Methods for the specification and verification of business processes

MPB (6 cfu, 295AA)

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02 - Examples
Insurance claim example

Sect.1.3 of Workflow Management: Models, Methods, and Systems
An example: insurance claim

1. recording the receipt of the claim
2. establishing the type of the claim
3. checking covering of client's policy
4. checking the premium (payments up to date?)
5. rejection, if 3 or 4 has negative result
6. producing a rejection letter
7. roughly estimate the amount to be paid, if 3 & 4 have positive results
8. appointment of an assessor, if needed
9. revision of the amount offered to the client
10. recording client's reaction
11. assessment of objection: decision to revise 9 or take legal action
12. legal proceedings
13. payment of claim
14. filing and closure of claim
Tasks

1. recording the receipt of the claim
2. establishing the type of the claim
3. checking covering of client's policy
4. checking the premium (payments up to date?)
5. rejection, if 3 or 4 has negative result
6. producing a rejection letter
7. roughly estimate the amount to be paid, if 3 & 4 have positive results
8. appointment of an assessor, if needed
9. revision of the amount offered to the client
10. recording client's reaction
11. assessment of objection: decision to revise 9 or take legal action 12
12. legal proceedings
13. payment of claim
14. filing and closure of claim
Some link patterns
Sequence

1-recording

2-type
Parallel

- 2-type
- 3-policy
- 4-premium
- 5-rejection?
Selection

5-rejection?

6-rejection letter

7-estimate
Another selection

- 7-estimate
  - 8-assessor
    - 9-revision
Iteration

9-revision → 10-reaction → 11-assessment → 12-legal proc.
Ambiguity!

Both tasks 3 and 4 are always executed.

Task 6 and 7 are possibly executed but not both.
Disambiguation

2-type

3-policy  4-premium

5-rejection?

6-rejection letter

7-estimate

+ parallel split

× choice split
Ambiguity!

Both tasks 3 and 4 must be completed before task 5

Task 6 and 13 are possibly executed but not both
Disambiguation

3-policy -> 4-premium

5-rejection?

6-rejection letter

13-payment

14-...

parallel split / join

choice split / join
Orchestration

Business process models are performed in a single organization by definition.

Thus, the ordering of activities can be controlled by a business process management system as a centralized software component run by the organization.

This kind of control is called orchestration.
Orchestration

Orchestration is about describing and executing a single viewpoint model

The analogy is with the conductor who centrally controls the musicians in an orchestra
Executing the model

1. recording

2. type

3. policy

4. premium

5. rejection?

6. rejection letter

7. estimate

8. assessor

9. revision

10. reaction

11. assessment

12. legal proc.

13. payment

14. filing
A process instance

1-recording

2-type

3-policy

4-premium

5-rejection?

6-rejection letter

7-estimate

8-assessor

9-revision

10-reaction

11-assessment

12-legal proc.

13-payment

14-filing
Another instance

1-recording
  ↓
2-type
  ↓
3-policy
  ↓
4-premium
  ↓
5-rejection?
  ↓
6-rejection letter

7-estimate
  ↓
8-assessor
  ↓
9-revision
  ↓
10-reaction
  ↓
11-assessment
  ↓
12-legal proc.

13-payment
  ↓
14-filing
Exercise

**Travel agency orchestration:**
define a series of task for
booking a flight, a hotel and optionally a car, with the possibility
to change dates,
to cancel the booking,
to confirm the booking.
Then, draw a process diagram relating the tasks.
Buyer & Reseller example

Sect.1.1 of Business Process Management: Concepts, Languages, Architectures
Example: Reseller
Example: Reseller

A *pool* is a rectangle that encloses a business process

(it can be divided in *lanes* to distribute tasks to different actors)
A reseller can use the business process model above to configure the business process management system accordingly

All instances will be executed as specified (after receiving the order, send and ship activities are concurrently executed)
Example: Buyers

Different processes are possible, but… do they all make sense?
Buyer & Reseller

Separately developed processes need to communicate!
Cross-organization interaction

Each business process is enacted by one organization

Business processes can interact with each other

Interacting activities of business processes must be related together
Interacting processes can exchange information (electronic messages, physically transported objects)
Interacting processes

Message flow is represented by dotted arcs

We move to BPMN-like syntax
Choreography

The interactions of a set of business processes are specified in a **process choreography**

**Difference w.r.t. orchestration:**
the absence of a central agent that controls the activities in the business processes involved

For the interaction to be realized correctly, the interacting business processes better **be aware** and **agree upon the choreography in advance**
Choreography

Choreography is about describing a global model (multi-point view)

The analogy is with the dancers who behave autonomously, but follow their parts in the choreography
Choreography diagrams allow for multiple concrete implementations, with different software support.

**Old-fashioned order:** a buyer browses a paper catalogue of a reseller, then fills a postcard and sends it by snail mail and pay by bank transfer.

**e-commerce:** a buyer browses an online web catalogue, fills a virtual basket and an electronic form (billing information) and presses the submit button. The goods themselves may be intangible (e-books, music, video, software).
Interaction issues

As said, interacting business processes must be aware and agree upon the choreography.

In such cases, the realization of business processes by participants can change without affecting the overall behaviour.

On the other hand, if the change is not done correctly, then some problems may arise.
Question time
Question time

Buyer

Place Order ➔ Receive Invoice ➔ Receive Products ➔ Settle Invoice

Reseller

Receive Order ➔ Send Invoice ➔ Receive Payment ➔ Ship Products

Still working fine?
Exercises

In previous slides, we have seen many variants of business processes for resellers (two) and buyers (four).

Build a “compatibility” matrix with two rows and four columns and mark all the combinations for which some problems may arise during the interaction because activities are not implemented in the expected order.

You are also free to consider other process diagrams, by adding the corresponding rows and columns in the matrix.
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<th>B₂</th>
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<td><strong>R₂</strong></td>
<td>ok</td>
<td></td>
<td></td>
<td>no</td>
</tr>
</tbody>
</table>
Exercises

Coffee break choreography:
Draw the process diagram for a vending machine that accepts a coin, then gives the possibility
(1) to get a coffee or
(2) to insert another coin and get either a cappuccino or a tea.

Draw the process diagrams for a compatible butler robot and a "problematic" butler robot.