DESIGN

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Referensi

- Brahma Dathan, Sarnath Ramnath – *Object-Oriented Analysis and Design* (2011)

Design
Design a Use Case

- Identify participating design classes
- Describe design object interactions
- Identify participating subsystems and interfaces
- Describe subsystem interaction
- Record implementation requirements
Design a Class

- Operations, attributes, methods (that realize its operations)
- Relationships, dependencies to any generic design mechanisms
- States and state transitions
- Requirements relevant to its implementation
- Realization of any interfaces it provides
Design a Class

- **Boundary class**
  - Depend on User Interface technology chosen

- **Entity class**
  - Depend on persistence design mechanism chosen in architectural design, often implies using a specific database technology

- **Control class**
  - Distribution issues, performance issues, transaction issues
  - May be realized by some related boundary and/or entity class
Relationships

- Application: collection of objects working together
- Working together happens by “message passing”
- Connections required for message passing
- Types:
  - Association
  - Generalization
  - Realization
  - Aggregation
  - Dependency
Association

- Structural relationship
- A connection between two classes
- A set of links

![Diagram of association between Person and Company with an employee-employer relationship.]
Aggregation

- Special kind of association
- For “part-whole” relationships
- For “has - a” relationships
- Composition
- Aggregation
Dependency

- Semantic relationship between two things
  Change to one may affect semantics of other
- A temporary relationship
Generalization

- Subclass object can be substituted for superclass object
- For “is kind of” and “is type of”
Example : School

- Every school has one or more departments. A student can belong to one or more schools. A student can attend many courses and each course can have many students. A course may not have any students. A student may not be attending any schools or any course. A course is offered by a single department, while a department can offer multiple courses. Each department has many instructors, with each instructor teaching one or more courses. Each department can have at most one instructor as the chair person.
Example : Election Information System

- The system keeps data on past elections as well as the partial data of the ongoing elections, which is updated as and when the data are available. The users interact with the system via a graphical interface. The system should have a flexible querying mechanism, which lets the users extract information in whatever form they need (party-wise, candidate-wise, region-wise), provide all kinds of views of the data (in the form of numbers, pie chart) and provide statistical tools to analyze the data. All information displays should reflect the updations to the election data immediately.
Example : Transaction

- A cash withdrawal transaction is started from within a session when the customer chooses cash withdrawal from the menu of possible transaction types. The customer chooses a type of account to withdraw from (e.g., checking) from a menu of possible accounts, and then chooses a dollar amount from a menu of possible amounts. The system verifies that it has sufficient money on hand to satisfy the request. If not, it reports failure to the session, which initiates the Failed Transaction Extension to report the problem. If there is sufficient cash, it sends the customer’s card number PIN, chosen account and amount to the bank, which either approves or disapproves the transaction. If the transaction is approved, the machine dispenses the correct amount of cash and issues a receipt. If the transaction is disapproved due to an incorrect PIN, the incorrect PIN extension is executed. All other disapprovals are reported to the session, which initiates the Failed Transaction Extension. The bank is notified whether or not an approved transaction was completed in its entirety by the machine; if it is completed then the bank completes debiting the customer’s account for the amount.
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