

Object Oriented Processes

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Life Cycle Models

Waterfall

Spiral

Fountain

Extreme

Model Driven

Phases and their relations with object orientation

requirements modeling

analysis of requirements and the domain

domain modeling

design of solution space

implementation

develop-test-build

refactoring

deploying the solution

Requirements modeling

functional requirements

core business logic,
business protocols etc.

non-functional requirements

performance, distribution, security etc.

OOSE

Transforming requirements into OO implementation applying object orientation in modeling

There is also a process called OOSE, which is use case driven (Jacobson)

Methods of organization

- Differentiation of experience into objects and their attributes
 - Distinction between whole objects and their parts
 - Formation of classes of objects and distinction/similarities between the classes
 - [Classification theory]
 - OOA builds upon these three organizational methods
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Primitives for organization

- Abstraction
 - Encapsulation
 - Inheritance
 - Association
 - Communication with messages
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Major approaches to analysis

- Functional decomposition
 - Subfunctions + function interfaces
 - Dataflow Analysis
 - Data and control flows
 - Data transformations, transformers
 - Data and control stores
 - Information modeling: Entity Relationships
 - Entities, relations, subtypes, associations
 - Object Oriented
 - Classes and objects, inheritance, associations, messages
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Coad and Yourdon's OOA Process

Major activities (Layers) in an OOA process

- Finding classes and objects
 - Identifying structures
 - Identifying subjects
 - Defining attributes
 - Defining services
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Layer 1: Finding classes and objects

- Objects are abstractions in problem domain

 - Classes describe one or more objects with uniform set of attributes and behavior
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Where to look for?

- Observe first hand – go to the site of use
 - Listen to problem domain experts
 - Reuse previous OOA results
 - Reuse results from similar systems
 - Read the requirements document
 - Ask the client for a concise summary
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What to look for?

- Roles
 - E.g. supervisor, clerk, student, faculty, manager, account holder, member
 - Things and Structures in the problem domain
 - E.g. Types of vehicles, types of operators for the system
 - Devices
 - E.g. sensor, port, modem
 - Operational procedures
 - E.g. registration, drop a course, pay fees, issue book
 - Events remembered
 - E.g. successful Registration, update, login session
 - Places, locations
 - Machine a.b.c.d, branch of a bank
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How to name?

- Use
 - Nouns in singular
 - Nouns with adjectives
 - Activity names
 - Standard vocabulary in problem domain
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Layer 2: Identifying Structures

- What's structure?
 - Why structure?
 - What to structure?
 - Objects, activities
 - How to structure?
 - Inheritance, part-whole, client-server, peer-peer
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Layer 3: Identifying Subjects

- What are they?
 - e.g. organization, persons, vehicles, sensors
 - Why?
 - How
 - select
 - refine
 - construct
 - add
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Layer 4: Attribute Layer

- what?
 - how?
 - attributes, instance connections etc.
 - Visibilities
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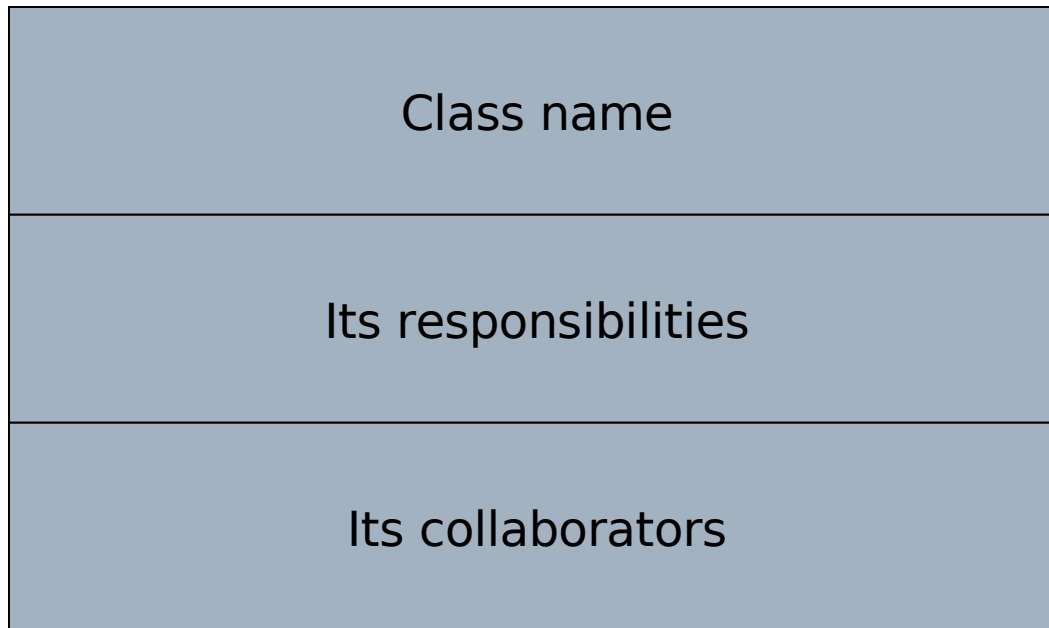
Layer 5: Service Layer

