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Probeklausur Sommersemester 2016, Fragen

Einführung in die Softwaretechnik (IN0006) (Technische Universität München)

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Questions :

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1. General Knowledge

a. *What major goal does the technique of decomposition pursue and why?*

b. *Explain the difference between a composition and an aggregation and show how they are represented in a UML diagram.*

c. *What are the two major components of an activity diagram? Please explain shortly their purpose.*

d. *What sort of UML-diagram do you use, when you want to model the flow and interactions between objects?*

e. *Explain the difference between a Class and an Object.*

f. *How does Abbot's technique in text to model transformation work?*

g. *Requirement engineering is a process that is done to raise the quality of the final product. What is URPS standing for?*

h. *Name the two types of concurrency in a system and explain them briefly.*

i. *What is Strict Inheritance?*

j. *Which kind of pattern is the bridge-, the observer- and the abstract factory pattern?*

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2. System Model

List the models that the system model is composed of. For each of the models also state its purpose in one sentence or question.

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3. Organization forms

List and explain three forms an organization can have which were discussed in the lecture (in one sentence each, no drawings are required).

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4. Requirements Review

a) *In the context of a requirements review, explain the following terms in one sentence each:*

correct, complete, consistent, unambiguous, realistic

b) *Also shortly explain the terms* verification *and* validation *and how these concepts relate to the term* correctness*.*

5. System Design

List the eight issues of system design and explain four of them by naming at least two aspects relevant to each.

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6. Testing

Briefly explain the terms black-box and white-box testing. For each type of testing also explain two related problems (one sentence per problem).

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7. Modeling a Campus Management System

The university UVN is planning a new campus management system (UVNOnline). The following text describes the desired functionality:

> The system provides a login mechanism for all users that requires a username and a password. Students shall be able to register for classes and for exams. In order to register for either, the student has to re-authenticate herself by only entering her password. Professors shall be able to enter exam grades into the system, which the students can then view. The dean, who is also a professor, shall be able to add new classes into the system. While adding new classes, she may additionally specify prerequisites if applicable.

a) *Model the functionality of the campus management system described above as a UML diagram.*

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Each class in the university is held by a single professor in a single room for many students. Rooms are identified by their number and are used for multiple classes. A professor has a name and teaches many classes. A Student has a name and a matrikelnumber and can take part in many classes. Each class has a title and consists of many lectures, each with a different topic. At the end of the semester, a class has one or two exams, each on a certain date. Exams can either be final exams or repeat exams.

b) Use Abbot's technique on the text above to create a static analysis model in UML (including attributes and multiplicities).

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8. Hardware/Software Mapping

The car manufacturer ALV is making plans for a new production management system with two main components, an order component and a production component. Clients should be able to access the order component via a web browser on their PC or with a native client on their mobile device. For complexity reasons, the web interface should not directly be integrated into the order component. Both the order component and the production component are backed by separate stand-alone database servers. The production component accesses the order component to receive new orders, and provides this information to an assembly line controller that is located on a production machine.

Take the above description and map the necessary components to as few nodes as possible in the form of a deployment diagram

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