Master Seminar
Case Management

Winter 2017/18

Business Process Technology Group

Agenda

- Organization
- Content
- Topics
- Grading
- Timeline

Organization

- Teaching Form: Seminar
- Organizer: Marcin Hewelt, Prof. Dr. Mathias Weske
- Topics are supervised by members of the BPT group
- 6 ECTS – 4 SWS
- Module: BPET, OSIS
- Registration Deadline: 27.10.2017

Case Management

Definition: "*Case management is a practice for knowledge-intensive processes with a case folder as central repository, whereas the course of action for the fulfillment of goals is highly uncertain and the execution gradually emerges according to the available knowledge base and expertise of knowledge workers.*" *(Marin, Hauder, Matthes, 2015)*

- Case has a *goal*, e.g. release patient
- A *case folder* stores all relevant case data
- Exact course of the case depends on process participants' decisions, case data, and other factors → **case unfolds over time**
- Deal with knowledge-intensive processes: Non-repeatable, unpredictable, emergent

→ Goal of CM is to support knowledge workers

Fragment-based Case Management Approach

Central Ideas:

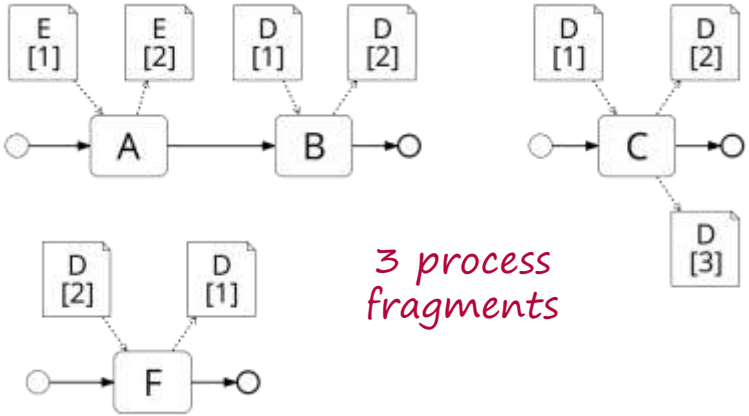
- Process model is split into smaller process fragments
- Dynamic combination of fragment instances at runtime
  - Based on case data, events and user decisions
- Balance between structured & ad-hoc parts of case
- Case data has both structure & behavior (lifecycle)
- Case can terminate when goal is reached