- what?
 - req/response, state machines, protocols
 - Why?
 - How?
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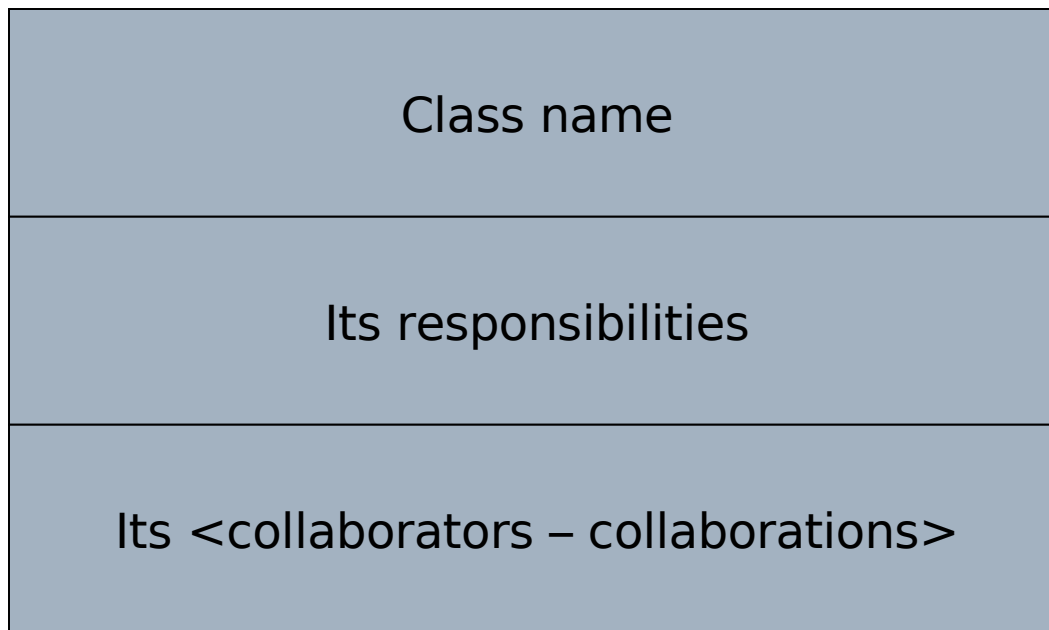
Beck and Cunningham's CRC Method of Object Identification

