EXAM METHOD ENGINEERING

First final exam, 13 April 2015

17.00-20.00

EDUC-GAMMA

NAME:	STUDENTNR.:

- This exam consists of 5 questions on 14 pages. Please check first whether you have properly obtained **all** pages.
- Enter the answers in the space allocated. In case you need more space you can **use the back** of the pages. Make a proper reference to such an extra part on the back.
- When you have finished the exam you should submit the complete package stapled in the correct order.
- The results of the exam will be communicated to you through the website of the course as soon as possible.

Question	Max. points	Awarded points
1	20	
2	20	
3	17	
4	20	
5	23	
Total	100	
Exam grade		

Good Luck!

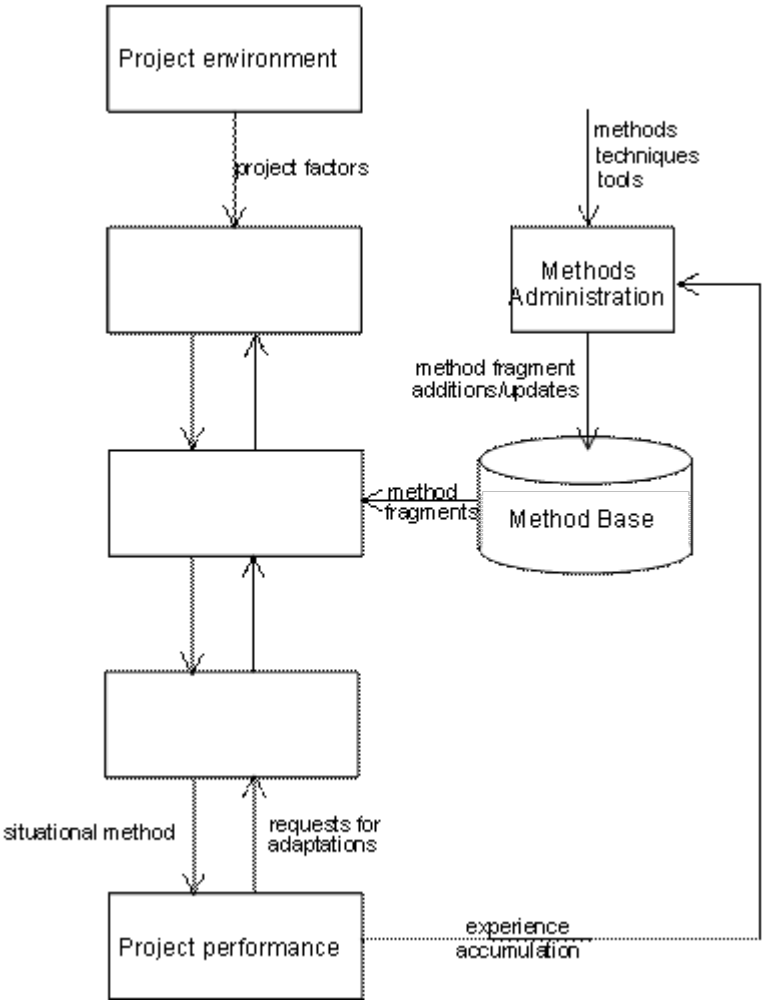
1. Situational method engineering

The following questions are based on the paper:

Brinkkemper, S. (1996). Method engineering: engineering of information systems development methods and tools. *Information and Software Technology 38*(4), 275-280.

a. Explain the notion of method assembly in terms of method fragments

b. Fill in the missing names for the 3 processes **and** 4 flows in the figure below.



c. Explain the usage of a method base in situational method engineering.