object life cycles for data objects D & E

$D[3] \wedge E[2]$

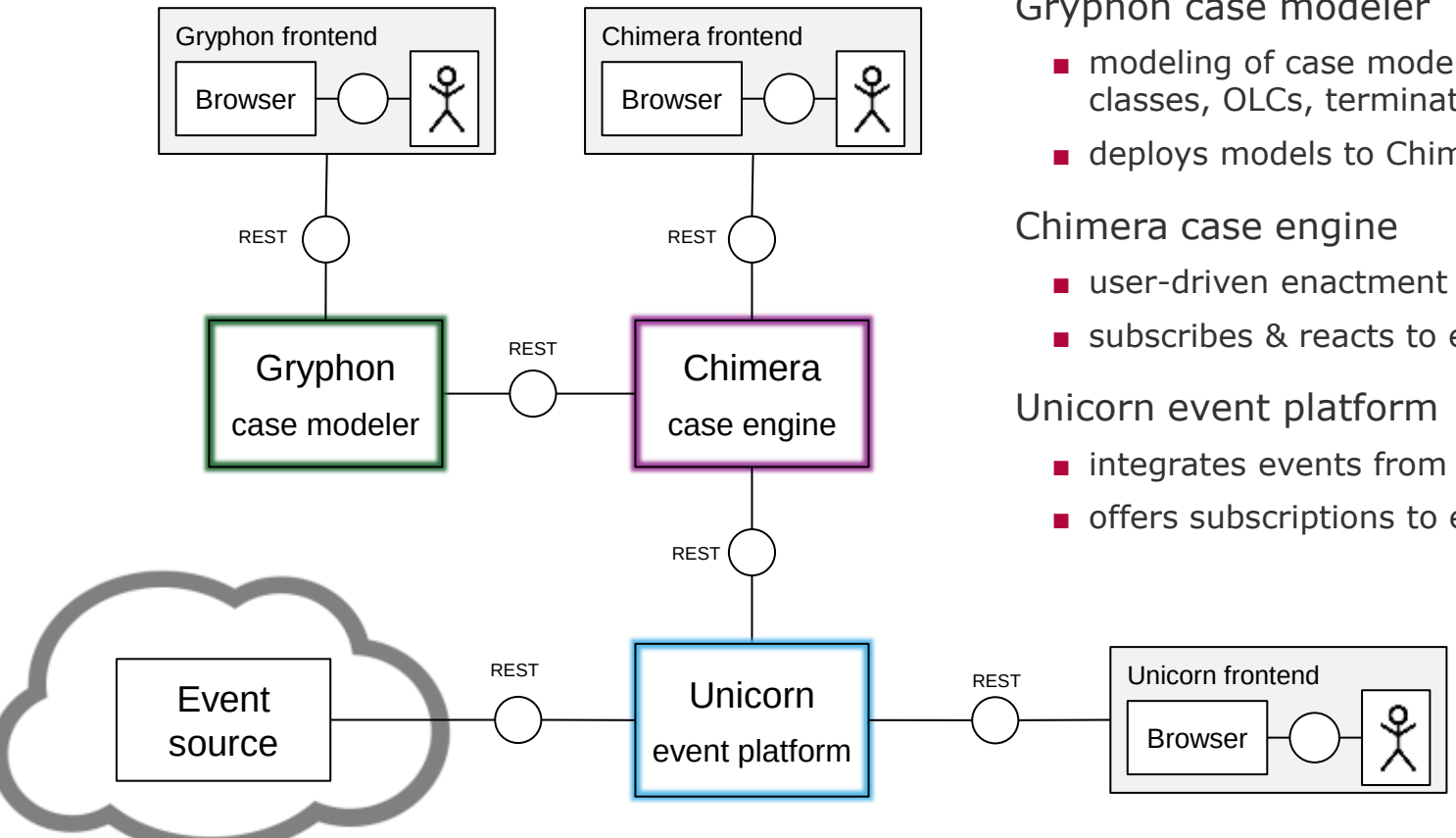
goal state

domain model



3 process fragments

BPT Research Architecture – Technical



Gryphon case modeler

- modeling of case models (fragments, data classes, OLCs, termination conditions)
- deploys models to Chimera

Chimera case engine

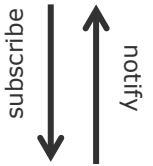
- user-driven enactment of cases
- subscribes & reacts to event notifications

Unicorn event platform

- integrates events from different sources
- offers subscriptions to event queries

T1: Bosch IoT Cloud Integration
(supervisor: Marcin Hewelt)

Description: Our case engine Chimera subscribes to external events via event processing platform Unicorn. Received events can trigger new cases and influence case execution. But how to get events from IoT devices into the platform? The solution is the Bosch IoT cloud.



Tasks

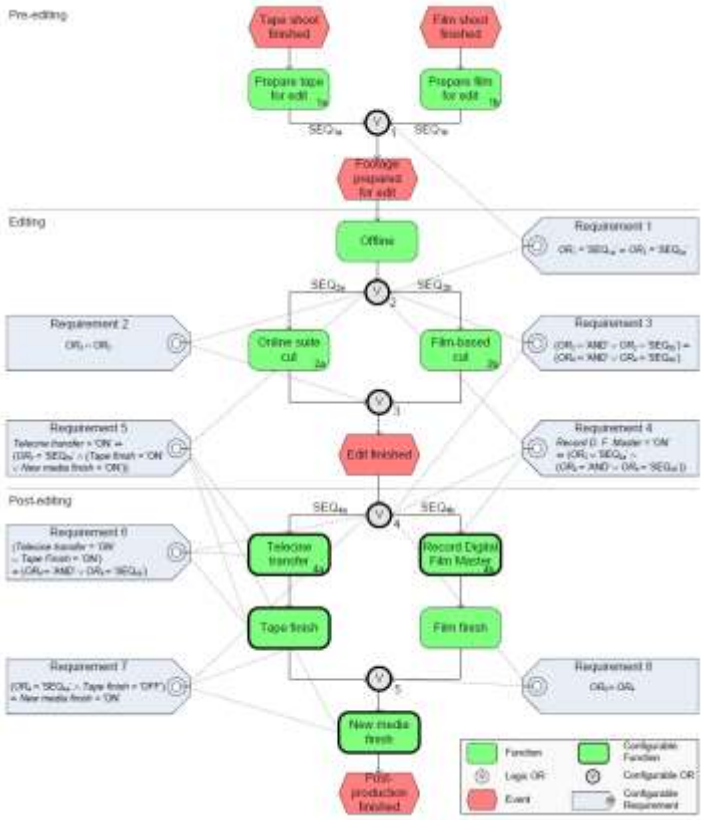
- Connect to and get to know the Bosch IoT suite
- Create digital representation of devices
- Get events of these devices to Unicorn
- Send commands to devices to do something,
  e.g. blink a warn LED when supervisor approaches office ☺

