

THE OPEN UNIVERSITY OF SRI LANKA  
 DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE  
 B.Sc. DEGREE PROGRAMME 2012/2013  
 FINAL EXAMINATION  
 CPU2140: SYSTEM ANALYSIS AND SOFTWARE ENGINEERING  
 DURATION: TWO HOURS ONLY (2 HOURS)



Date: 19<sup>th</sup> December, 2013

Time: 9.30 a.m. to 11.30a.m.

Answer **FOUR** Questions **ONLY**.

Use the following case to answer;

- all the questions in **Q1)**
- questions **a), b) and c)** of **Q2)** part I and the question **a)** of **Q2)** part II
- questions **a)** and **b)** of **Q6)** part I

An online retailer has decided to introduce a new business functionality through his Web site. It is an electronic "gift token" which can be purchased through the Web site and customers will be able to pay for it. For each purchase, a identification code is issued and it can be sent to the recipient of the gift via e-mail. The recipient may then visit the Web site and use the identification code to purchase items up to the gift token value. The balance of the token value (if any) will remain in the account, which can be used later. The online retailer wants to complete the implementation of this functionality for the Web site within one month and with a limited budget. Assume that you have been consulted for this project as an undergraduate, who has learnt system analysis and software engineering.

**Q1).**

I.

- a) Do you recommend them to adapt software engineering discipline for this project? Give reasons for your answer.
- b) Discuss the importance of adapting the key characteristics of good quality software for this Web site.

II. Draw three (03) different types of UML diagrams that could be used in the analysis and design of the above new functionality. Explain the purpose of each type of diagram in the design process.

**Q2).**

I.

- a) Discuss the advantages of use of the incremental prototyping model for the new functionality development to the Web site.
- b) What are the important activities that are carried out during the feasibility study phase of the new functionality development to the Web site?
- c) What is an SRS and list three (03) desirable characteristics of a good SRS document for the new functionality development to the Web site?

II.

- a) Discuss the suitability of OOA and OOD for the new functionality development to the Web site?
- b) Draw class diagrams to model the following:
  - i. A CPU can drive any number of controllers; a controller is driven by just one CPU. A SCSI controller is a special type of a controller, which can manage from 1 to 4 disk drives.
  - ii. Each room contains a thermostat that can drive multiple heaters. Different types of heaters exist: electric heater, wood heater, or a hot water radiator.

Q3)

- I. Draw a class diagram for the case given below. Clearly show the attributes, behaviors (if exist), relationships and cardinalities. Clearly state assumptions you make if any.

This system provides the basic services to manage bank accounts at a bank called ABC Bank. ABC Bank has many branches, each of which has an address and branch number. A client opens accounts at a branch. Each account is uniquely identified by an account number; it has a balance and a credit or overdraft limit. There are many types of accounts, including: A mortgage account (which has a property as collateral), a chequing account, and a credit card account (which has an expiry date and can have secondary cards attached to it). It is possible to have a joint account (e.g. for a husband and wife). Each type of account has a particular interest rate, a monthly fee and a specific set of privileges (e.g. ability to write cheques, insurance for purchases etc. ABC Bank is divided into divisions and subdivisions (such as Planning, Investments and Consumer), the branches are considered subdivisions of the Consumer Division. Each division has a manager and a set of other employees. Each customer is assigned a particular employee as his or her 'personal banker'

II.

- a) Describe fault tree analysis using an appropriate example as it is used in building safety critical systems.
- b) Software testing is crucial for any critical systems. Briefly describe how you use the types of testing for critical systems testing.

Q4)

I.

- a) "*Project planning is not a one-off exercise in project management*". Comment on this statement.
- b) Software productivity measurement is an essential factor for software cost estimation in project management. Briefly describe the two types of matrices that can be used for productivity measurement.

II.

- a) Describe the major software quality management activities by indicating their importance.
- b) Quality reviews are expensive and time consuming and inevitably delay the completion of a software system. How software measurements help to eliminate this problem.

Q5).

I.

- a) Explain the RAD approach and how it differs from the traditional approaches of information systems development.
- b) CBSE is also another approach used in present software development. How would you use CBSE approach for the case given in (Q1)?

II.

- a) Describe why organizations support for and against for the adaption of CBSE tools.
- b) Can we get the support of CASE tools for Agile development? Give your comment.

Q6).

I.

- a) Identify the processes, their execution techniques and process deliverables in the new functionality implementation for the Web site. Clearly define them as a summary in a table.
- b) Once the system implementation stage is concluded, and the system in its maintenance stage of the life cycle. What would be the type of maintenance stage that the said changing to the Web site fall into ? Give reasons.

II.

- a) What are the four (04) fundamental configuration management activities?
- b) Briefly describe why software configuration management is required for complex software system development.

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