

CLS 110 Recitation

Objects

July 24 2017



Agenda / Requests

- Today:
 - Objects
- Any requests?
 - Midterm questions?
 - Things from lecture?

Motivation for Objects

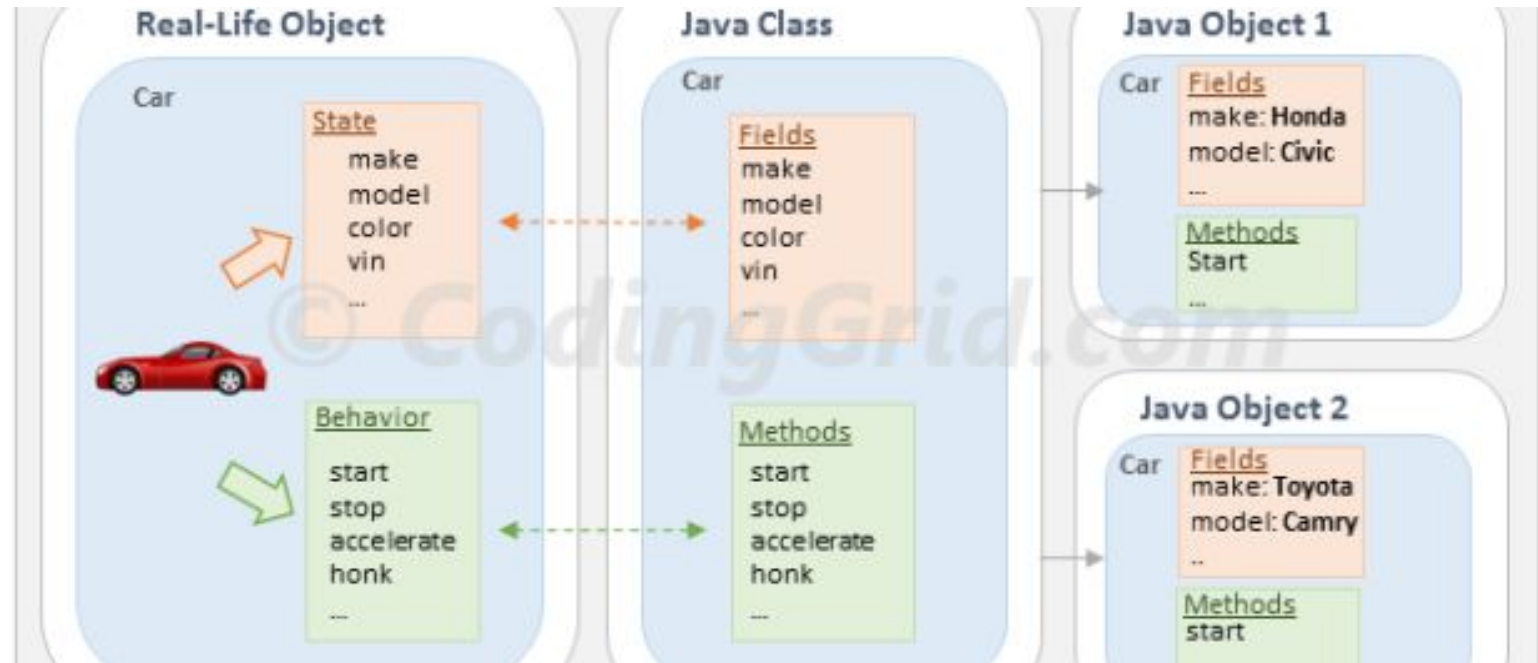
- Objects allow us to encapsulate functionality
 - encapsulated functionality is easier to debug, understand, and reuse
- The object-oriented programming paradigm
 - We understand a program as a collection of objects that interact with each other
 - Java is an object oriented language
- Note that OOP isn't the only programming paradigm
 - Before talking about objects we were using the procedural paradigm.
 - Functional programming paradigm ... look forward to CIS 120.
- Modularity
 - Different objects for do different things!
 - Avoid repeating yourself

Anatomy of an object

- Objects have 3 things:
 - **Constructors**
 - Creates new instances of an object
 - There is an implicit default constructor
 - Can be overloaded
 - `public ClassName() {}`
 - **Fields**
 - Variables
 - The internal state of the object
 - **Methods**
 - Functions
 - What the object “does”
- An object can be made to interact with other objects / other data by calling its methods



Visualize an Object



Static v. non static

- Static = shared (not associated with a single object)
- **Fields:** Static fields are shared by all instances of the class whereas non-static fields are attributed to each instance.
 - E.g. (static) number of pokemon created so far, Math.pi
 - E.g. (non static) pokemon's hp (want one of these for each pokemon)
- **Methods:** Static methods (like functions before) can be called anywhere.
Non static can only be called on an object
 - Static methods can only access static variables. (why?)
 - E.g. (static) helper methods, formulas, Math.random()
 - E.g. (non static) attack() method for a pokemon.
- Bank account example

Cars.java Example

Write a program called Car that creates a Car object.

Field variables: make, model, speed, and //numCars.

Methods: start(), stop(), accelerate(), isMoving(), and //getNumCars()

Things to consider:

Which fields and methods should be static?

What arguments do you need in the constructor?