BIRZEIT UNIVERSITY

OO Basic Concepts

By: Mamoun Nawahdah (Ph.D.)
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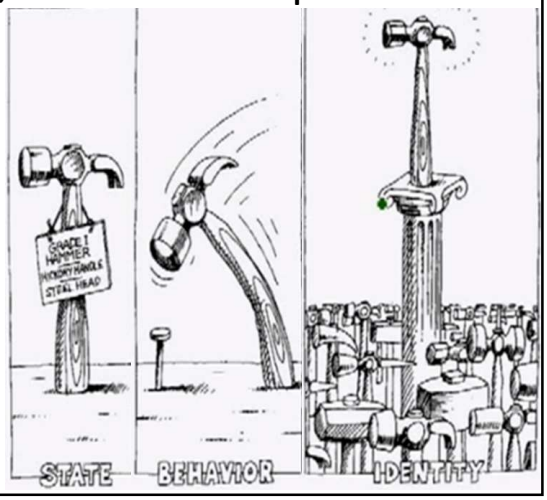
Problems with Procedural Languages

- Data does not have an owner.
- Difficult to maintain data integrity.
- Functions are building blocks.
- Many functions can modify a given block of data.
- Difficult to trace bug sources when data is corrupted.

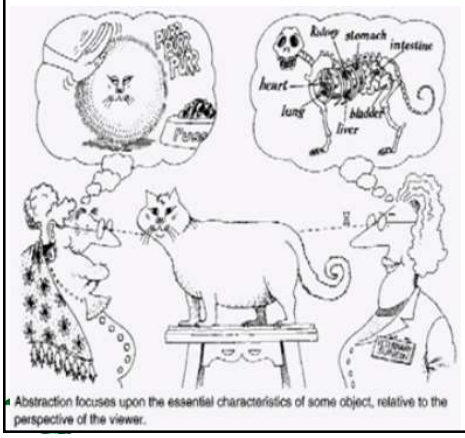
What is Object?

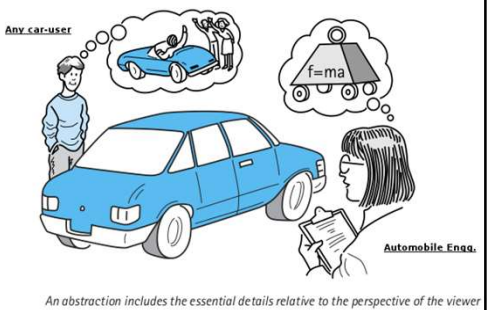
- A thing that has **state**, exhibits some well defined **behavior**, and has a unique **identity**.
- **State**:
  - Data members
  - Fields
  - Properties
- **Behavior**:
  - Member functions
  - Methods



Abstraction - Modeling

- **Abstraction** focuses upon the **essential** characteristics of some object, relative to the perspective of the viewer.

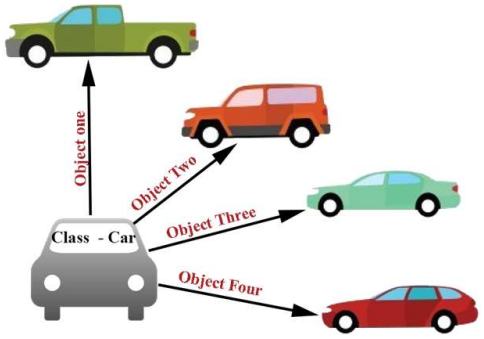




An abstraction includes the essential details relative to the perspective of the viewer

What is Class?

- A **class** represents a set of objects that share common structure and a common behavior.
- A **class** is a **blueprint** or **prototype** that defines the variables and methods common to all objects of a certain kind.



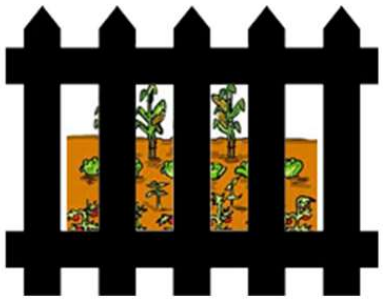
Class (Car)	
Attributes	Methods
Company	Move
Type	Stop
Model	Turn Right
Color	Turn Left

Class Access

- **Problem**: You have a garden and it is **public**. Anyone can take the properties of the garden when they want.

Class Access cont.

- **Solution**: Make it **private**, put a high fence around my garden, now it is safe!



- But wait, I can no longer access my own garden!!!!

Class Access cont.

- **Solution**: Hire a private guard and give him **rules** on who is able to access the garden.
- Anyone want use the garden must get permission from guard.
- Garden is now **safe** and **accessible**.

Class Access cont.

Initialization of Objects

What if garden had weeds from the beginning?

- **Constructors** ensure correct initialization of all data. They are automatically called at the time of object creation.
- **Destructors** on the other hand ensure the de allocation of resources before an object dies or goes out of scope.

Lifecycle of an Object

- **Born Healthy**:
  - Using **constructors**
- **Lives Safely:**
  - Using **setters** and **getters**
- **Dies Cleanly:**
  - Using **destructors**