Object Oriented Analysis and Design

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Software Life Cycle

- specification of the problem to be solved,
- analysis of the problem
- design of a program to solve it
- Coding (expressed the design in some programming language)
- Maintenance (fixing the new problem, modifying to adapt it)
Object Oriented Design

• Abstraction : Ignore the details.
  – a mechanism and practice to reduce and factor out details so that one can focus on few concepts at a time

• Modularization : break into pieces.
  – a component of a larger system, and operate within that system independently from the operations of the other components

• Information Hiding :
  – separate the implementation and the function
Class-Responsibility-Collaboration cards (CRC cards)

• CRC cards are a brainstorming tool used in the design of object-oriented software.

• CRC cards are usually created from index cards on which are written:
  1. The class name.
  2. The package name (if applicable).
  3. The responsibilities of the class.
  4. The names of other classes that the class will collaborate with to fulfill its responsibilities.

• The back of the CRC card is often used for a more detailed description of the class.
CRC cards

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<th>Class</th>
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Finding class

- A Class represents a collection of similar objects.
- Objects are things of interest in the system being modeled.
- They can be a person, place, thing, or any other concept important to the system at hand.
Finding Responsibility

• A Responsibility is anything that the class knows or does.

• These responsibilities are things that the class has knowledge about itself, or things the class can do with the knowledge it has.
Finding Collaborators

• Collaboration occurs when a class needs information that it doesn’t have.
• Classes know specific things about themselves.
• Very often to perform a task a class needs information that it doesn't have.
• Often it's necessary to get this information from another class, in the form of collaboration.
Modeling

• Functional Model
  – Showcases the functionality of the system from the user’s Point of View
  → Use case diagram

• Object Model
  – Showcases the structure and substructure of the system using objects, attributes, operations, and associations
  → Object / class diagram

• Dynamic Model
  – Showcases the internal behavior of the system.
  → Sequence Diagrams, Activity Diagrams and State Machine Diagrams.
Use case diagram