T2: Variability in Chimera

Description: *Variability* of process models is an important flexibility need. Organizations with large process model collections require often different variants of one process model, e.g. due to country-specific regulations. Existing solutions provide *configurable process* models needing much preparation work. The fragment-oriented *Chimera* approach could support variability of business processes in much efficient way.

Tasks

- Study configurable process models
- Apply Chimera (using existing examples) to support variability of process models and study whether concepts are missing



La Rosa, Marcello, van der Aalst, Wil M.P., Dumas, Marlon, & Milani, Fredrik P. (2017) Business process variability modeling : A survey. *ACM Computing Surveys*, *50*(1), 2:1-2:45.

M. La Rosa, **Managing Variability in Process-Aware Information Systems**. Queensland University of Technology, Brisbane, Australia. April 2009.

T3: Compliance Checking of Case Models

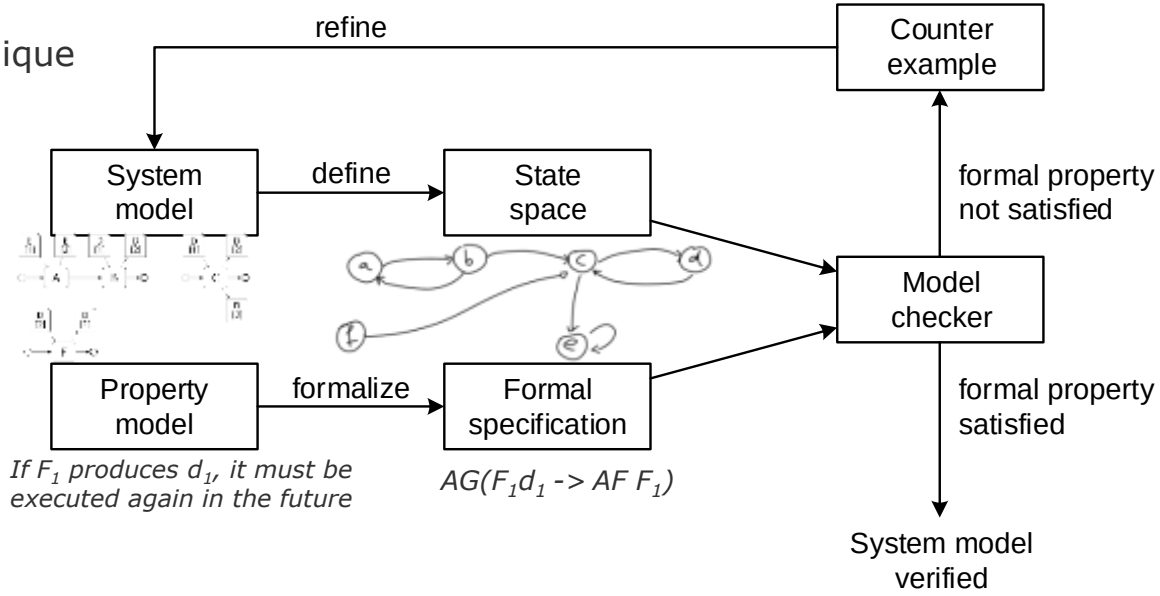
(Supervisor: Kimon Batoulis)

Description:

Model checking is an established technique to check properties of a system. Here we apply it to case models.

Tasks:

- Get familiar with model checking
- Find an exemplary case model
- Identify interesting properties
- Generate state space
- Check the properties

