Identifying Classes and Objects

Object Oriented Analysis

Lecture Outline

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Classical Approaches

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Ross:

`People, Places, Things, Organizations, Concepts, Events`

Coad and Yourdon:

`Structure, Other Systems, Devices, Events Remembered, Roles Played, Locations, Organizational Units`

Example

Identify classes for a tourist operator (ex: Paulo Travels) using classical approaches.

Tangible Things – office, bus, location, garage, seat, waiting hall, route, trip, . . .

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Locations – city, town, village, bypass, . . .
Other Systems – toll gates, revenue department, bus dealers, . . .

Lecture Outline

Structured Analysis

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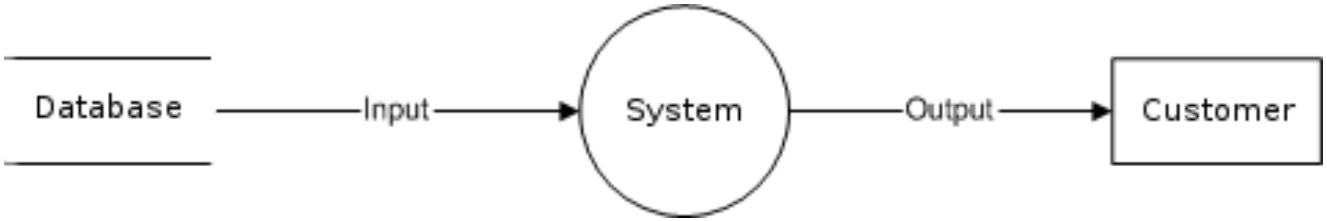
Not recommended approach

Data Flow and Control Flow Diagrams

Data Flow Diagram:



Data Flow and Control Flow Diagrams

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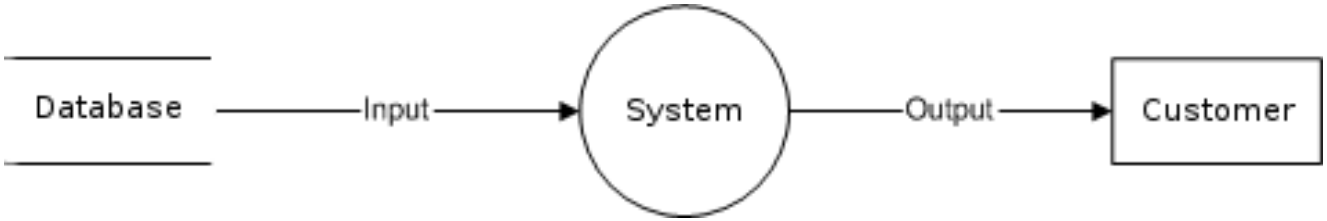
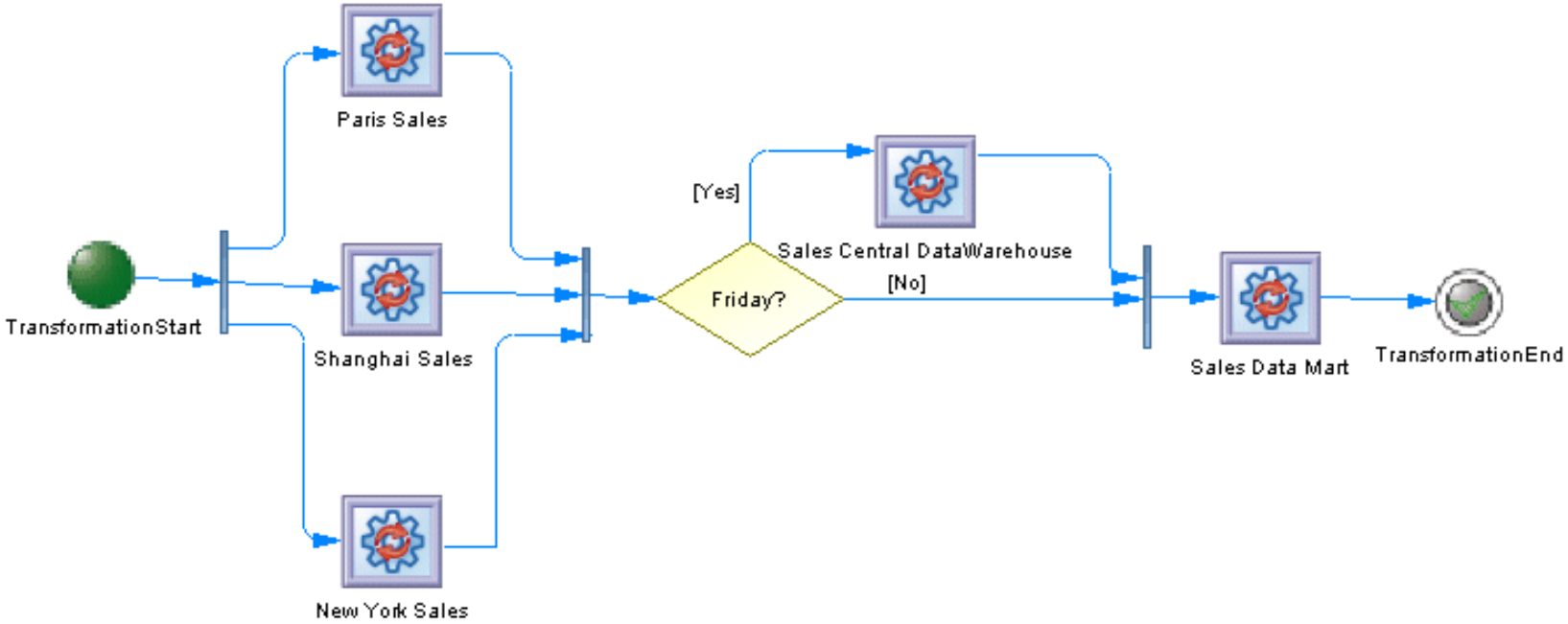


