**Software Modeling 2020/21**
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Exam – February 15, 2021

The questions require you to use parts of your own project in Software Modeling. At the exam, you may use any sources. However, you must write your exam on your own. Communicating with persons other than the examiner is not allowed.

To write your exam, you may use whatever text editor you wish. If you need to draw a diagram, you can do so in Enterprise Architect, but you can do so also in tools for quick diagram sketching, such as UMLet. Afterwards, create one PDF file and submit it to the corresponding submission site in AIS by 12.35.

**1. (6 b)** Explain the meaning of the extend relationship between use cases in the example of use cases from your own project and compare it to the typical implementation in object-oriented programming. If necessary, add use cases.

a) explanation of the extend relationship on a relevant example: 3 p

b) comparison to a typical implementation in object-oriented programming: 3 p

**2. (6 b)** Explain marking of the transitions in UML state machine diagrams (all parts of this marking) on an example from your own project. If necessary, modify the example.

a) explanation of the trigger on a relevant example: 2 p

b) explanation of the guard on a relevant example: 2 p

c) explanation of the effect on a relevant example: 2 p

(besides the trigger [guard] / effect terminology, the event [condition] / action is also acceptable)

**3. (6 b)** Introduce another Boolean attribute into the class that occurs in the algebraic specification in your project. How the algebraic specification should be modified so that it would take into account this extension?

a) amending of the corresponding operations (for setting and reading the attribute) with an explanation: 2 p

b) amending of the corresponding axiom with an explanation: 3 p

c) amending of the corresponding precondition with an explanation: 1 p

(an explanation is sufficient if it's clear what needs to be amended out of it)

**4. (6 b)** On an example from your own project, amended as necessary, explain the meaning of the realization and usage of an interface, as well as the purpose of this construct.

a) introducing a relevant example (a class diagram): 2 p

b) interface realization explanation: 2 p

c) interface use explanation: 2 p

**5. (6 b)**   Draw a class diagram corresponding to a possibly modified sequence diagram from your project containing only relevant classes and operations with correct relationships between these classes.

a) introducing a relevant example (a sequence and class diagram): 2 p

b) correspondence of the operation placement: 2 p

c) correspondence of the message direction: 2 p