



The University of Fiji

School of Science and Technology

Department of IT and Computer Science

ITC303/CSA311

Software Engineering Practices

Semester I, 2010

FINAL EXAMINATION PAPER

Time Allowed: 3 hours [10 minutes extra allowed for Reading The Paper]

Total Marks: 100

Instructions

There are 15 Questions, all of which are compulsory. Answer all questions in the Answer Booklet.

- For these questions write your answer on the answer sheets provided by the instructor. The marks allocated for each of the questions are written in brackets.
- Marks will be given for working. Write your statements and working clearly in to gain maximum marks.
- You may ask for extra sheets from the supervisors.
- Do not forget to write your name and ID number on this page.
- This booklet contains 3 pages including this page. Hand in both the question paper and your answers sheets.

Student Name:

Student Id:

GOOD LUCK!

SECTION A 40 Marks (10 question at 4 marks each)

1. Explain why it is important to produce an overall description of a system architecture at an early stage in the system specification process.
2. What are the strategic options for legacy system evolution? When would you normally replace all or part of the system rather than continue maintenance of the software (with or without reengineering)?
3. Explain why a software system that is used in a real-world environment must change or become progressively less useful.
4. Explain why an object-oriented approach to software development may not be suitable for real-time systems.
5. Discuss the advantages of graphical information display and suggest four applications where it would be more appropriate to use graphical rather than digital display of numeric information.
6. Explain why adopting an approach to design that is based on loosely coupled objects that hide information about their representation should lead to a design which may be readily modified.
7. What factors should be taken into account when selecting staff to work on a software development project? Giving reasons for your answer, suggest which of these would be most important in choosing staff for an embedded real-time systems development project to develop a controller for an eye surgery machine.
8. Explain why program inspections are an effective technique for discovering errors in a program. What types of errors are unlikely to be discovered through inspections?
9. Explain why adopting an approach to design that is based on loosely coupled objects that hide information about their representation should lead to a design that may be readily modified.
10. Identify and briefly describe four types of requirements that may be defined for a computer-based system.

SECTION B 60 Marks

1. Using the UML graphical notation for object classes, design the following object classes identifying attributes and operations. Use your own experience to decide on the attributes and operations that should be associated with these objects: (6 marks)
 - A bank account
 - A library catalogue
2. Suggest process model for the following processes:
 - Lighting a wood fire
 - Cooking a three-course meal (you choose the menu) (8 marks)
3. Explain why it is very difficult to validate a reusable component without the component source code. In what ways would a formal component specification simplify the problems of validation? (4 marks)
4. What are the strategic options for legacy system evolution? When would you normally replace all or part of a system rather than continue maintenance of the software (with or without re-engineering)? (6 marks)
5. You are appointed Project manager for the development of Online Student Registration System at the University of Fiji. You are to develop the system from scratch and use the University facilities. The system should have an interface to the Microsoft Financial System to handle course fees' payment currently used by the University. Your project will also need to develop appropriate interface programs so that the required integration takes place. (36 marks – 6 marks each)

All staff members in your team are well versed with emerging technologies and have been with the department for more than 4 years.

An appropriate budget has already been allocated for the project.

- a) Outline the software and hardware technologies you will use. What factors will you take into account when selecting staff to work on the development project?
- b) What risks are there in this project and how would you mitigate the risks?
- c) Develop a sequence diagram showing the interactions involved when a student registers for a course in a university. Courses may have limited enrolment, so the registration process must include check that places are available. Assume that the student accesses an electronic course catalogue to find out about available courses.
- d) Cost estimates are inherently risky irrespective of the estimation technique used. Suggest four general ways in which the risk in a cost estimate can be reduced, not limited to this project.
- e) The University is interested in quantifying its software development. Write a report suggesting appropriate metrics and suggest how these can be collected.
- f) Explain why the process of project planning is iterative and why a plan must be continually reviewed during a software project.