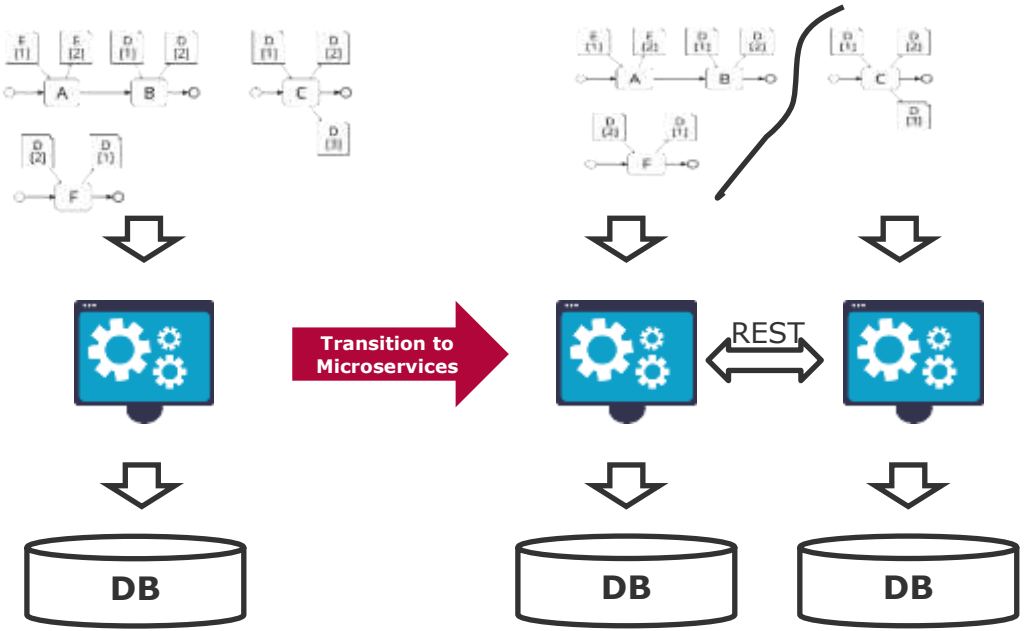


Literature

- Rinderle-Ma et al.: *Business Process Compliance (Aktuelles Schlagwort).* EMISA Forum (2008)
- Awad et al.: *Specification, Verification and Explanation of Violation for Data Aware Compliance Rules*. ICSOC (2009)
- Knuplesch et al.: *A visual language for modeling multiple perspectives of business process compliance rules*. Software & Systems Modeling (2017)

T4: Chimera and Microservices

(Supervisor: Adriatik Nikaj)



Description: Traditionally business process models are executed by a single business process engine. With the surge of microservices as a new software paradigm the need to investigate business process execution via a composition of microservices has emerged.

In this seminar, we investigate the use of Chimera, as a business process engine, in a microservice setting.

Literature:

Agnes Koschmider, Microservices-based Business Process Model Execution, Emisa (2017)

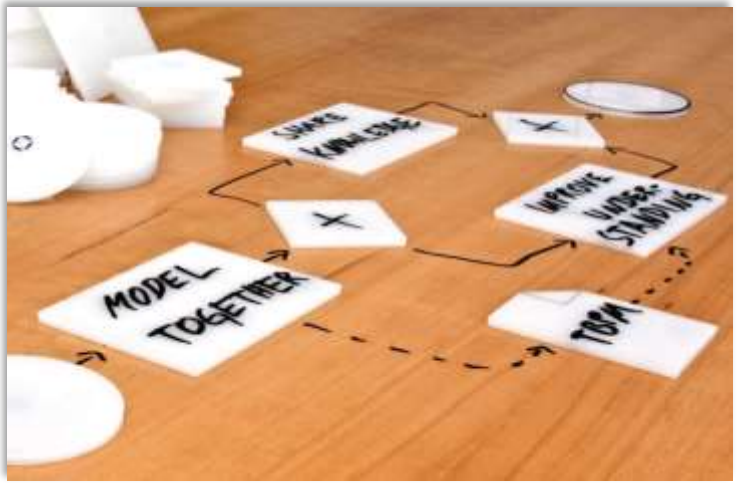
T5: Methodology for Case Model Elicitation

(Supervisor: Luise Pufahl, Sankalita Mandal)

Description:

As part of business process management, we often have to elicit the process model by interviewing the domain experts, exploring the organizational documents and so on. Also, there exist interactive methods such as t.BPM to elicit the process models efficiently.

So far, there is no specific methodology for designing case models or identifying fragments from a process model. The goal of this seminar will be to find a method to extract the case models and fragments taking into account the conceptual as well as the organizational aspects.



