Object orientation (3)

Content

- Object interaction diagrams:
  - Sequence diagrams
  - Collaboration diagrams
- Reality of ISD
- Taxonomy of ISD methods
- Place in ISD
- Evaluation of Object orientation
- Reading list

Object interaction Models

- Sequence diagrams illustrate interactions that occur between the actors and objects in the system in order to carry out the behaviour specified in the scenario (Modelling behaviour, p. 103). Arranged in time sequence.
- Collaboration diagrams shows interaction organized around objects and their messages to each other (Satzinger and Orvik, 2001)

Sequence diagrams

Example of a use case description (Scenario)

- Sue approaches the car park and can see that the full sign is off
- Sue’s car arrives at the entrance to the car park
- Her car’s arrival at the barrier is detected
- Sue inserts her card in the card reader
- The card is recognized as one that is known
- Sue’s card is returned
- The entrance barrier is raised
- Sue drives into the car park
- Her car’s departure is detected
- The barrier is lowered (Britton & Doake, 2000)

Interaction in this case is

- Between the actor Sue (car driver) and objects from the classes Car Park, Valid Cards, Card Reader, Full sign, Barrier and Sensor
- As we draw the sequence diagram we ask questions that is not part of requirements and is thus moving from analysis to design.

(Britton & Doake, 2000)
Differences?

- Show exchange of information between object in the system not just actors and system
- Identify gaps that needs to be filled in
- Show early design decisions

Collaboration diagrams

- Show objects (rectangles)
- Lines between objects (lines)
- Numbered arrows show the order in which they occur

Scenario for a card that is not recognised

- Sue approaches the car park and can see that the full sign is off
- Sue’s car arrives at the entrance to the car park
- Her car’s arrival at the barrier is detected
- Sue inserts her card in the card reader
- The card is not recognized as one that is known
- A message is displayed to say that the card has not been recognized
- The card is returned
- Sue drives away

(Britton & Doake, 2000)
Examples of expanding the models to include design issues and implementation issues

(Britton & Doake, 2000)

Reality of ISD (Review)

- Application domain
- Conceptual models
- Formal Models
- Implementation domain


Reality in Application domain

- Conceptual model - Descriptive model (not the same as DB conceptual model)
- Response to the application domain need
- Not formal into software product
- Quality, correspondence – subjective. Called validation
- Need application domain experience

Reality in Implementation domain

- Prescriptive model – establish how software product works
- Unambiguous requirements for construction
- Formal into mathematics and logic
- Correctness - verification
- Verification is binary and objective
- Formal models express criteria for product acceptance

Tension between the two:

- Problem statement – not formal. Need a formal model to create a verifiable model
- Requirements are subject to change

Hard systems thinking

- One correct solution for a problem
- Manage complexity by dividing system into elements, top down
- Functional analysis (understanding and design) ex in ISD?
- Assume reality is ordered and stable
- Develop a representation of reality – use the representation
- Danger in this?
**Functional analysis of a system?**

- What do we get?

**Soft systems thinking**

- 'Let us conceive of this part of the world as a system'
- Interpretation of different perspectives
- Many systems – not just one
- The system is more than the sum of its parts
- Debate of different perspectives and experiences
- Methods? (participative, iterative)
- Design is seen as learning – develop requirements for change
- Problem?

**Soft systems thinking of a system**

- What do we get?

**Dialectic systems thinking**

- Assumption – world is always changing
- Reality is: Totality of related contradictions
- Dialectic approach takes serious different perspectives – see them as views of the world that is dynamic and pervaded by contradiction.
- Question the assumption of harmony, order and common interest

**What do we get when we apply dialectics?**

- Identify contradictions
- Identify the dominant assumptions
- Negotiations, compensations or compromise

**Thinking in Object orientation**

- Hard Vs Soft ??
- Perspective
  - Objective vs Subjective
  - Nature of the organisation
Develop a framework for a taxonomy for ISD methods

- **Type of orientation:**
  - Problem oriented methods – human comprehension, document decisions
  - Product oriented methods – formal model of the programmed system

- **Type of model:**
  - Conceptual model – domain formalisms and some degree of formality (if only syntactically)
  - Formal model – criteria for correctness and acceptance

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Evaluation of Object oriented modelling

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Object orientation view of ISD

Reading for next week