

CSCA08 FALL 2017

WEEK 9: Inverted Lecture - OOP

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Nov 6-10, 2017



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OBJECTS

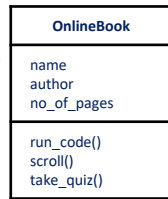
- What is an object?
 - An entity that has some states and behaviours.
- Each object has its own unique state
 - Each car has its own name, colour and engine number.
 - Each book has its own title, authors and publisher.
- Each object may have its unique behaviour.
 - Pen is a type:
 - Both pencil and ball pen are pen and both can write (not a unique behaviour)
 - A ball pen cannot be erased with an eraser while a pencil can. (a unique behaviour)

REPRESENTATION

- An object is an instance of a class.
 - A `python book` is an object and an instance of class `OnlineBook`.
 - A `monitor` is an object and an instance of class `ElectricalDevice`.
- A state is called an instance variable
 - `my_python_book` (i.e. an object) has 3 instance variables:
 - `_name = "how to think like a computer scientist"`
 - `_author = ["J. Elkner", "A. B. Downey", "C. Meyers"]`
 - `_no_of_pages = 306`
- A behaviour is shown by a method
 - `my_python_book` (i.e. an object) has 2 methods:
 - `run_code()`
 - `take_quiz()`

Instance variables

Name of the class



methods

EXAMPLE:

Dream Car dealership, where Brian bought his Lamborghini, sells fine cars. In this dealership every buyer is assigned to a sale representative, who provides information about each car and fills out the required form for a purchase. Information required to fill out the forms include personal information such as name, address, etc plus banking information in order to debit monthly installment.

You do not need to test drive on a road or racetrack if you are buying from this dealership, instead a software program (i.e. a simulator) provides all sets of the control that you require to drive a car and feel like you are physically in the car.

CLASSES, INSTANCE VARIABLES AND METHODS

Car
name year make model body_type no_of_cylinders power price
start() accelerate() turn() brake() play_music() set_navigator() show_map()

Buyer
name address phone
buy_car()

SaleRepresentative
name personnel_id phone
sell_car() fill_form()

Form
name form_items
write_to_file() print_form()

BankAccount
card_number name expiry_date cvv
debit() deposit()

DreamCarDealership
name address phone
Hire_sale_representative()

QUESTIONS

- How do you represent Brian's car?
- How do you represent his black Lamborghini?
- How does he accelerate in test drive?
- Now think of an `object` as a `remote control` and `state and behaviours` as the `buttons` on the remote and `pressing` the buttons as `dot operator`.
- Why do you think Brian's remote does not start my Bugatti?
- Suppose that Brian buys exactly the same car as I have, how do you justify the fact that each object has `unique states`?