

UNIVERSITY OF EDINBURGH
COLLEGE OF SCIENCE AND ENGINEERING
SCHOOL OF INFORMATICS

**INFR11038 SOFTWARE ARCHITECTURE, PROCESS AND
MANAGEMENT (LEVEL 11)**

Wednesday 29th April 2015

14:30 to 16:30

Year 4 Courses

Convener: I. Stark

External Examiners: A. Cohn, T. Field

INSTRUCTIONS TO CANDIDATES

Answer any TWO questions.

All questions carry equal weight.

This is an OPEN BOOK examination.

You may consult any books or other documents during this examination.

The use of calculators is NOT permitted.

1. Please read all of this question before commencing to answer. In particular, all of the information provided in the earlier parts of the questions should be relevant to your answer to part 1d. Note that the inclusion of irrelevant information in answers may be penalised.

Choose one large scale software project you are familiar with:

- (a) Provide a brief description of the project. Your description should focus on characteristics of the project that are relevant to choice of development methodology. [3 marks]
- (b) Do you think the project is a success or a failure. You should justify your answer by describing two or three characteristics of the project that support your opinion. These characteristics should be relevant to the choice of development methodology for the project. [6 marks]
- (c) Identify and describe two or three project risks that arose in your chosen project. You should justify why these risks were significant for your chosen project. In addition, you should choose risks that are influenced by the choice of development methodology. [6 marks]
- (d) Choose two different development methodologies and provide brief notes on how each would have handled the risks you have identified. You should make use of the information identified in the earlier parts of the question to support your account of how the identified risks are influenced by choice of development methodology. [10 marks]

2. You have been asked to develop the architecture for a web based system that runs a task matching system for volunteers and tasks to help old people in the community. The system has three broad sets of users: older people who can post tasks (usually with the help of family or friends), volunteers who offer to meet needs posted on the system, and administrators who tidy up task descriptions and match tasks with volunteers, ensuring the safety and comfort of the older people.
- (a) Suggest an architectural pattern that is a good match for this system. You should justify your answer by pointing out two or three features that are well matched with your chosen pattern. [6 marks]
 - (b) Suggest an architectural pattern that is a poor match for this system. You should justify your answer by pointing out two or three features that are poorly matched with your chosen pattern. [6 marks]
 - (c) Provide a diagram of your high level architecture with a brief description of the role of each component. [5 marks]
 - (d) After a scandal caused by a group of criminals who have been stealing from elderly people while pretending to carry out helpful tasks a decision is taken to add an auditing function that will allow independent auditors to track volunteer/administrator involvement in all tasks of a specified time period. Provide an assessment of how well you think your chosen architecture would allow the system to evolve to adapt to this change. Justify this by providing two or three likely changes in components in your chosen architecture together with an assessment of how easy or difficult these changes would be to deal with. [8 marks]

3. You are working in a company that produces products with complex embedded controllers that utilize a large codebase that has been developed over two decades. Failures in the system do not pose a safety hazard but buggy code poses a reputational risk in a competitive market. The company has decided to explore the adoption of an open source policy on all the software it embeds in its products. You have been asked to prepare a short summary on the consequences of such a decision. To answer this question you should provide an outline of the content of the report, two to three pages in length, covering the potential impact on:

- (a) the development methodologies used by the company; [5 marks]
- (b) the management and evolution of systems; [5 marks]
- (c) the approach to risk and the management of risk; [5 marks]
- (d) the approach to licensing and intellectual property ownership; [5 marks]
- (e) the approach to ensuring the quality of the product; [5 marks]