

# Tentamen Software Architecture

## January 2009

This exam is centered on the following case study:

TripForU is a company that wants to develop a software system supporting the features of the following scenario example:

*John wants to plan a trip with his wife, to celebrate his new car. He starts planning the trip in his office with a laptop. He starts searching for a nice location: it must be close enough to where he lives (say, within 100 miles), by a lake and close to mountains. Moreover, John wants a nice and comfortable hotel, where they can rest and enjoy the fitness center. After finding the place, he makes a reservation for a room for the weekend.*

*At home, he describes the almost planned trip to his wife and they start searching for good restaurants and places to see close to the chosen location. Again, they reserve tickets for a couple of museums, and also reserve a table in a nice restaurant by the lake for lunch on Saturday.*

*The day after, while waiting for his wife, John starts downloading the plan he had created and the reservations done at home. Before leaving, they also need a map and a good service to identify the best itinerary to reach the place. Thus, they decide to exploit a simple and cheap map service and asks the itinerary planning service for the fastest way to reach the target.*

The system allows its registered users to dynamically select and de-select features to organize their trips and to get all necessary information and support before departing and during the trip itself. This also includes the possibility to request further services such as short excursions decided on-the-fly, notification for special events, and local news. Notifications and information are sent to the users via email.

Note: this problem description may be ambiguous and incomplete. In answering the questions, you are free to complete it (if needed) and to briefly motivate your assumptions.

### Question 1: Software Life Cycle and Architecture

- Give a definition of Software Architecture. Motivate your answer.
- Concisely describe ABC.

### Question 2: Architecture representation

- Explain what is represented with a "module view" of your choice.
- Give a viewpoint specification for the chosen view.
- Explain why and for whom the viewpoint defined above is relevant for the case study.
- Using the viewpoint chosen, give the architectural view for the case study.

### Question 3: Design decisions

- Give two reasons why it is important to make design decisions explicit.
- Give five elements of design decisions that one needs to document. Motivate your choice.
- Draw a graph for one selected design issue and the related options and decisions specific for the case study.

### Question 4: Software quality

- Explain the difference between "user-based quality" and "value-based quality"?
- Explain concisely the relation between software architecture and quality.
- Describe the parts of a quality attribute scenario.
- Provide an example of a usability tactic relevant for the case study.
- Give an example of a concrete scenario using the tactic given above.

### Question 5: Variability Modeling and Assessment

- Give the definition of "commonality" in software variability modeling. Give also one concrete example.
- Provide a possible feature representation for the base architecture of the system in the case study.
- Name two benefits of the ATAM method.
- Explain the difference between "trade-off point" and "sensitivity point".

**Scoring**

With this exam, you can gain 90 points at most. Your final mark for the written exam is calculated as follows:

$$\text{Final mark} = (\# \text{points} + 10) / 10$$

The weight of each question is as follows:

1a: 5	b: 5									= 10
2a: 3	b: 7	c: 3	d: 7							= 20
3a: 5	b: 5	c: 10								= 20
4a: 3	b: 3	c: 2	d: 6	e: 6						= 20
5a: 3	b: 10	c: 3	d: 4							= 20

**Language**

You may give answers in Dutch.