Object Oriented Analysis and Design

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Historical Perspective

- Decades of work to provide more structure to software
- Why?
  - S/W becomes ever larger
  - ‘lone programmer’ is a thing of the past
  - Long development times
  - S/W is used for more complex tasks

Software as a Model

- We talk about S/W abstractions
- We hide the details
  - E.G. you don't have to know how the transmission changes gears to drive a car
- Function decomposition into modules
  - Also called procedural decomposition
- Object Oriented analysis into classes

What’s a Class?

- They divide the problem domain into ‘chunks’
- Self-contained data and functions make it easy to share
- All data needed is contained in the class
- Only functions defined in the class can directly access the data

Why Classes?

- They provide encapsulation
  - Avoids problems with global variables
  - If data is changed it is done within the class
- They provide inheritance
  - Items can be organized in hierarchies
  - Higher levels are more general
  - Common features are ‘shared’ by lower classes

Object Oriented Analysis

- Simply- we break down the problem domain into classes
- Identify potential classes
- Compare classes to look for common elements
- Collect those elements into superclasses
- If a class does not have a single purpose split it into 2 or more classes

Object Oriented Design

- Convert the class hierarchy into classes in the targeted programming language
- Revisit OOA as details are refined
  - Implement new classes
  - Integrate with inheritance requirements

Object Oriented Programming

- Implement the class hierarchy into classes in the targeted programming language
- Develop code to instantiate classes as objects
- Revisit OOA as details are refined
  - Implement new classes
  - Integrate with inheritance requirements
- Conduct unit testing of classes/objects

Nothing new?

- OOAD uses the standard S/W lifecycle

Analysis Design

Implementation Testing

- The difference is decomposition into classes
- And implementation to create objects

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