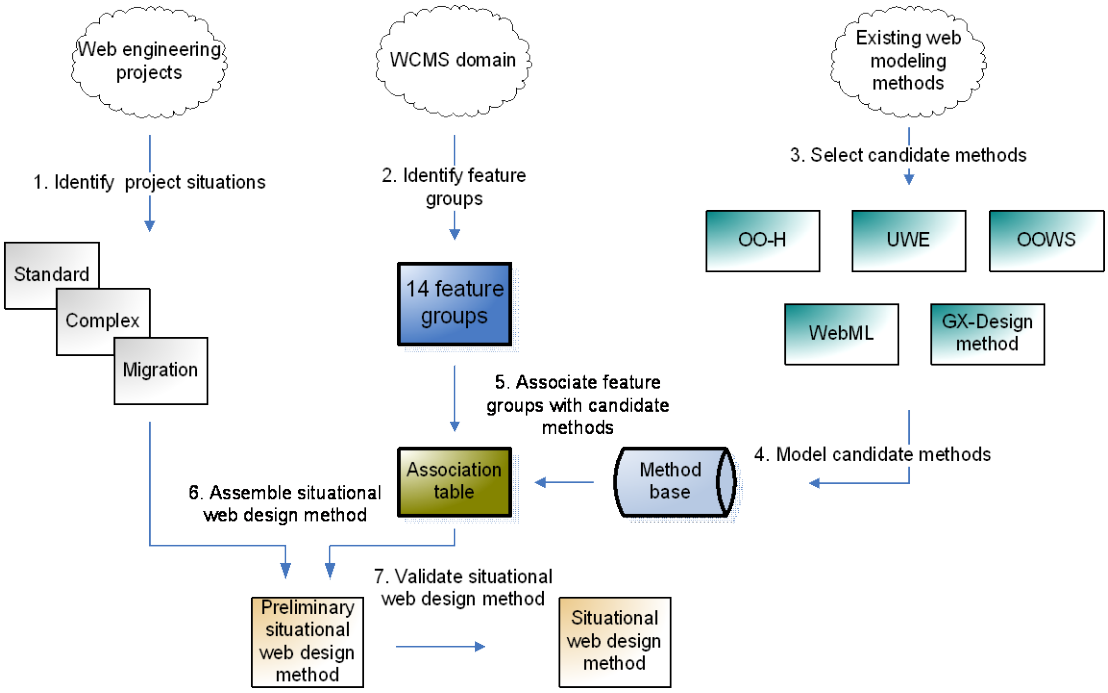
d. Explain why a meta-modeling technique is necessary for carrying out a situational method engineering project.

e. Give two advantages and two disadvantages of using a situational method over a standard method

f. The company ABC experiences some shortcomings of their current method, called Scrum, as reported by different stakeholders of the company. ABC decides to use a situational method engineering approach to extend the Scrum method with *some* parts of the DevOps method into a new method called ScrumOps.
Explain the steps the company needs to perform in this approach.

2. Method Association

In the lecture on method association, the following figure was presented for the creation of a situational web design method for a particular Web content management system (WCMS).



a. Step 1 identifies the project situations. Explain how the process of identification of project situations is performed.

b. Explain the concept of feature groups and give two examples in the domain of Web Content Management Systems.

c. In step 3 the candidate methods are selected. Explain the necessity of this selection.

d. Explain the association process in step 5.

e. Describe the necessity of the validation in step 7 and describe a possible way to perform this step.

f. Explain which steps of the Method Association approach should be adapted for a completely different type of software application.

3. Method comparison

This question is based on the paper on the method comparison approach, as described by Hong, van den Goor and Brinkkemper (1993).

a. Give two reasons why comparison of methods should be done by using meta-models.

b. During the method comparison process, as described in the literature and presented in the lectures, a *supermethod* is created. Give the definition of super method and explain the usage of a supermethod in method comparison.

c. Give two advantages of using PDDs instead of the Task Structure diagrams and the Extended Entity Relationship diagrams as described in Hong, van den Goor and Brinkkemper (1993).

d. The activities of methods are compared utilizing four operators. Explain their meaning.

Activity A = Activity B:

Activity A < Activity B:

Activity A > Activity B:

Activity A >< Activity B:

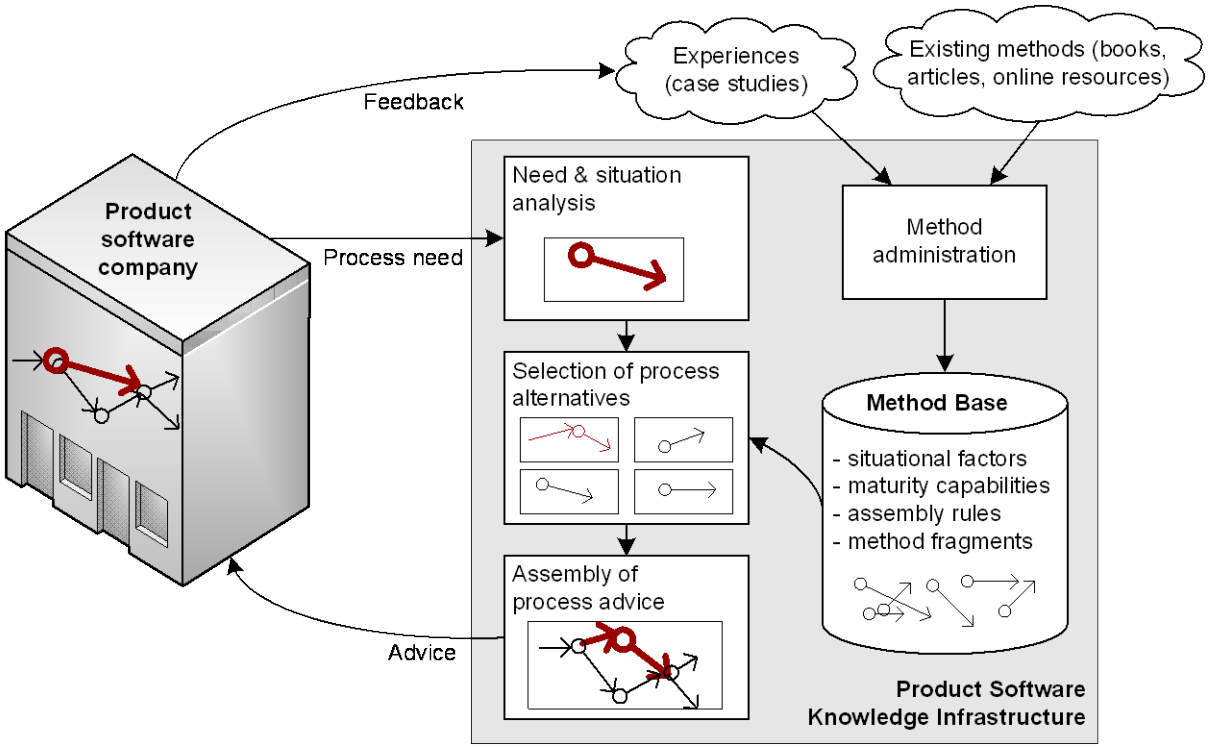
4. Incremental method evolution

a. Explain the concepts *method snapshot* and *method history*, and how they interrelate.

b. A method increment is an adaptation of an existing method resulting into a new method in order to improve the overall performance of a method.
Is it possible to have a method increment in which the newest snapshot contains fewer activities than its preceding method snapshot? Explain.

c. Explain the difference between situational method engineering and incremental method engineering.

Given is the model of the Product Software Knowledge Infrastructure.



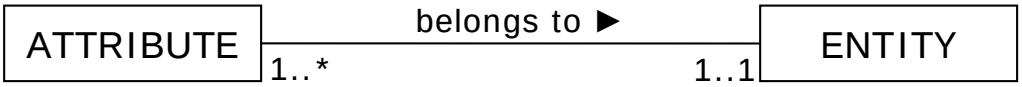
d. Explain the process of ‘Need and situation analysis’

e. Explain the process of ‘Selection of process alternatives’

f. Explain three activities that are part of ‘Method administration’

5. Method Formalization

The following meta-model on a part of the Entity-Relationship diagramming technique is given.



The Algebraic structure consists of two sets and one predicate:

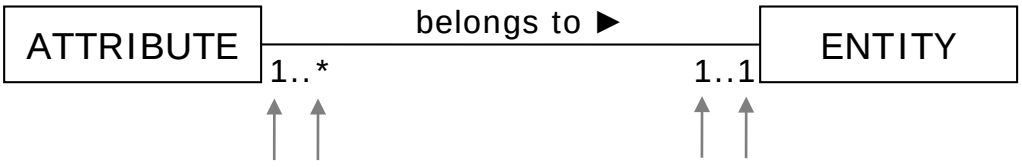
A: set of Attributes
E: set of Entities

Predicate belongs **over** A x E
where *belongs(a,e)* means attribute *a* belongs to entity *e*

a. Express the axiom R1 in natural language
   R1:$\forall e \in E\ \exists a \in A$: belongs(a,e)

b. Express the axiom R2 in predicate calculus.
   R2: All attributes belong to just an entity

c. Indicate where R1 and R2 are expressed in the meta-model.



d. Express the axiom R3 in predicate calculus.
R3: An attribute belongs just to one entity

e. What are the names and purpose of the four semiotic levels of communication?

f. Are the predicate calculus above formalizing the syntax or the semantics of the ER diagramming technique? Explain your answer.

g. Give three motivations of formalization of diagramming techniques.