Tasks:

- ❑ Explore process elicitation using t.BPM and other methods
- ❑ Extend methodology for eliciting case models
- ❑ Find out the limitations and solutions for them

Literature:

- Grosskopf A., Edelman J., Weske M.: *Tangible Business Process Modeling – Methodology and Experiment Design.* In: Business Process Management Workshops. BPM 2009. Lecture Notes in Business Information Processing, vol 43. Springer, Berlin, Heidelberg (2010)
- Lübbe A.: *Tangible Business Process Modeling Design and Evaluation of a Process Model Elicitation Technique.* PhD thesis (Nov 2011)
- Pesic M., Schonenberg M.H., Sidorova N., van der Aalst W.M.P.: *Constraint-Based Workflow Models: Change Made Easy.* In: On the Move to Meaningful Internet Systems. Lecture Notes in Computer Science, vol 4803. Springer, Berlin, Heidelberg (2007)
- Pohl, K.: *Requirements Engineering: Fundamentals, Principles, and Techniques.* 1st edn. Springer Publishing Company, Incorporated (2010)

T6: Deriving Case Models from BPMN

(Supervisor: Luise Pufahl, Marcin Hewelt)

Description:

Why elicitate case models from scratch, if we already have BPMN process models? Instead, we could just split the BPMN model into fragments, that exhibit the same behavior when combined. However, what are the criteria for splitting the process? And how to deal with data objects?

Tasks:

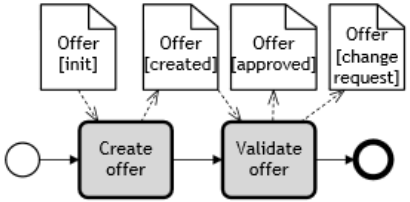
- ❑ Find a suitable usecase
- ❑ Suggest criteria for splitting
- ❑ Ensure that behavior is preserved

T7: What should I do next? Decision Support during Case Execution

(Supervisor: Ekaterina Bazhenova, Marcin Hewelt)

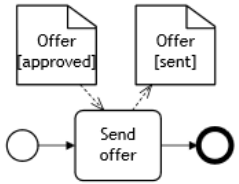
Description:

Case management heavily depends on user decisions on which enabled fragments or activities to execute during runtime. The idea is to provide execution recommendations to users based on derivation of decision rules based on recorded historical decisions.



Tasks:

- Come up with a supporting use case and simulate an event log
- Formulate and solve classification problem where inputs refer to relevant process model data, and classes refer to historical decisions on which enabled fragment/activity to choose
- Model use case in Chimera, and provide a proposal on visual representation of recommendations



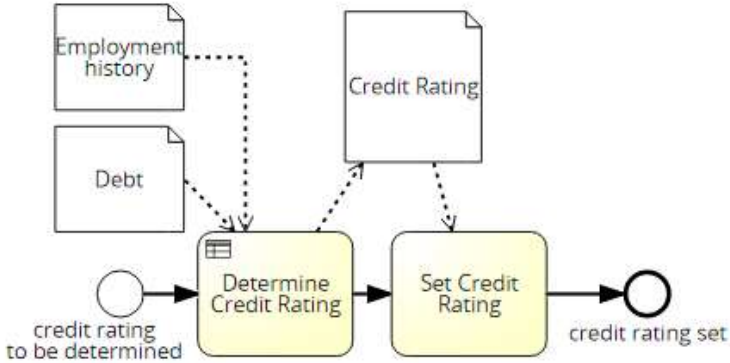
Literature:

- Hewelt, Weske (2016) *A Hybrid Approach for Flexible Case Modeling and Execution*
- Bazhenova et al. (2016) *Discovering Decision Models from Event Logs.*

T8: Integration of Decision Models into Chimera

Description:

Case management heavily depends on user decisions. In recent years, the DMN standard was proposed to model decision logic in processes. It offers a language to express decision rules based on process data.
The goal of this topic is to integrate DMN into the Chimera case management environment, to allow modelling decision tables and evaluating them during runtime.



Tasks:

- Extend the modeling component Gryphon with „decision task" and integrate DMN modeling
- Come up with concept to evaluate decision tables
- Implement or integrate this concept in Chimera

	Inputs		Outputs
UC	Debt	Employ ment History	Credit Rating
	{Low,High}	{Bad,Good}	{A,B,C}
1	= Low	= Good	A
2	= Low	= Bad	B
3	= High	= Good	B
4	= High	= Bad	C

Literature:

- Tom Debevoise, The MicroGuide to Process and Decision Modeling in BPMN/DMN, 2014
- OMG DMN 1.1 Standard
- Documentation on Camunda DMN engine

