A First Taste of Object Oriented Programming (OOP)

- Classes
  - A `class` is a template used to create multiple objects with similar features (more on objects later)
  - Classes embody all the pertinent features of a particular set of objects
  - The hardest part of OOP is to design and construct the classes of objects which work best to meet your needs
    - Objects are created from these classes and used as needed
    - A well designed class has a high potential for reuse
  - Java comes complete with a set of predefined classes that implement most of the functionality you need and are called the Java core libraries

A First Taste of Object Oriented Programming (OOP)

- Classes (cont)
  - You can think of a Tree as an object for which you can create a class that has the following features
    - Height
    - Age
    - Grows
    - Blooms

```
class Tree
```

```
Height
Age
Grows()
Blooms()
```

A First Taste of Object Oriented Programming (OOP)

- Classes (cont)
  - Classes are made up of two components
    - Attributes (i.e. height, age)
    - Behavior - the way that a class of objects can do anything to themselves or to other objects (i.e. grows, blooms)
  - Attributes are defined by variables
    - Class variables are items of information that apply to the entire class, not just one object of the class
    - Instance variables are items of information that applies only to a specific object.

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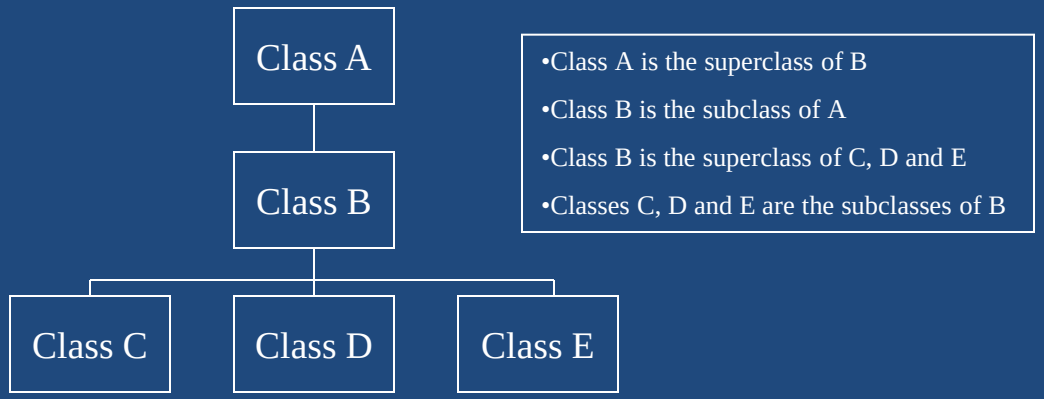
- Classes (cont)
  - Behavior of a class is implemented using methods
    - Methods are groups of related statements in a class of objects that act on themselves and on other classes and objects.
    - Methods are used to accomplish specific tasks in the same way as functions in C or C++
    - Class methods are methods that apply to an entire class
    - Instance methods are methods that apply to a specific object

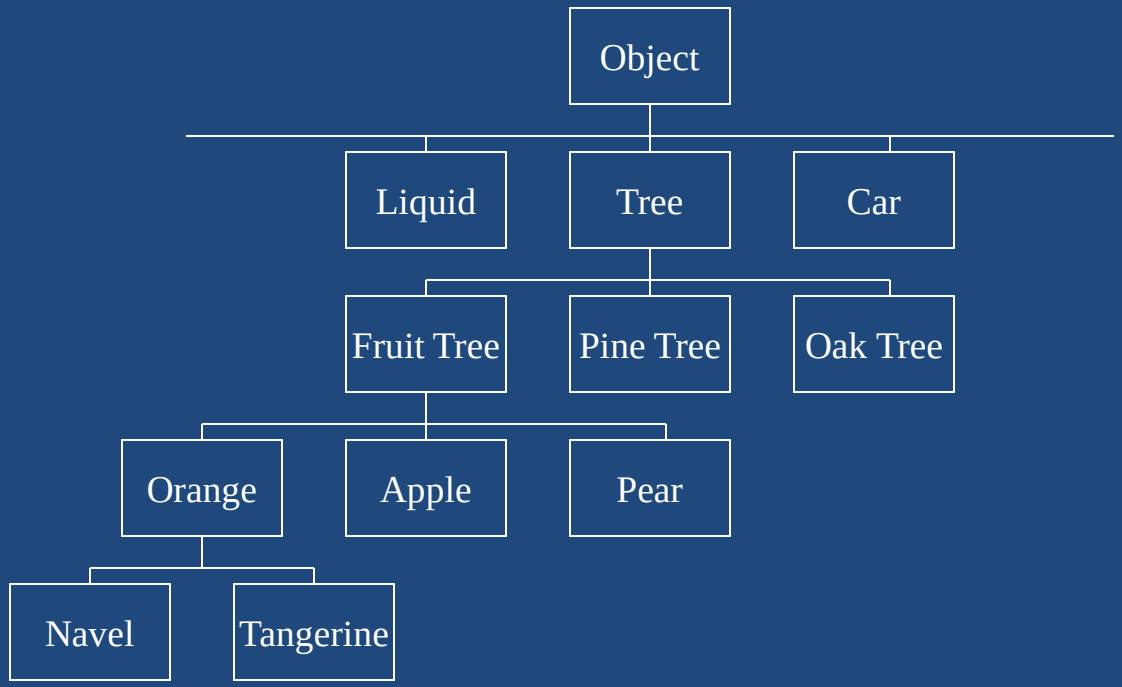
A First Taste of Object Oriented Programming (OOP)

- Classes (cont)
  - Classes can be organized into a hierarchical fashion that allows a class to inherit features from another class. **This is one of the most crucial concepts in OOP!**
  - Inheritance is a mechanism that enables a class to inherit all of the behavior and attributes of another class
  - A class hierarchy defines abstract concepts at the top of the hierarchy
    - The top of the Java class hierarchy is the class `Object`



A First Taste of Object Oriented Programming (OOP)

- Classes (cont)



A First Taste of Object Oriented Programming (OOP)

- Objects
  - Objects are instances of a class and they contain the attributes and exhibit the behavior specified in the class (and the superclasses)