CSCI 1110 Lecture 7 & 8 Objects and Classes (Prof : Juliano Franz)

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Object Oriented programming (OOP)
Classes and objects are building blocks
Objects interact together to fulfil a purpose
Example:
While designing a game you have many objects like:
Worlds
Weapons
Tools
Characters

Objects
Store data used by the program
Have methods that manipulate the data
Are instantiated (created) from classes

Classes are blueprints for objects that specify
The data (variables) the object contains
The operations (methods) may be
performed on the object

To create an object of class, specify the class name, followed by the object name, and use the keyword new.
Example : className obj = new className();

Classes
A class describes a set of objects with the same behaviour
Objects of different classes have completely different behaviour
Different classes have different responsibilities
A string knows about the letters that it contains
A string doesn't know how to send itself to a console window or file.
You can import different classes to your program

Object
an entity in your program that you can manipulate by calling one or more of its methods.
Method
consists of a sequence of instructions that can access the data of an object.
You do not know what the instructions are. You do know that the behaviour is well defined
You know for the ones you wrote the code

Using Objects

We use/manipulate objects by calling one or more of its methods

When you call a method you don't know exactly how it is internally programmed however the behaviour of the method is well defined and that is what matter

String Class
Objects of type String
All Strings behave the same and have the same methods
toUpperCase()
toLowerCase()
length()
Strings methods (and therefore behaviour) are all about text
String can't make math :P
String's don't know how to print themselves to the terminal
It is the responsibility of another class: PrintStream

Instance?
EVERY TIME YOU CREATE A NEW OBJECT YOU ARE CREATING (INSTANTIATING) A UNIQUE ENTITY

Creating a Class: data, instance variables
Instance Variables:

- Data, or information, that is unique to each instance of a class.
- That is, if we create two points and we translate one, the other one should not move.
    - Each instance has its own x and y coordinate
      Modifier Type VariableName;

Instance Variables must be:

- Declared inside the class
- Declared outside of all methods
- Declared private (in most cases)

The Class' public interface
When we design our classes we need to create methods so people can use/modify our objects
The public interface consists of all methods that are public, that is, available for others to call

- What are two behaviours that users may need in our tally counter?

The public interface must be documented with JavaDocs!

Creating a Class: Instance Methods
Instance Methods:

- Instance methods are invoked on individual objects
- When an instance method is called on an object, I has access to all instance

variables
    - The private modifier has no effect code from the same class
- may be declared anywhere in a class, except inside another method
- should be declared either public or private depending on their role
- are not static!

modifier returnType methodName (parameters)

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Terminology stop
In OOP we can have mutators and accessor methods
An accessor is a method who reads information about an object and makes no changes to its internal state
e.g.: getCount() //gets the current count
A mutator is a method whose purpose is to modify the internal data of an object
e.g: setCount //changes the current count to a specified value