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**Semester Two 2017
Examination Period****Faculty of Information Technology**

EXAM CODES: FIT2101

TITLE OF PAPER: SOFTWARE ENGINEERING PROCESS AND MANAGEMENT - PAPER 1

EXAM DURATION: 2 hours writing time

READING TIME: 10 minutes

THIS PAPER IS FOR STUDENTS STUDYING AT: (tick where applicable)

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| <input type="checkbox"/> Berwick | <input checked="" type="checkbox"/> Clayton | <input checked="" type="checkbox"/> Malaysia | <input type="checkbox"/> Off Campus Learning | <input type="checkbox"/> Open Learning |
| <input type="checkbox"/> Caulfield | <input type="checkbox"/> Gippsland | <input type="checkbox"/> Peninsula | <input type="checkbox"/> Monash Extension | <input type="checkbox"/> Sth Africa |
| <input type="checkbox"/> Parkville | <input type="checkbox"/> Other (specify) | | | |

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AUTHORISED MATERIALS

OPEN BOOK	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
CALCULATORS	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO
SPECIFICALLY PERMITTED ITEMS if yes, items permitted are:	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO

Candidates must complete this section if required to write answers within this paper

STUDENT ID: _____

DESK NUMBER: _____

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This exam is 6 pages long and contains 7 questions. It is worth 62 marks in total.

Please write your answers in the script book provided. If you run out of paper, you may request another script book. You may answer the questions in any order, but please make sure you number each question clearly. To maximize your mark, we suggest that you attempt the questions you find easiest first.

Each question that requires a written answer has a suggested length. This suggestion is only there to help you understand how much detail we're expecting – there is no penalty for writing more or less than the suggested length provided your answers are clear and complete.

Your markers request that you not use red pen.

Question 1 (2 + 3 + 10 = 15 marks)

This question is about **risks**.

- a) In your own words, what is a *technical risk*?
- b) Name a technique for mitigating technical risk, and explain how it works in one or two paragraphs.
- c) Here is part of a risk register belonging to an inexperienced Agile team. List the problems that this risk register has, and suggest ways that the team might fix them.

Risk	Likelihood	Impact	Mitigation
Data centre flooded, all data is lost	Medium	⌘	Take weekly backups. Restore from backups if data is lost.
Team member gets sick, leaves project	Medium	Δ	Renegotiate schedule with client
Team member wins lottery, leaves project	0.0001	⌘	Renegotiate schedule with client
Data centre burns down, all data is lost	Low	Δ	Take weekly backups. Restore from backups if data is lost.
Program doesn't work	Medium	Δ	Avoid writing buggy code. Fix program if it stops working.
Zombie apocalypse, civilization breaks down	0		Renegotiate schedule with client
New developer on project doesn't know Java	Already happened	Δ	Supply new developer with Java books and reevaluate performance periodically

What are the good and bad points of this risk register? What could the team do to improve it? Write no more than one page.

Question 2 (1 + 3 + 2 = 6 marks)

This question is about **requirements**.

User stories can be evaluated using the INVEST criteria. These criteria say that user stories should be “Independent, Negotiable, Valuable, Estimable, Small, and Testable”.

- a) In your own words, what does it mean to say that user stories should be *independent*?
- b) What are the potential negative consequences of having user stories that are *not* independent?
- c) Give an example of one or more user stories that are *not independent*.

Question 3 (5 + 5 = 10 marks)

This question is about **process models**.

Here is a description of a software process given by a team member:

“First, our Product Owner sits down with the client and end users, and they spend about a month sorting out a list of user stories to make sure that it’s complete. After that, the team gets together and designs the system so that we know which modules and functions need to be written and what their inputs and outputs will be. Then we start to iterate.

“Our sprints are two weeks long and each developer is expected to implement at least one method in each sprint. We keep doing sprints until all the functions we’d planned have been implemented, and then we have one final sprint which has been set aside for testing. After that, we have a retrospective. So our process is a pretty standard version of Scrum.”

- a) Is the developer correct that this process is standard Scrum? Which features of this process are similar to Scrum and which are different? Write about half a page.
- b) Do the variations from Scrum that you identified in the previous question introduce extra risks to the success of the project? Do they reduce any risks? Write about half a page.

Question 4 (2 + 1 + 2 = 5 marks)

This question is about **process improvement**.

- a) In your own words, what is the difference between a *retrospective* and a *sprint review*?
- b) In our own words, what is *velocity*?
- c) We said in lectures that it was important for retrospectives to focus particularly on differences between actual and expected velocity. Why is this important? Write about half a page.

Question 5 (6 marks)

This question is about **software metrics**.

Imagine a large company that is organized into several Scrum teams. A senior executive suggests paying a bonus to the team that averages the highest velocity each year. What do you think of this proposal, and why? Write about half a page.

Question 6 (5 + 5 = 10 marks)

This question is about **Agile software development practices**.

- a) One of the principles behind the Agile Manifesto is to “*deliver working software frequently, from a couple of weeks to a couple of months, with a preference to the shorter timescale*”. What advantages can a team gain by delivering working (but unfinished) software to the client frequently, as opposed to delivering only the finished product when development is complete? Are there any disadvantages to frequent delivery? Write about half a page.
- b) The Agile Manifesto says that Agile practitioners value “*working software over comprehensive documentation*”. What effect does this have on the practices that Agile developers adopt, compared to the practices of more traditional software developers? Write about two paragraphs.

Question 7 (10 marks)

This question is about **choosing a process model**.

Riparia is a small software company that specializes in creating software to help government agencies manage rivers and waterways. Their products allow river managers to record levels of pollutants, fish populations, introduced pest species, weeds, and other indicators of the health of the ecosystem.

Riparia is a very small company, comprising three experienced developers with at least seven years' experience programming in this field. It has been using ad-hoc methods to write software for local governments. However, they have recently won a large contract to provide software to the Parks and Wildlife Department of the national government. This has allowed them to hire two junior programmers and a third senior programmer, who is an excellent programmer but lacks experience with ecological monitoring.

The new software will mostly be used by rangers and fisheries officers, who spend most of their time in remote areas and often cannot be contacted by phone. One of the finance officers in the Parks and Wildlife department has volunteered to act as a contact person and pass on any questions that the team has for these end users. She says that she will usually be able to get a response to her email within three days.

Riparia now has to decide how to create this new software. One of the junior developers suggests adopting an Agile process model such as Scrum, the other suggests that a heavyweight process model like Spiral might be more suitable, and one of the experienced staff members suggests sticking to their existing ad-hoc approach.

What kind of process do you think Riparia should adopt, and why? Your answer should consider the potential risks and benefits of each of the alternatives: Agile, heavyweight, and ad-hoc. Write about one page.