Objects

Fall 2019

Programming Practices

- Procedural Programming
  - Focuses on executing a specific task
  - All about what procedures (functions) accomplish a task
- Object-Oriented Programming
  - Focuses on creating objects through classes
    - Contains data and procedures (functions)

Object

- What is an object?
  - A value in memory referenced by an identifier
  - Procedural
    - Functions
    - Variables (an instance of a string, integer, etc)
    - etc
  - Object-oriented
    - An instance of a class
    - Contains the data and functions

Object-Oriented Programming (OOP)

- Based around the idea of essentially creating your own data type
  - Means we won't be limited by strings, ints, floats, booleans
- Data
  - Also known as "class attributes"
  - Data (variables) that are relevant to the class
- Functions
  - OOP does contain procedures, or functions
  - The procedures must pertain to the object you're creating, though
  - Something you want to *do* with the data

Object Example

- Rectangle
  - Data
    - Height
    - Width
    - Color
    - etc
  - Functions
    - Calculate perimeter
    - Calculate area
    - etc

Object Example

- Class (like a class you take)
  - Data
    - Course code
    - Course name
    - Hours
    - etc
  - Functions
    - Add class
    - Drop class
    - View classes
    - etc

OOP Uses

- Encapsulation
  - Refers to the practice of placing similar data and functions within the same code
  - Makes testing easier
    - Ex. If there’s an error in calculating the average, you don’t have to look at a code base dealing with rectangles
  - Maintenance is improved
    - Updated parts of the code affects less around it
    - Taking down one part doesn’t (always) affect the entire code base

OOP Uses

- Object Reusability
  - Makes reusing code infinitely easier
  - If a separate program deals a lot with rectangles and you already have a class built, just include that file instead of making new code
- Productivity
  - Organization is much easier
  - Each file can contain a solitary class
    - Makes locating code and finding what you need easier

Exercise 11

You are given the job of creating an object “Dog”. Write down 4 relevant data attributes and 4 relevant functions that would apply to a “Dog” object.