T9:Survey on Case Management Approaches

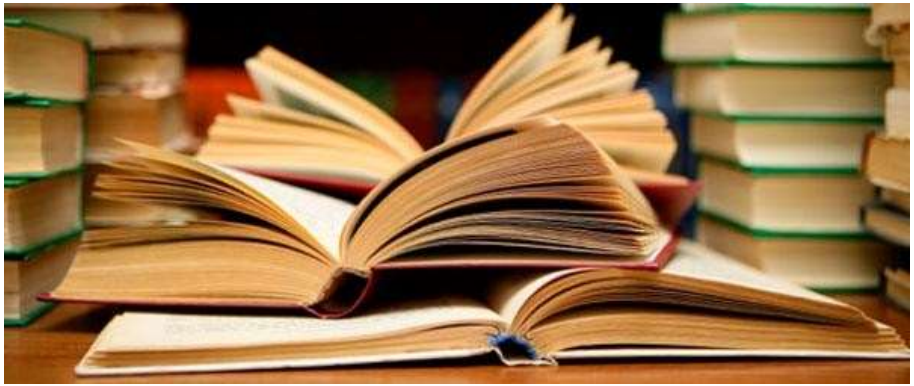
(Supervisor: Luise Pufahl, Marcin Hewelt)

Hasso Plattner Institut
Digital Engineering · Universität Potsdam

Description:

The first case management approach has been published in 2005, since then, different approaches have been proposed with different goals and functionalities

- **Tasks**
  - Conduct a literature survey on case management approaches
  - Categorize and evaluate them regarding different perspectives:
    - Goals
    - Functionality
    - Maturity etc.

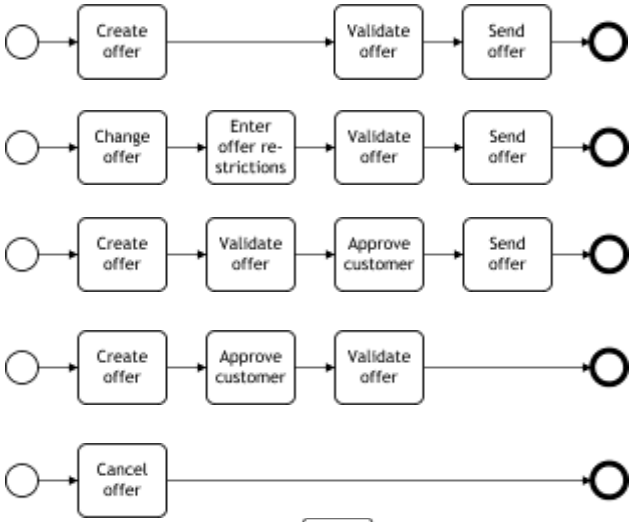


T10: Complexity Metrics for Case Models

(Supervisor: Kimon Batoulis)

- How complex are Case Models compared to traditional BPMN process models?
- Conduct study to find out how well users understand the different types of models

- Laue et al.: *Complexity Metrics for Business Process Models*. BIS (2006)
- Genon et al.: *Analysing the Cognitive Effectiveness of the BPMN 2.0 Visual Notation*. SLE (2010)



Topic Selection

- Select 3 topics
- Rank them (1 is first priority)
- Send your preferences to marcin.hewelt@hpi.de
- **Application Deadline:** 23.10.2017
- Notification for topic allocation: 25.10.2017
- Registration deadline: 27.10.2017

Grading Procedure (1/2)

- Intermediate Presentation
  - 15min talk + 10min discussion
  - Understanding of the material
  - Realization of central concepts
  - **Outline** of your use case/application of the approach
- Final Presentation
  - 20min talk + 10min discussion
  - **Final results** on your use case/application of the approach

Grading Procedure (2/2)

- Paper
  - ~ 12 pages, LNCS style, PDF
  - Presentation of your ideas in textual form

Assignment	Intermediate Presentation	Final Presentation	Review	Final Paper
Weight	20%	30%	2x5%	40%

Timeline

Date	Description
19.10.2017	Topic Presentation
23.10.2017	Topic Selection
27.10.2017	Registration Deadline
02.11.2017	Introduction to Case Management
During semester	Individual Meetings with Supervisor
27.11.2017	Introduction to Research I: “How to give scientific presentations?”
07.12.2017	Intermediate Presentation
18.01.2018	Introduction to Research II: “How to write scientific papers?”
29.01.2018	Final Presentation
01.02.2018	Paper Draft Submission
08.02.2018	Review Submission
28.02.2018	Final Paper Submission