

School of Computing and Information Technology**CSIT314**
Software Development Methodologies
Singapore Institute of Management**Final Examination Paper**
Session 2 2020

Exam duration	3 hours
Weighting	50 % of the subject assessment
Marks available	50 marks
Directions to students	<p>Clearly mark the question numbers. Answer each question on a new page.</p> <p>This paper includes 6 questions.</p> <p>Submit your work in one single file (PDF or Word) to the Final Exam submission site provided on Moodle.</p> <p>To draw diagrams, you can use any tool of your choice (or draw by hand and take pictures – make sure the pictures are all clear). However, you need to insert the diagrams back into the submission file.</p> <p>Submission must be made by the exam end time. Late submission is not accepted. The submission site will automatically closed after the exam end time.</p> <p>The exam is expected to be completed independently. You must do it on your own and do not discuss and collude nor share you work with anyone else.</p> <p>When you submit, you acknowledge it is your own work. Plagiarism and other academic misconduct may result in a Fail grade and will be subject to university Academic Misconduct Procedures</p>

Question 1

(7 marks)

Reflect on how your group has followed an agile methodology to develop the system in the project by discussing how your group have addressed the twelve agile principles. For each agile principle, describe what your group has done or did not do to support it. In addition, discuss how you would improve (with respect to each agile principle) if you work on a similar project again in the future.

Question 2

(16 marks)

BigU University is developing a quiz-making system that assists academic staff in the process of making mid-term tests and weekly quizzes. The system will simplify the entire process: developing questions, designing answers and generating tests/quizzes.

In order to use the system, each academic staff needs to contact the Discipline Team Leader and registers for an account. The Team Leader then creates an account for the staff based on his/her staff number, name, a list of courses that he/she is teaching and an initial password. The Team Leader can also modify an account or delete it from the system. The system should allow staff to only change their password.

The system maintains a bank of questions that staff are allowed to add new questions, modify and/or delete existing questions. In order to add a new question to the bank of questions, a staff firstly needs to login into the system. After that, the staff selects from a list of courses the course that the new question is relevant to. The staff then needs to decide the type of the new question. Currently, the system supports only two types of question: multiple choice questions and short answer questions. A multiple choice question can have from 2 to 6 potential answers and only one of them is the correct one. The staff then fills in the content of the new question, the number of potential answers and their content, and indicates which one is correct. The staff can preview the new question before saving it to the bank. Since the number of questions in the bank is relative large, the system should also allow staff to search questions based on keywords. There are also other attributes associated with a question such as: the creation date and the creator (staff).

A staff can also make a test/quiz based on the bank of questions. The staff selects the subject, specifies the number of questions and the title of the test/quiz. Based on these information, the system then randomly picks up the questions from the bank (relevant to the selected subject) and generate the test/quiz. The staff can preview the exam before deciding to print it and/or save it.

- a) Develop a list of user stories for this system. (4 marks)
- b) Develop a UML use case diagram for this system. (4 marks)
- c) Write a use case description for the use case of making a test/quiz. (2 mark)
- d) Use the **b-c-e framework** to develop a design for the above system. Draw a class diagram to represent your design (4 mark)
- e) Draw a sequence diagram depicting the use case from part (c). (2 mark)

Question 3

(6 marks)

Assume that you have a team of 6 people. Describe how you would apply the Scrum methodology to develop the quiz-making system above in 2 months starting from today. Your discussion should include the following details:

- a) How would you organize your team (e.g. roles and tasks)?
- b) What are the processes you would follow?
- c) What are events/meetings that you would organize and when?
- d) What is your plan in terms of iterations and milestones? What should be delivered in each iteration and when?
- e) How do you execute your plan, monitor it and make adjustments if necessary?
- f) Discuss how your team would use Planning Poker in this project. Give a specific scenario of this use.

Your discussion must be **specific** to this quiz-making system. Any assumptions which you make must be stated clearly.

Question 4

(6 marks)

Assume that your team is now also considering to follow the Rational Unified Process (RUP) methodology to develop the quiz-making system. The duration of the project remains unchanged (i.e. 2 months).

- a) Discuss the differences your team would do if your team follows RUP instead of Scrum to develop the quiz-making system. (3 marks)
- b) Discuss the advantages and disadvantages of following RUP instead of Scrum to develop this quiz-making system. (3 marks)

Your discussion must be **specific** to this quiz-making system. Any assumptions which you make must be stated clearly.

Question 5

(9 marks)

Assume that you are responsible for the verification and validation activities in the development of the quiz-making system above.

- a) Discuss how you would conduct static verification and dynamic verification for this quiz-making system. Provide examples that are specific to this quiz-making system. (3 marks)
- b) Describe how you would apply test-driven development to develop this quiz-making system. Provide the steps and examples that are specific to this quiz-making system. (3 marks)
- c) Assume that you are asked to adopt a DevOps approach to develop this quiz-making system. Discuss what changes you would make to your verification and validation activities to ensure a successful adoption of a DevOps approach. The discussion must be specific to this quiz-making system. (3 marks)

Question 6

(6 marks)

- a) Draw a UML activity diagram describing the entire process from setting up a bank of questions to making a test/quiz. (3 marks)
- b) Draw a UML state diagram to model the behaviour of an **object** in the quiz making system. You need to clearly specify which object you model and your state diagram needs to have at least 5 states. (3 marks)

End of Examination