THE OPEN UNIVERSITY OF SRI LANKA
DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE
B.Sc. DEGREE PROGRAMME 2011/2012
**FINAL EXAMINATION**
**CPU2140: SYSTEM ANALYSIS AND SOFTWARE ENGINEERING**
DURATION: **TWO HOURS ONLY (2 HOURS)**

**Date: 06th December, 2012** **Time: 9.30 a.m. to 11.30a.m.**

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

**Q1).**

I.

a. What is *Software*?
b. What is *Software Engineering*?
c. Why Software Engineering is needed for the modern software development?
d. Discuss the professional and ethical responsibilities of a software engineer.

II. Tourism is one of the emerging industries in Sri Lanka. A company in tourism industry plans to make use of a mobile application that guides tourists to achieve the following tasks;

- Providing essential information about the important places in Sri Lanka
- Helping to translate English to Sinhala
- Showing the shortest path for a given destination in the map
- Giving the most important up to date news in Sri Lanka

This application should be able to be installed in any mobile phone that has the Windows platform. Assume that you have been consulted for this project as an undergraduate, who has learnt software engineering.

a. Out of *generic product* and *customized product*, what software product will fulfill the above requirements of the company best? Discuss the reasons for your suggestion by giving the characteristics of these two types of software products.
b. Assume that they are going to develop the software in house. What model you suggest them to select among the *Waterfall model* and *Evolutionary Development*. Give reasons for your suggestion by considering their advantages and disadvantages of these models.

**Q2).**

I.

a. Discuss the importance of *Milestones* and *Deliverables* for software project planning.
b. What are the three (03) *categories of risks*?
c. Identify two (02) risks related to each category you identified in Q2 part b, that associate for the above described mobile application in Q1 part II.

II. Assume that the Open University of Sri Lanka is planning to develop a software to automate the examination process. The target user group of this software is the academic staff and non-academic staff in the examination division. Even though, their expectation is high on the system that it will enhance the transaction speed; currently, they are not familiar with computer systems. All regional centers of the university should be able to log in to this system at any time. In addition, the university is intending to introduce a policy to use Free and Open Source Software (FOSS) in university computers. You have been assigned the task of the Software Engineer of this project.

a. What are the steps involved in *requirements engineering process*?
b. Briefly describe how are you going to gather the functional requirements for the above mentioned system?
c. Identify five (05) *non-functional requirements* for the above system.
d. *"Software Requirements Specification of this system should be written for the academic and non-academic staff (users of the system)*". Do you agree with this statement? Justify your answer.

**Q3).**

I. Hotel ABC wishes to automate the manual business processes by introducing a hotel management information system. The IT department at the hotel plans to use a set of system models for the development of this software.

a. Name three (03) *system models* that can be used in this development process?
b. Briefly describe the advantages of using them to develop this software.

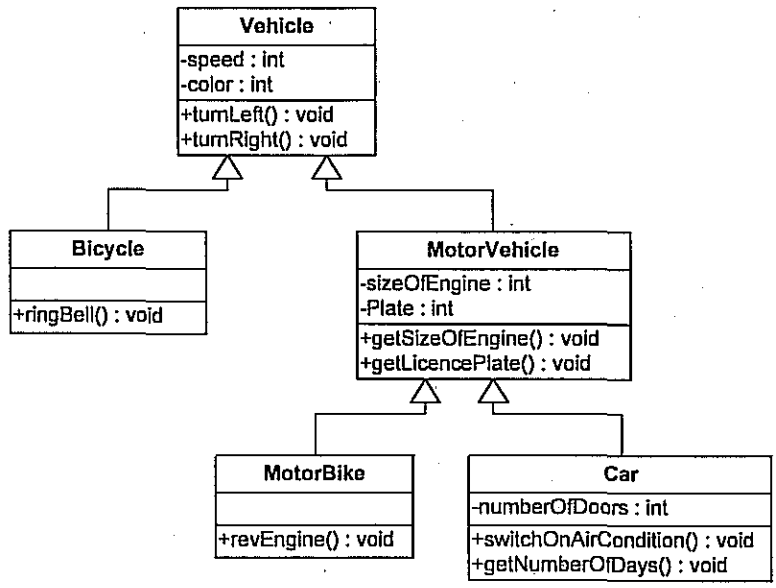
II. A company owns several holiday homes around Sri Lanka. It rents these houses to their employees. The company needs to develop an information system that would allow room reservation on the Internet. After successful completion, an employee shall be able to reserve a room in a desired holiday home for himself and his family members. Besides, he shall be able to review his reservations and be able to cancel them. Holiday home manager will be able to do the same as an employee. Manager will be able to add new reservations (ie. for people that doesn't have access to the Internet and would like to reserve by phone), review reservations and cancel any reservation. Manager will also be given authority to edit information about a particular holiday home. The administrator will have the same access rights as of the manager and he is responsible to add and edit details. Everyone must log into the system before they can use it.

Draw a *use case diagram* for the above scenario.

**Q4).**

I.

a. Describe the class diagram given below, in terms of Object Oriented concepts.




b. Draw the class diagram for the scenario given below.

Each course provided in an academic program at OUSL has a list of students who follow that course and the teacher who has been assigned to teach that course. Students can register and drop these courses. Head of the department should be able to assign teachers to the courses, getting a list of students and teachers who are currently assigned for the courses. A teacher may teach more than one course and a course is taught by a single teacher. Each teacher also maintains a list of the courses that the teacher teaches. A course may have zero or more Students, and a student may attend to multiple courses.

II.

a. Why *Component Based Software Engineering (CBSE)* can be used as an important development approach for business and commercial systems?
b. Although *Component Based Software Engineering (CBSE)* is developing rapidly into a mainstream approach to software development, there are a number of problems remaining. Briefly describe three (03) of them.

**Q5).**

Assume that you have been assign for ABC Company as a Software Engineer for a project that develops a Management Information System. This system should be able to manage accounting details, inventory and human resource details of the company.

I.

a. Give reasons why software system should be tested.
b. If you advise them to do the testing for the above system, what are the two types of testing you suggest?

II.

a. What are the steps you would follow to implement the above system in the operational environment of ABC Company? Briefly describe how you are going to do them.
b. Discuss the three (03) types of *software maintenance* associated with this system.

**Q6).**

I.

a. Discuss the difference between *Software Quality Assurance* and *Software Quality Control*?
b. Briefly describe the steps included in *Quality Planning*.

II. Rapid software development processes are designed to produce useful software quickly. Agile Method is one of them.

a. Name the common principles associated with the Agile methodology?
b. How Configuration management helps for Agile development?
c. How do the Computer Aided Software Engineering (CASE) tools help to manage the *version management*?