# Classes (of the programming kind)

#8

CS 0007
Introduction to
Computer Programming

Luís Oliveira

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# OOP

- Different style of programming
  - We have been using procedural
  - **Procedural programming**: A program is split into multiple procedures that are executed in succession to perform a task.
  - Data is modified by each function and passed to the next.
- Object-Oriented Programming
  - Focused on Objects (O.o)
  - **Object**: Entity that contains both data (attributes) and procedures (methods).
  - **Methods**: Functions (this is where it you may call them methods)
  - **Encapsulation:** Combine data and code in self-contained units
  - **Data Hiding:** Objects can hide data. Expose methods to access the attributes.
  - **Abstraction:** Objects expose an interface, not the implementation details.

# Classes

- **Classes are the blueprint of an object!**
  - Like building a house
  - Specifies what the object is describing
  - Used as a template to allocate memory
  - Defines the data and procedures that are associated with the object
- **Analogies:**
  - Cookie cutter: The class cuts the dough into the object
  - House: The class is the blueprint, the object is the house
- **In both:**
  - One class can be used to **instantiate** multiple objects ☺

# Example

- Alarm clock
  - What are the attributes and methods for the clock?

# Example

- **Alarm clock**
  - What are the attributes and methods for the clock?
- **Attributes:**
  - Hour (0-23)
  - Minute (0-59)
  - Second (0-59)
  - Alarm hour (0-23)
  - Alarm minute (0-59)
  - Alarm on? (false-true)

# Example

- Alarm clock
  - What are the attributes and methods for the clock?
- Public methods → Can be accessed by the user
  - Set time
  - Set alarm time
  - Set alarm
  - Reset alarm
- Private methods → Used internally
  - Increment second
  - Increment minute
  - Increment hour
  - Sound alarm

# Anatomy of a Class

- Access specifier
  - Should be public to be used in other files
    - In this course they will all be public
- Naming convention says class name should start with a capital letter!
- Attributes and methods
  - Also have access specifiers:
    - private → Cannot be accessed from the outside
    - public → Can be accessed from the outside
    - protected → Ignoring for now ☺
  - No static here:
    - static → Belong to the blueprint
    - Non static → Belong to the instance