THE HONG KONG POLYTECHNIC UNIVERSITY

DEPARTMENT OF COMPUTING

EXAMINATION

Course : MSc Scheme - 61030

Subject : COMP5222 Software Testing and Quality Assurance

Group : 101, 102, 104

Session : 2011 / 2012 Semester I

Date : 14 December 2011 Time : 19:00-21:00

Time Allowed: 2 Hours Subject Lecturer: Richard Lui

This question paper has 14 pages (cover included).
(Some pages may be intentionally omitted.)

Instructions to Candidates:

Section A: Circle the best answer in the provided answer sheet.

Section B: Answer ALL questions in the space provided.

This is a closed book exam.

Do not turn this page until you are told to do so!

Section B (70%): Write your answers in the space provided.

Question 21 [10 marks]

a) Define the following terms in software testing. (2 marks)

Debugging	
Test Oracle	

b) Describe the uses of JUnit testing framework in software testing. (4 marks)

c) What are the major phases of a Software Quality Assurance (SQA) audit? (4 marks)

Question 22 [15 marks]

a) What is load testing? Suggest 2 popular tools for load testing. (4 marks)

b) Discuss how the use of Web Application Assessment Proxy can help the security testing of a web application. (5 marks)

c) Describe 3 types of navigation tests in web testing. (6 marks)

Question 23 [10 marks]

a) Fill in the blanks (6 marks).

Bob is the user of a drawing program. The program suddenly crashes and he reports the incident to Alice at customer support. Alice enters the failure details, ascertain the facts about Bob's configuration and set the severity to "normal". The system assigns the defect report an identifier PR1234. Carol, a programmer, is in charge of checking all the defect reports. Carol checks that the defect report contains the relevant facts (otherwise, the status of PR1234 will be set to (1)_____ and the resolution will become (2)_____). Also, Carol checks that the defect is not an obvious duplicate of a known problem.

It is indicated that the defect is not known before, Carol sets the status of PR1234 to (3)_____. Dave, the manager, asks Carol to solve PR1234. The state is now (4)_____. However, Carol fails to reproduce the failure. Therefore, she set the status to (5)_____ and the resolution to (6)_____. Carol asks Alice if further details about the bug can be obtained. Alice requests further information from Bob and set the status of PR1234 to (7)_____. Carol assigns Eva (another programmer) to handle the defect report and sets the status of PR1234 to (8)_____. With the new data, Eva can finally reproduce the failure and fix the defect. The status now set to (9)_____ and the resolution is (10)_____. Fanny, a software tester, verifies Eva's fix and authorize the fix to be integrated with the current production release. The status of the defect report now becomes (11)_____. Finally, the fix is delivered to Bob and the status of PR1234 becomes (12) _____.

b) Consider the following description for a defect report.

"The application crashes after inputting random keystrokes for 10 hours".

What should be the severity and priority? Explain your answer (4 marks)

Question 24 [10 marks]

a) In the following table, the rows shows the defect created in different phases in the system development life cycle and the columns show the phases in which the defects are discovered.

	Phase Discovered									
	Requirements	High-Level Design	Detailed Design	Coding	Unit Testing	Integration Testing	System Testing	Acceptance Testing	Pilot	Production
Requirements	0	8	4	1	0	0	5	6	2	1
High-Level Design		0	9	3	0	1	3	1	2	1
Detailed Design			0	15	3	4	0	0	1	8
Coding				0	62	16	6	2	3	20

Compute the defect removal efficiency (DRE) for high-level design and unit testing phase. (5 marks)

b) Suppose we have to conduct configuration testing for a web application.

- Browser: IE, Chrome, Opera, Firefox
- Ram: 1GB, 2GB, 4GB, 8GB
- OS: Windows 7, Windows Vista, Windows XP, Linux, Mac OS

Consider the following test set.

Browser	**Ram**	**OS**
IE	1GB	Windows 7
Chrome	2GB	Windows 7
Opera	4GB	Windows 7
Firefox	8GB	Windows 7
IE	2GB	Windows vista
Opera	8GB	Windows vista
Firefox	4GB	Windows vista
IE	4GB	Windows XP
Chrome	8GB	Windows XP
Opera	1GB	Windows XP
Firefox	2GB	Windows XP
IE	8GB	Linux
Chrome	4GB	Linux
Opera	2GB	Linux
Firefox	1GB	Linux
IE	1GB	Mac OS
Chrome	2GB	Mac OS
Opera	4GB	Mac OS
Firefox	8GB	Mac OS

Discuss whether the above test set can achieve the pairwise testing criterion. (5 marks)

Question 25 [17 marks]

Consider a system which accepts applications for home equity loan. The telephone banker first logs into the system and waits for the customers' phone calls. When a phone call is received, the telephone banker will collect data about the customer (e.g. personal information, loan amount and property value) and input the data into the system through a web browser interface.
After submitting customer information, the loan equity system will then perform credit evaluation. If the loan is rejected, the customer will be notified and the system will archive the loan request. If the loan is approved, the system will display the various home equity products that the telephone banker can offer to the customer. If the customer chooses one of these products, the Telephone Banker will conditionally confirm the product. The interview ends and the telephone banker will direct the transfer of the application to the loan document printing system for origination. The telephone banker will then wait for the next customer's phone call until he/she logs out of the system. During the interview process, the customer can choose to end the interview at any time and the application will be cancelled and archived.

