THE OPEN UNIVERSITY OF SRI LANKA
DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE
B.Sc. DEGREE PROGRAMME 2014/2015
FINAL EXAMINATION
CPU2140: SYSTEM ANALYSIS AND SOFTWARE ENGINEERING
DURATION: TWO HOURS ONLY (2 HOURS)

Date: 06th November, 2015   Time: **9.30 a.m. to 11.30 a.m.**

Answer **FOUR** Questions **including QUESTION 01** which is **compulsory**.
All questions carry equal marks.

Q1).

I.   Draw the **class diagram** capturing attributes, operations, relationships and multiplicities to the case given below.

In a family pet office, each veterinarian handles two kinds of pets: dogs and cats. Each dog or cat has a name, a height and a weight. Dogs have a breed. For each pet there is a single owner, but one owner can have multiple pets. Owners have names and phone numbers. At any one time, certain pets have appointments, so some pets have no appointment, but others have a single appointment. An appointment is for a specific date and time. Each veterinarian also has multiple assistants who have names and identification numbers. One assistant is assigned to each appointment with a second assistant assigned as backup if needed. Assistants work for just one veterinarian.

II.   Draw **use case diagram** by identifying at least five use cases and two actors to the system description given below.

Pair programming is one of the agile software development techniques. Two programmers work together at one workstation in pair programming. One programmer types in code while the other reviews each line of code as it is typed in. The person typing is called the driver. The person reviewing the code is called the observer. The two programmers switch roles frequently.

Suppose that you are asked to build a system that supports Remote Pair Programming. That is, the system should allow the driver and the observer to be in remote locations, but both can view a single desktop in real-time. The driver should be able to edit and interact with the desktop, and the observer should be able to "point" to objects on the driver's desktop. In addition, there should be a video chat facility to allow the programmers to communicate. The system should allow the programmers to easily swap roles. In addition, the system should keep a backup of old work and there should be a feature to record rationale in the form of video chats.

III.

    a.   Identify four functional requirements for the system described in Q1) II.
    b.   Identify four non-functional requirements for the system described in Q1) II.
    c.   How can we use viewpoints to gather the requirements of the system described in Q1) II?

Q2).

I.

    a.   Name the two fundamental types of software products.
    b.   Suggest the best option among them for the system described in Q1) II. Give reasons for your suggestion.

II.   Assume you have been assigned as the software engineer for the system described in Q1)II. Briefly describe the professional responsibilities that you should have.

III.   Assume an organization that develops software as its business and its management planning to shift for Agile as their software development process. Do you consider the system described in Q1)II is a critical system for them? Give reasons for your answer.

Q3).

I.

    a. Name three software process models.

    b. Suggest the best process model to develop the system described in Q1) II. Give reasons for your suggestion.

II.   Discuss how CASE tools aid for software development organizations by considering the software engineers' and the organization's view points.

III.   Assume you have been assigned as the project manager for the system described in Q1) II. Briefly describe the difficulties you may face than the other engineering projects.

Q4).

I.

    a. Name three system models in software engineering.

    b. Discuss how they help in software development.

II.   Discuss the advantages of object oriented systems than the others.

III.   Describe fault tree analysis using an appropriate example, as it is used in building safety critical systems.

Q5).

I.   If we want subsystems to work as one system, we must control sub-systems. Briefly describe the techniques that can be used to control subsystems.

II.   Though there are advantages in Rapid Application Development than the waterfall model, we can identify some disadvantages as well. Describe them briefly.

III.

    a. What is regression testing?

    b. *"Testing is a process intended to build confidence in the software"* Comment on this statement.

Q6).

I.

    a. *"Size oriented software productivity measurement factor misleads the management due to some reasons"* Comment on this statement.

    b. Briefly describe other productivity measurement techniques by considering their advantages than the size oriented measurement.

II.   Quality control is a main task in software quality management. How are you going to control the software quality described in Q1)II?

III.   Briefly describe the four fundamental activities in configuration management.

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