CRC A Method for object oriented thinking

Classes Responsibilities and Collaborators

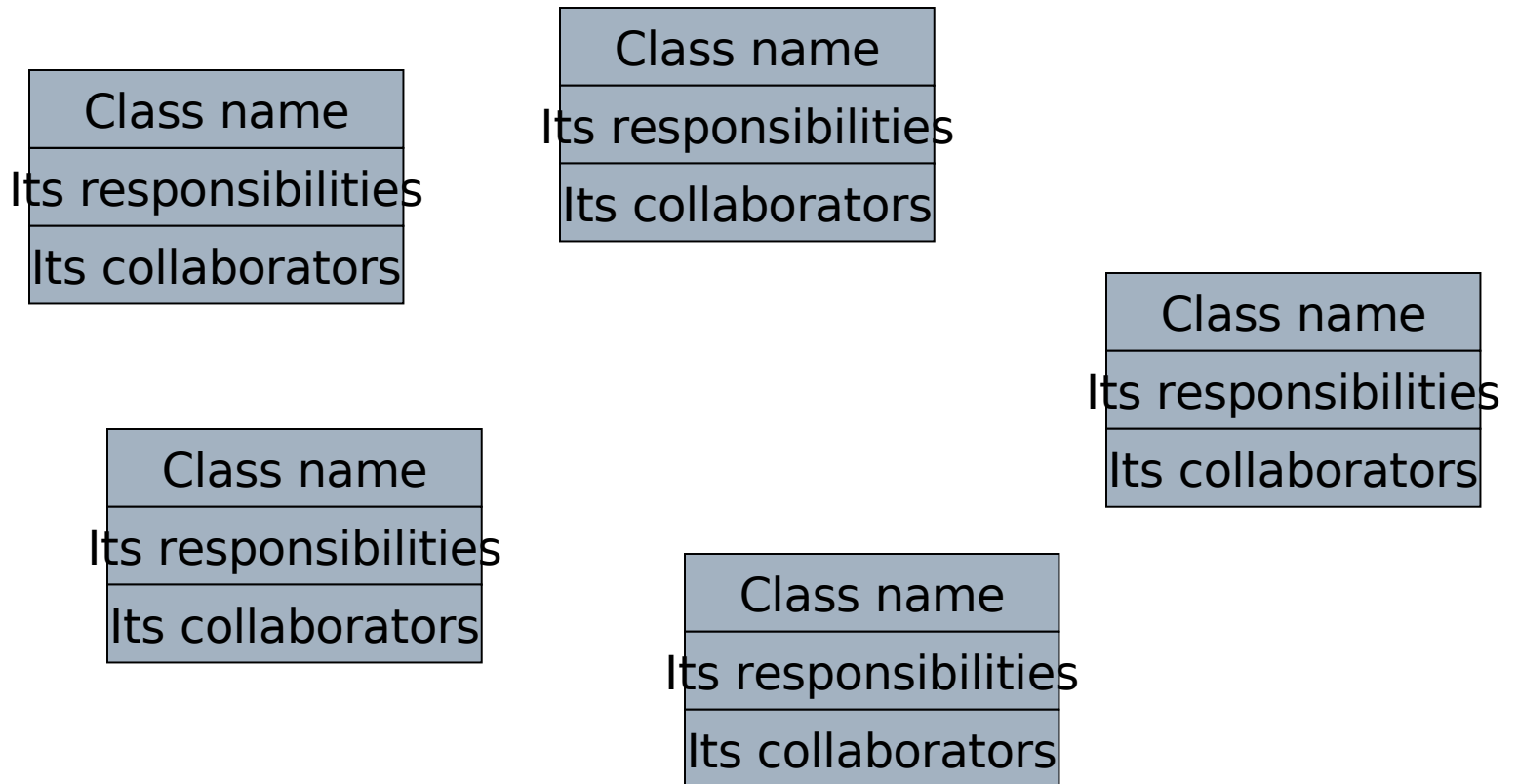


CRC: our recommendation



Collaborators are other CRC cards
Collaborations will be their *responsibilities*

A system decomposed in CRCs



Contributions of CRC

- The authors found that CRC gives a perspective of object-ness in the problem domain
 - It's a good technique to teach object decomposition to novices
 - A card is 4X6 inch size (palmtop)
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Classroom Case study

- IIT Lan Acadaemic system for courses, registrations, grades

References

- Peter Coad/ Edward yourdon: Object-oriented Analysis, Yourdon press computing series, Pearson education, 1991
 - Kent Beck, Ward Cunningham: A laboratory for object oriented thinking, OOPSLA 1989 conference
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