Object Oriented Programming

Chantilly Robotics - 612

We're finally here!

Object Oriented Programming is the crux of modern programming!

What is Object Oriented Programming? (OOP)

- The idea that things in the real world can and should be represented in code as accurately as possible.
- Variables and functions (now called methods) are grouped together in ==data structures== and ==classes==. They represent the types of things we see in real life
- Variables of classes and data structures (called objects) represent the real live occurrences of these types of things

It's not as hard as it sounds! (Conceptual Example 1)

Let's say I wanted to write a program that organized people based on their name, address, phone number, and age.

- We could define a data structure called person, which has the variables
    - std::string name;
    - std::string address;
    - std::string phone;
    - int age;
- Then, if we wanted to add a specific person named Dewayne Duncan, who lived on 4337 Par Drive Santa Barbara, CA 93101, who's phone number was 1-805-896-6030, and whose age was 24…

Conceptual Example 1 cont

- We could create a data structure ==object== called Duncan
  - name = "Dewayne Duncan";
  - address = "4337 Par Drive Santa Barbara, CA 93101";
  - phone = "1-805-896-6030"
  - age = 24;
- Let's write this scenario in code

Example 1

http://pastebin.com/t5X5mKuf

Try writing this on your own

Write a quick program that defines a struct, creates an object, and uses the data in some way.

Classes

Classes are struts with more powerful features

- Functions (methods)
- Methods and variables that only the class can use
- The ability to create variables and methods that are only used inside the class
- The ability to create classes that inherit the properties of other classes

Components of a typical class

Fields
- Variables that only the class can see and manipulate with. These are usually the values of your object. For example, a class called "Quadrilateral" could have fields of a base and a height.

Methods
- Because fields are only accessible to the class, we must write functions that return the value of the fields in order to use them or get the values of those fields in order to change them. These are special functions called **getters and setters**
- Other methods should logically reflect the capabilities of the

Constructors and Destructors
- Constructors are special methods that are called the instant an object is created. They are used to set the initial values of fields
- Destructors are called when the object is deleted in code. You won't be using them much but they come in handy later

Basic Class Example

https://repl.it/E1NT/1

Homework Due 11/30

Create a class called Car.

- The class should have the fields: color, brand, current_gas, and miles per gallon
- The constructor should take all these values and set the fields
- The class should have getters and setters
- The class should have a method (function) called drive that prints out "VROOM!" and decreases the "current_gas" variable by 1

Use all the aspects of the class in the main function