Control Flow Diagram:



Lecture Outline

Informal English Description

nouns $\longrightarrow$ objects

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Problem? Nouns can be verbed, verbs can be nouned.

Example on Informal English Description

... If a customer enters a store with the intention of buying a toy for a child, then advice must be available within a reasonable time concerning the suitability of the toy for the child. This will depend on the age range of the child and the attributes of the toy. If the toy is a dangerous item, then it is unsuitable. ...

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Ans:

... If a customer enters a store with the intention of buying a toy for a child, then advice must be available within a reasonable time concerning the suitability of the toy for the child. This will depend on the age range of the child and the attributes of the toy. If the toy is a dangerous item, then it is unsuitable. ...

Notation: class operation attributes/associations

On Thinking/Communication

Lecture Outline

Domain Analysis

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1. Construct strawman model of domain

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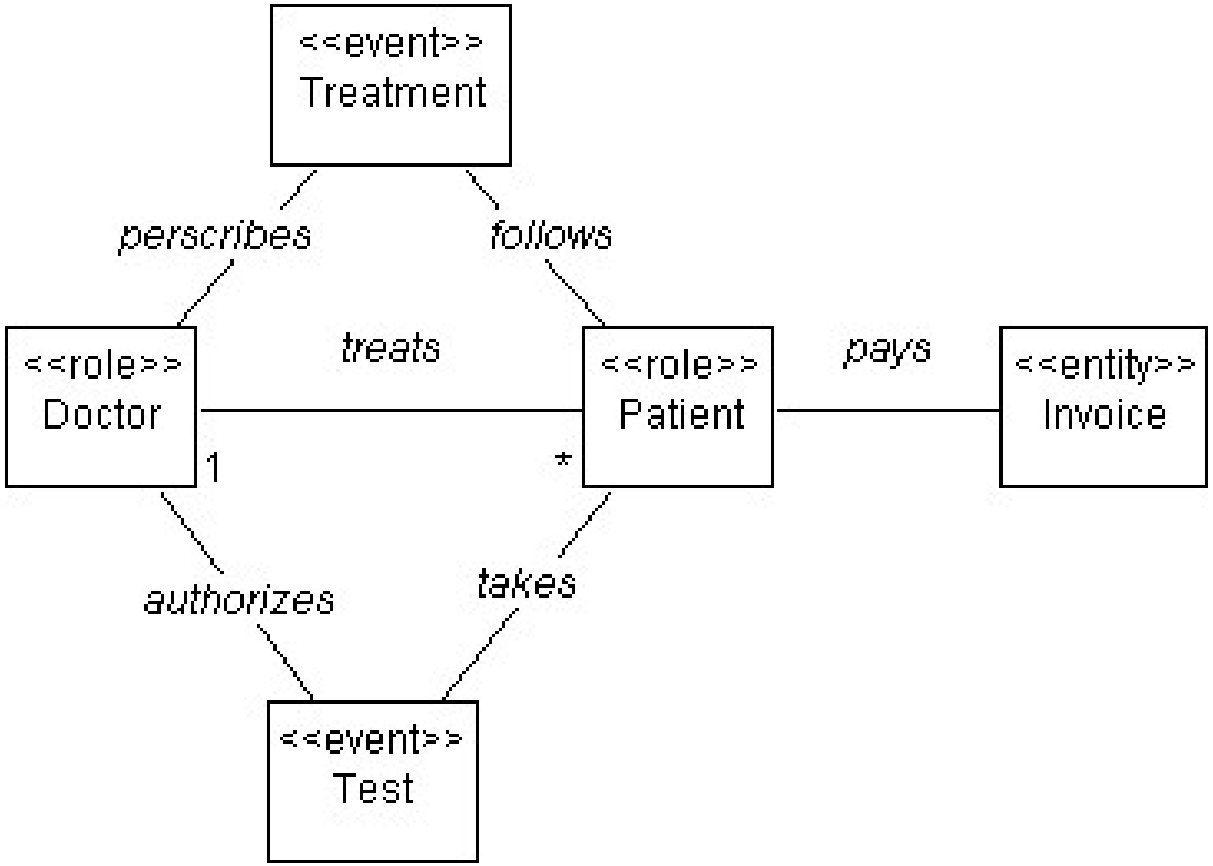
Moore and Bailin Approach:

1. Construct strawman model of domain
2. Construct/collect models of existing softwares serving the domain
3. Reconcile the differences
4. Refine strawman model to accommodate existing models

Example on Domain Analysis

Hospital Domain



Lecture Outline

Object Behavioral Analysis (OBA)

Idea: Form classes based on groups of objects that exhibit similar behavior.

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Two suggestions:

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   Responsibility - service provided by object(s) for all contracts it supports.

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Two suggestions:

1. Responsibility identification
   Responsibility - service provided by object(s) for all contracts it supports.
2. Behavior allocation
   1. Assign system behavior to parts of the system.
   2. Initiators of / participants in behaviors are objects

Object Behavior Analysis (OBA) Exercise

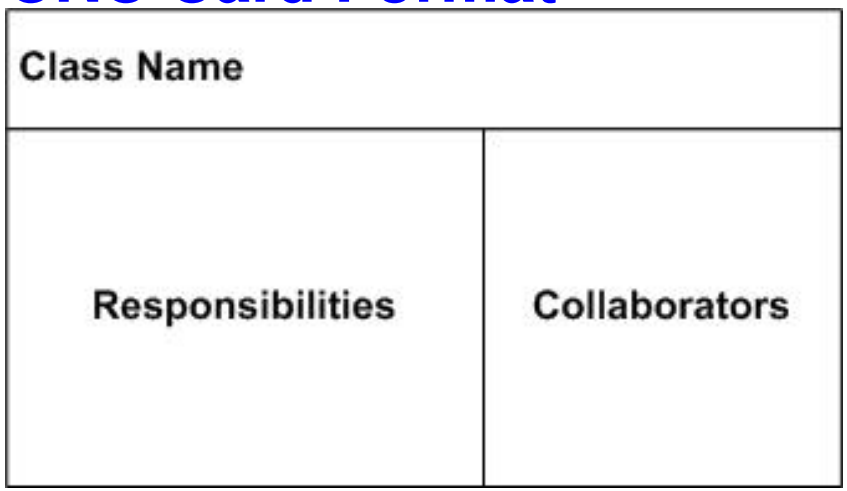
Identify objects and behaviors in a regular OOP lab of this course.

