

Exam Software Architecture

February 2014

This exam is centered on the following case study:

This exam is centered around the case study "*supermarket online*" (SOL). All questions refer to the SOL case study.

The system needs to manage the storage of goods and the price lists: for each good, identified by a code, the system manages the total number of available units and their price.

Further, the system includes a cashier subsystem that:

1. manages each payment session for each customer and issues a receipt detailing the code of each purchased unit, its price and quantity, and the total amount of the purchase; for each unit, the storage management functionality is involved to update the actual status of stored units.
2. manages the daily session, that is it computes the total amount purchased that day, it shows the unit that has been sold most, and it updates the status of the storage.

The SOL will be made available on the public Internet; hence each user must be authenticated before granting access to the storage and/or cashier subsystems. The login information is also logged in the SOL system on a "users' registry", and is maintained for statistical purposes only.

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

- a) Concisely explain AIC, the Architecture Influence Cycle.
- b) Concisely explain the tension between Agility and Architecture.

Question 2: Architecture representation

- a) Concisely explain the main characteristic of an Allocation view.
- b) Give one viewpoint specification for the SOL case study. Explain why and for whom the viewpoint you chose is relevant.
- c) Give the architectural view of the case study for the viewpoint defined under point b). Present adequate documentation of your view.

Question 3: Design

- a) Concisely list and explain the steps of ADD, Attribute-Driven Design
- b) Give three reasons why it is hard to make purely rational design decisions.
- c) Concisely explain the 4+1 view model of Kruchten.
- d) One design issue for the SOL case is whether data is to be replicated. Choose one possible design decision for this issue, and concisely document it.

Question 4: Software quality

- a) Provide an example of a usability tactic **relevant** for the SOL case study. Explain why this tactic is relevant.
- b) Give an example of a concrete usability scenario for the case study.

Question 5: Architecture Analysis

- a) Explain the difference between "tradeoff point" and "sensitivity point" in ATAM.
- b) Concisely explain the notion of a "utility tree", as used in ATAM.
- c) Concisely explain the notion of a question set as used in an architecture design review.

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: 5	b: 5	c: 10			= 20
3a: 10	b: 5	c: 10	d: 10		= 35
4a: 5	b: 5				= 10
5a: 5	b: 5	c: 5			= 15