TE WHARE WĀNANGA O TE ŪPOKO O TE IKA A MĀUI
VICTORIA
UNIVERSITY OF WELLINGTON

EXAMINATIONS — 2011

MID-YEAR

SWEN 301

Structured Methods

Time Allowed: 3 Hours

Instructions: Answer each of the exam questions.
Total marks are 180.
Use the marks for each question as a guide as to how long to spend on it.
Calculators are not permitted.
Paper dictionaries for translating between English and a foreign language are permitted.

Question 1. Software Life Cycles [38 marks]

(a) [20 marks]

Describe the following process models. For each of them, discuss the **strengths**, **weaknesses, and when to use**.

- V model
- Spiral model

(b) [10 marks]

Suppose you have just joined *Smart Software* as a software manager. *Smart Software* has been developing accounting software for small business for many years using the waterfall model, usually with some success. On the basis of your experience, you think that the Rational Unified Process (RUP) is a far superior way of developing of developing software. *Write a report to convince the vice-president that the organization should switch to RUP.* Remember that vice-presidents do not like reports that are more than half a page in length.

(c) [8 marks]

Collective Code Ownership and **Pair Programming** are two practices used in the **Extreme Programming**. *Describe each of them and discuss how these two practices support each other.*

Question 2. Software Requirements, Design & Architecture [44 marks]

(a) [5 marks]

Prototyping requirements is one approach used during the process of capturing the requirements. *Discuss when it is appropriate to use it*.

(b) [12 marks]

To ensure that the eventual product is successful, it is important that the requirements be of high quality. *Explain the desirable characteristics that can be used for validating the requirements.*

(c) [5 marks]

For documenting a system's high-level functionality and the data dependencies among various processes in the system would you recommend to use an **Entity Relationship diagram (ERD)** or a **Data Flow Diagram (DFD)** ? *Justify your answer.*

(d) [12 marks]

Describe the following two **architectural styles**. *For each of them discuss advantages and disadvantages.*

- Client-Server
- Layering

(e) [10 marks]

In the course we discussed several **tactics for improving the modifiability** of software systems. *List and briefly explain them.*

Question 3. Software Testing [32 marks]

(a) [12 marks]

System testing is performed through several steps. *List and briefly describe the steps in the system testing process.*

(b) [5 marks]

Use cases have been created in your **requirements analysis documents**. *Explain how use cases can be used during system testing.*

(c) [5 marks]

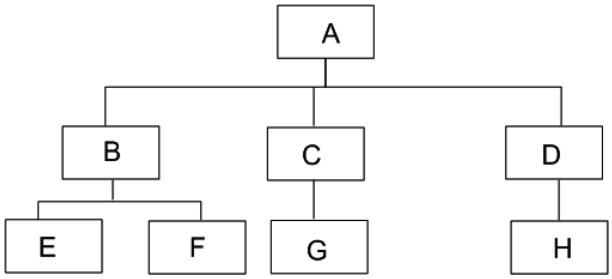
What is the importance of **regression testing**?

(d) [5 marks]

You claim that your program is fault-free at a 96% confidence level. Your test plan calls for you to test until you find all seeded faults. With how many faults must you seed the program before testing in order to substantiate your claim?

(e) [5 marks]

The following figure illustrate the component hierarchy in a software system. *Describe the sequence of tests for integrating the components using the Sandwich approach.*



Question 4. Software Deployment & Maintenance [40 marks]

(a) [8 marks]

Software systems need to be documented for end users. *List the four steps of the **documentation cycle** for end users discussed in the course, and briefly explain them.*

(b) [4 marks]

List the four **types of Software maintenance activities** that we discussed in the course.

(c) [6 marks]

Consider the following examples of software changes to existing software. *What type of software maintenance activity does each represent? Justify your answer.*

1. A text-based word processor needs a speech recognition module implemented and incorporated into it.
2. Sales point software needs to be changed to support the latest security identification procedures for credit and debit cards.
3. Spreadsheet software has a malfunction that prevents a particular function from being accessed by the user.

(d) [12 marks]

Lehman introduced following three types of software systems. *Explain the three types and give an example of each of these software systems.*

- S-systems
- P-systems
- E-systems

(e) [10 marks]

An alternative to **reengineering** a legacy system is the acquisition of new software; replacing the legacy software by a completely new acquisition. *Compare and contrast the process of reengineering with the acquisition of new software.*

Question 5. Free & Open Source Software [26 marks]

(a) [5 marks]

Discuss the validity of the statement: "Software that can be used for educational purposes for free is "**Free software**" "as defined by Free Software Foundation.

(b) [10 marks]

How do the **Agile** development approaches relate to **open source** software development?

(c) [5 marks]

The **factory model** for software developing companies are based on two premises

- Most developer time is paid by sale value,
- Sale value is proportional to development cost.

Explain why they are not realistic.

(d) [6 marks]

"Widget Frosting" is a popular **indirect sale-value model**. *Briefly describe this model, and give an example*.

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