a) Use state transition testing to evaluate the correctness of the system. You should include a state transition diagram and generate test cases to achieve the transition coverage. (12 marks)

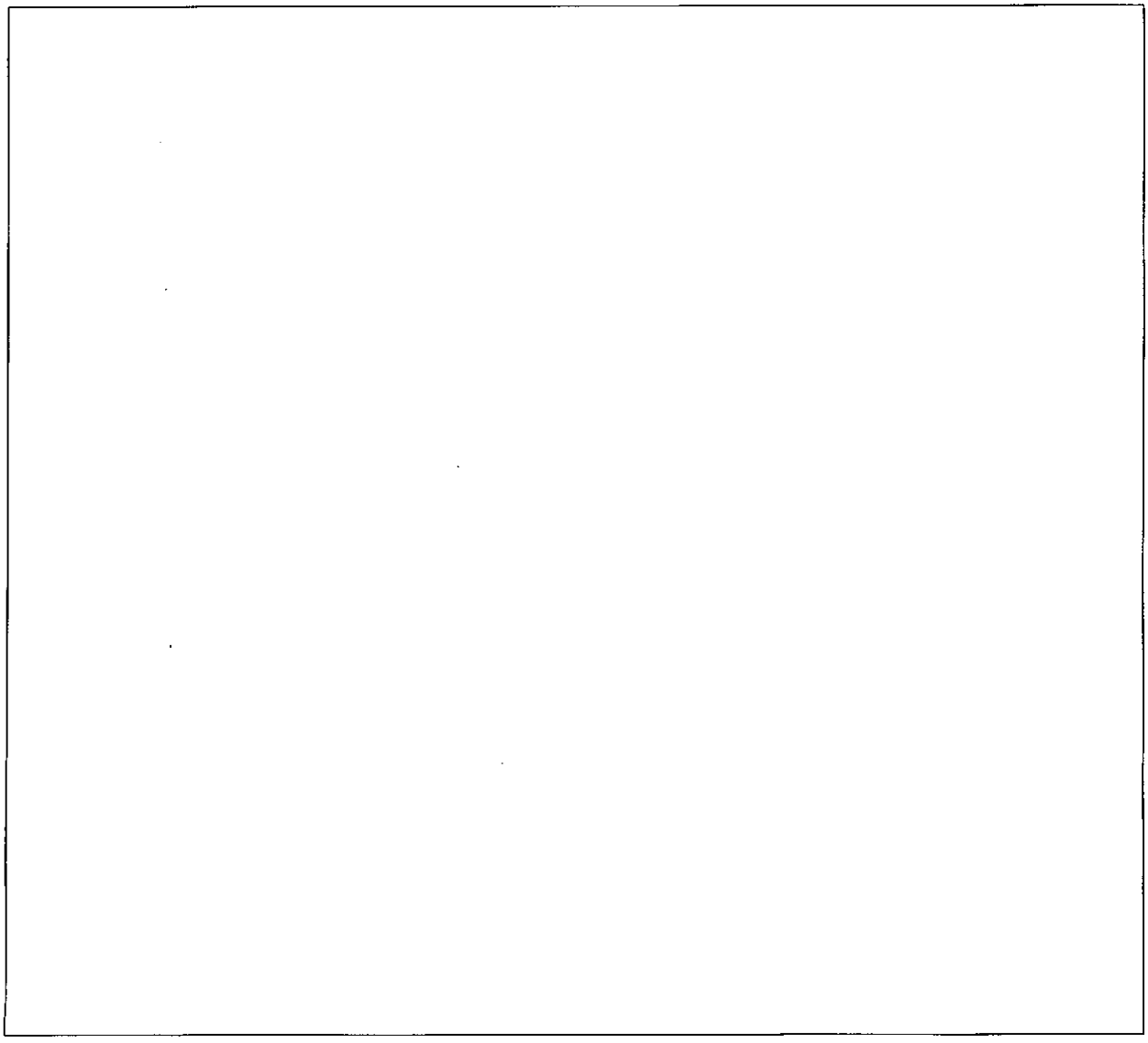
b) Suppose the system allows the telephone banker to input the loan amount. The minimum loan amount is $5,000 and the smallest denomination of money is one cent. Use the boundary value analysis for test case generation. What value(s) should be chosen to detect the shifted-boundary fault? Explain your answer. (5 marks)

Question 26 [8 marks]

Consider an application which allows the user to input their personal data (their age, whether they are full-time student and whether they are disabled) and display if the user should travel with adult fare or eligible for concessionary fare. The business rules are as follows.

- Concessionary fares at around half of the price of adult tickets are available for children aged 3 to 11 and senior citizen aged 65 or above.
- Eligible full-time students aged between 12 and 25 studying in HK may apply for a personalized octopus card with "student status" and enjoy concessionary fares on the MTR network.
- Eligible persons with disability wishing to enjoy concessionary fare must travel by a personalized octopus card with "persons with disability status".

Construct an extended-entry decision table for decision table testing. You may consider the following conditions: Age, Full time student (Y/N), Disabled (Y/N).



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