School of Computing and Information Technology

CSIT314
Software Development Methodologies
Singapore Institute of Management

Final Examination Paper
Session 2 2022

Exam duration	2 hours + 15 minutes for scanning and uploading answers
Weighting	50 % of the subject assessment
Marks available	50 marks
Directions to students	Clearly mark the question numbers. Answer each question on a new page. This paper includes 3 questions. Submit your work in **one single file** (PDF or Word) to the Final Exam submission site provided on Moodle. 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. Submission must be made by the exam end time. Late submission is **not** accepted. The submission site will automatically be closed after the exam end time. **The exam must be completed independently**. You must do it on your own and must **not** discuss, communicate, collude or share you work with any individual or group. 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

Question 1 **(20 marks)**

Using the **b-c-e framework** to develop the design of a software application which supports the Kanban software development process. Your answer should include the following:

- Design a set of 5 user stories that are **specifically** to this application. Note that your user stories must reflect the functionalities that are **unique** this kind of application. *Generic user stories for normal software applications (e.g. log in, log out, create or edit account, registration, change password, etc.) will receive 0 mark.*
- A flow of events for one selected use case from the above user stories. *Again, note that generic use cases for normal software applications (e.g. log in, log out, create or edit account, registration, change password, etc.) will receive 0 mark.*
- A class diagram to represent your design based on the above user stories.
- A sequence diagram depicting the selected use case above.
- A UML state diagram to model the behaviour of an **object** in this system. You need to clearly specify which object you model and your state diagram needs to have at least 5 states.

*Your discussion must be **specific** to this case study. Generic answers copied from the lecture slides or other sources will be given 0 mark.*

Question 2 **(15 marks)**

Describe and demonstrate how you would follow test-driven development to develop a class that has the following functionalities: (a) convert a given amount of money in AUD into SGD; (b) given two integer numbers x and y ranging from -10 to 10, calculate their sum of squares (i.e. $x^2 + y^2$); and (c) given a distance and the time taken a car to cover that distance, calculate its average speed.

For each functionality, sketch 5 different unit test cases. Justify your choices of test cases.

*Your answer must be **specific** to this case study. Generic answers copied from the lecture slides or other sources will be given 0 mark.*

Question 3 **(15 marks)**

Assume that you have a team of 6 people. Describe how your team would apply Continuous Integration and Deployment (CI/CD) to develop the system in Question 1. Your discussion should include the following details:

1) The processes that you would setup for your team to follow.
2) The environments and tools that you would setup for your team and how you set them up.
3) How do you execute those processes and utilise those environments/tools, monitor them, and make adjustments if necessary?
4) How would your team address at least 4 of the eight laws of software evolution discussed in the subject?

*Your discussion must be **specific** to this case study (e.g. provide specific details, activities and examples that are specific to this team, their chosen methodologies and this system). Generic answers copied from the lecture slides or other sources will be given 0 mark.*

End of Examination