

# **SPM4340IA: Design of Innovative ICT infrastructures and Services (ICT-systems engineering)**

*Wednesday, April 1, 2012*

*9.00-12.00h*

*Answers should be formulated in English*

*In total 100 points can be earned for this exam*

*This exam has 3 questions, make sure that you answer all questions*

*Please, indicate which course(s) you take on your answer sheets*

**Good luck!!**

## **Question 1: General questions (25 points)**

Web services are heralded as a way of enabling reuse in software development and service design. Determining reusable components is often challenging.

- a) Why is developing reusable components difficult? Include organizational and technical aspects. (10)
- b) Can you describe different methods for determining reusable components? What are the benefit of each method? (10)
- c) What is the role of architects in ensuring the use of reusable components? (5)

## **Question 2: Enterprise architecture (EA) and architectural governance (35 points)**

An insurance company has many delivery channels to interact with their customers. They are employing various labels (i.e. different brands), have direct and indirect (using financial intermediaries) selling channels and employs a variety of websites. They just introduced a new application for devices such as the iPad.

In the backend the insurance company has still a large number of legacy systems which provide the core of their transaction oriented systems. The company has over 3 Million customers and customers have typically more than one insurance policy. The company has several offices in the Netherlands and many offices abroad. Core processes include:

- 1. Customer contact –handling the interactions with customers
- 2. Policy & marketing – responsible for developing new insurance policies, innovation and ensuring to attract customers
- 3. Claims processing – taking care of the handling of claims
- 4. Factoring – collecting money (often monthly) and payment of claims

Some of these processes are labor intensive (i.e. special request for policies, checking of claims) and supported by a variety of applications. Some of the applications are connected to each other and are able to share information with each other. All formal communication needs to be stored to ensure that they can be retrieved as further evidence. The insurance company has no good overview of their clients and is considering introducing a customer relationship management (CRM) system. Moreover, they want to ensure that their processes will be more adaptive.

### Architecture

- a) What can an enterprise architecture framework (EAF) help to adapt the CRM system? (5)
- b) What will be the main challenges for adapting CRM? Provide both technical and organizational challenges. (10)
- c) What elements of EA are relevant for adapting the CRM system? Make use of the meta-architecture framework to explain your answer. (10)
- d) What is a *view* in EA? And how is this different from a *viewpoint*? (5)
- e) Provide a classification of governance mechanisms. Provide at least one example of each governance mechanism. (5)

### Question 3: Process architecture and adaptability (40 points)

The staff of insurance company are analyzing and modeling their business processes to make use of business rules technology and business process management (BPM) to create workflows. The insurance company wanted to be agile to responds quickly to changes in customers' needs and flexible to respond to changes in legislation. The company initiated a project to analyze the business processes and capture them in knowledge rules. An example of a knowledge rule is that somebody with multiple insurance policies will get a discount.

- a) What process modelling languages would you recommend to use? Which rules language would you recommend to use? Provide arguments for selecting these languages (10)
- b) Why are both business process management and knowledge rules necessary? What are the advantages of combining BPM and knowledge rules (5)
- c) What is the relationship between processes, (knowledge) rules and SOA (web services)? (5)
- d) What is a design guideline? (3)
- e) Provide design guidelines which can be used to guide the development of an architecture containing both processes and (knowledge) rules. Provide at least 3 guidelines, describe them using the elements of a design guideline and explain their use. (7)
- f) Design a system architecture which combines processes and knowledge rules for the insurance company. (10)