Process Modelling

Content

- Nature of process modelling
- Abstraction
- Tools/Techniques used in process modelling
- Place in ISD
- Evaluation of process modelling
- Reading list

Process modelling help us to grasp:

- Inputs
- Outputs
- Processing
- Relationship between processes

Abstraction

- Def: Stripping an idea or system of its concrete and physical features (Avison et. Al.)
- Show essence!!
- Level of abstraction
  - High
  - Low

Levels of DFD’s

- Context DFD
- Decomposition diagram
- Overview DFD (system DFD)
- Middle level DFD
- Primitive level DFD
- Link to other techniques?

Example Context Diagram
Tools used

• Data flow diagrams
• Decomposition diagram
• Data Dictionary
• Structured English
• Decision Tables
• Decision Trees

Symbols

• Process
• Internal/external entity
• Data store
• Data flow

Data dictionary entry example

sales order = sales order no. +
sales order date +
customer number +
(account customer cash customer) +
customer name +
customer address +
(customer telephone no) +
(order item) +
sales order total amount +

order item = item no +
item desc +
item price +
item qty +

Example Structured English

Accept sales-order
Find customer-details
If customer-details not found
Then reject sales-order
Else
Create sales-order-header
Do while more sales-order-items
find item-details
calculate sales-order-item price = item price * order-qty
Endo
Authorise sales-order
Endif

Example Decision Table

<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>Y</th>
<th>Y</th>
<th>N</th>
<th>N</th>
<th>N</th>
<th>N</th>
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</thead>
<tbody>
<tr>
<td>avg account bal $1,000</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>overdraft amount &lt; $50,000</td>
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<td>Y</td>
<td>Y</td>
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<tr>
<td>previous paid-out loan</td>
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<td>Y</td>
<td>N</td>
<td>Y</td>
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<tr>
<td>approve</td>
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<td>X</td>
<td></td>
<td></td>
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<tr>
<td>conditional approval</td>
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<td></td>
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<td>X</td>
<td></td>
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<td>reject</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Decision Trees

Determine Customer Discount

Wholesale customer

Local item 15%

Imported item 10%

Retail customer

Local item 12%

Imported item 7%
Example Function Decomposition Diagram

ABC Sales System

1. Sell Products
2. Manage Inventory
3. Control Finance

2.1 Deliver Product
2.2 Accept Delivery
2.3 Check Stock levels

Rules to guide the modelling

- Levelling – two ways
  - Expand
  - Explode

- Balancing
- Naming conventions
- Always input and output
- No direct dataflow between data store and entity
- Number of processes on a level
- Numbering conventions

Levelling DFDs

Context diagram

Diagram 3 (level 1)

Level zero diagram

Diagram 3 (level 1)

Different levels of modelling

- Conceptual level – Not confuse with conceptual modelling of data
- Logical level
- Physical level
- Where does DFD’s fit into this?

Deliverables for process modelling is used

<table>
<thead>
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<th>Old</th>
<th>New</th>
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<tbody>
<tr>
<td>Physical 1</td>
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<tr>
<td>Logical 2</td>
<td>3</td>
</tr>
</tbody>
</table>

Validation of the model

- Walkthroughs with user
- Validate for:
  - Missing algorithms
  - Logical verification
  - Syntax Checking
  - Tracing data elements
  - Cross referencing
  - Tracing objectives
Reality of ISD

Application domain

Conceptual models

Formal Models

Implementation domain

Evaluation of Process modelling

<table>
<thead>
<tr>
<th>Conceptual</th>
<th>Problem oriented</th>
<th>Product oriented</th>
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</thead>
<tbody>
<tr>
<td>Structured analysis</td>
<td>Structured design</td>
<td>Structured design</td>
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<tr>
<td>Entity relationship modelling</td>
<td>Object oriented design</td>
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<tr>
<td>Logical construction of systems</td>
<td>Levels of abstraction</td>
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<tr>
<td>Modern structured analysis</td>
<td>Proof of correctness</td>
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<tr>
<td>Object oriented analysis</td>
<td>Data abstraction</td>
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Thinking in Process modelling

- Hard Vs Soft ??
- Perspective
  - Objective vs Subjective
  - Nature of the organisation

Advantages of Process modelling

- a well-known process modelling ISD technique
- easily understood
- a good communication tool
- model both manual and automated processes
- shows relationship between data and processes
- Excellent tool for logical level discussions
- Supported by a number of CASE tools

Disadvantages

- Focus on processes – need to know a lot to get a good understanding
- Miss key aspects of the data
- Others??

Process modelling view of ISD
## Classification of methods

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</table>
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|              | Entity relationship modelling  
|              | Logical construction of systems  
|              | Modern structured analysis  
|              | Object oriented analysis |
| **Formal**   | FSL/PSA  
|              | JSD  
|              | VDM |
|              | Levels of abstraction  
|              | Stepwise refinement  
|              | Proof of correctness  
|              | Data abstraction  
|              | JSP  
|              | Object oriented programming |

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### Reading for next week

- Any text on data modelling
- For Example: