3).reshape((3,1))+np.arange(3)`