Lecture Outline

CRC Cards

CRC stands for Class/Responsibilities/Collaborators

CRC Card Format



CRC Cards

CRC stands for Class/Responsibilities/Collaborators

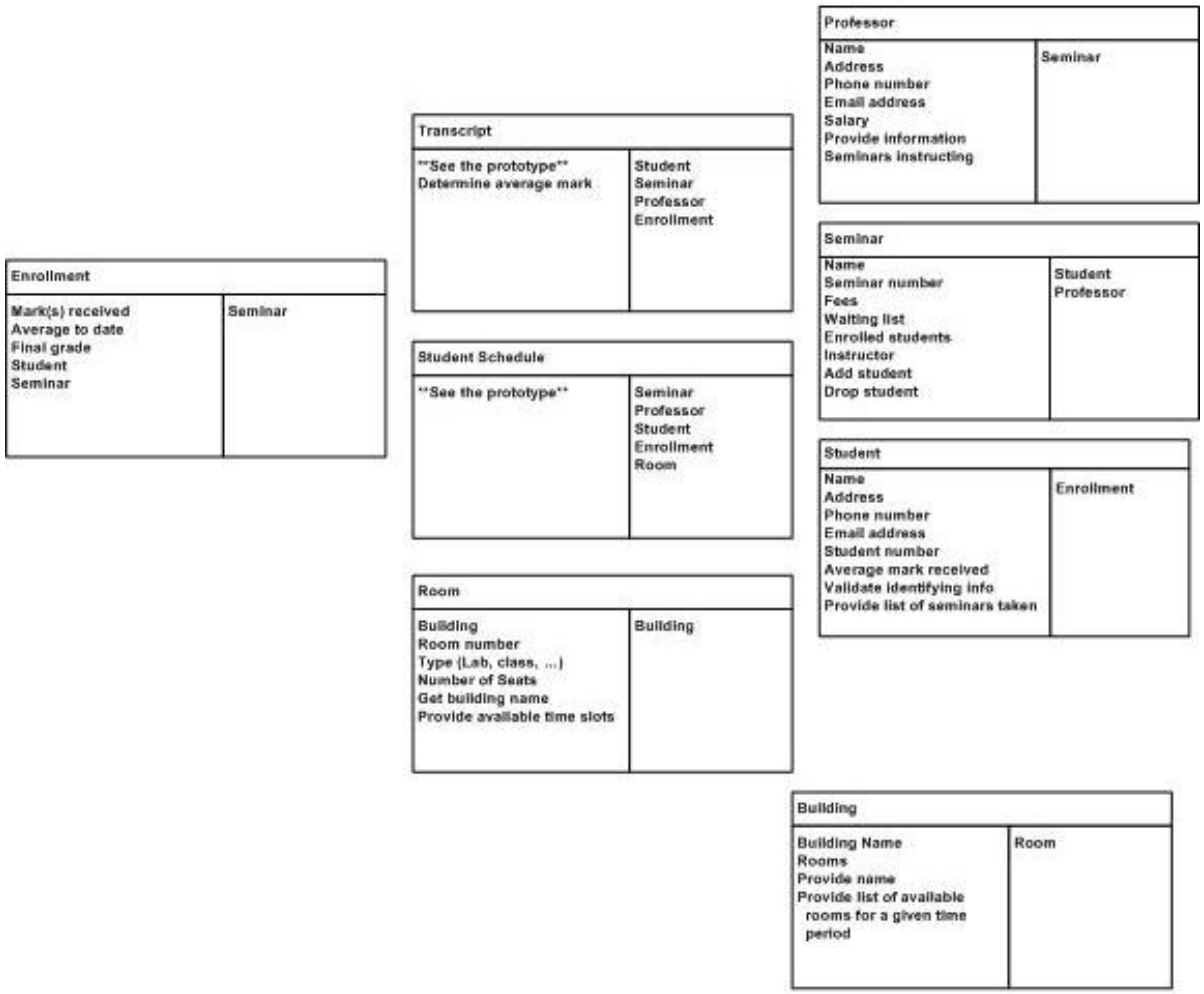
CRC Card Format

Class Name	
Responsibilities	Collaborators

CRC Card for Student Class

Student	
Student number Name Address Phone number Enroll in a seminar Drop a seminar Request transcripts	Seminar

CRC Card Layout



cards can be arranged as class/object hierarchy

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Use Case Analysis

A behaviourally related sequence of transactions performed by an actor in a dialogue with the system to provide some measurable value to the actor.

–Jacobson et. al.

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Approach: In each use case,

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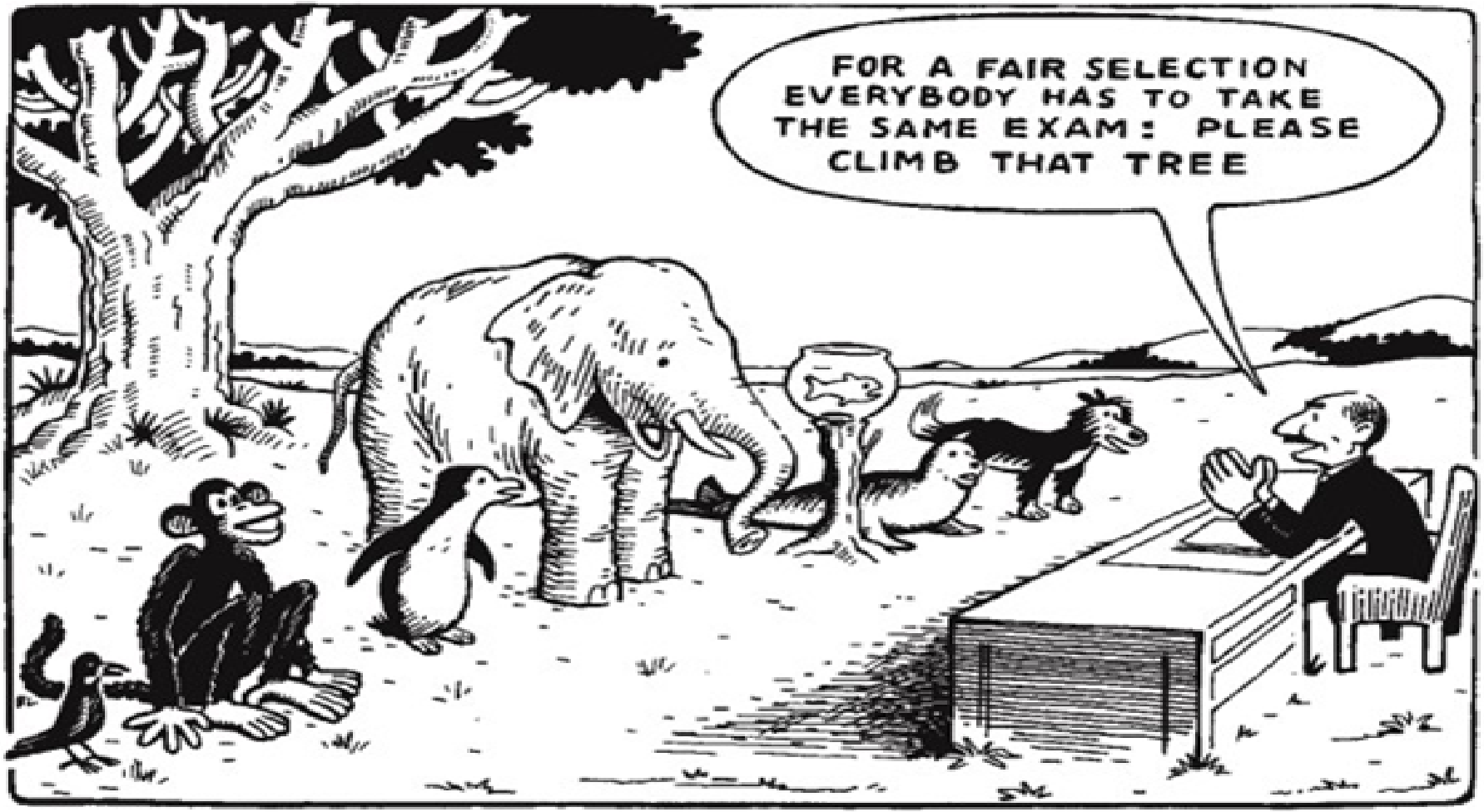
Use case analysis serves as basis of system tests.

Fair Comparison



Acknowledgements

CRC diagrams	*http://agilemodeling.com/artifacts/crcModel.htm*
domain-analysis.jpg	*http://www.cs.sjsu.edu/faculty/pearce/pop/chp1/chapter1_files/image008.gif*
assessment.png	*http://www.behaviorbabe.com/assessments.htm*
DFDExample.png	*http://upload.wikimedia.org/wikipedia/commons/c/c8/DataFlowDiagram_Example.png*
CFDExample.png	*http://upload.wikimedia.org/wikipedia/commons/e/e3/Performance_seeking_control_flow_diagram.jpg*
controlFlow.png	*http://infocenter.sybase.com/help/index.jsp?topic=/com.sybase.infocenter.dc00120.1653/doc/html/rad1232636366142.html*