THE OPEN UNIVERSITY OF SRI LANKA
DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE
B.Sc. DEGREE PROGRAMME 2012/2013
FINAL EXAMINATION
CSU3277: SOFTWARE ENGINEERING
DURATION: **THREE HOURS (3 HOURS)**

Date: 28th May, 2013 **Time: 1.00 p.m. to 4.00 p.m.**

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

Q1)

(i) Briefly explain the following terms.

(a) Data Flow
(b) External Entity
(c) Data Store
(d) Process

(ii) (a) What is a *Context Diagram*?

(b) What are the unique rules apply when drawing a Context Diagram?

(iii) Consider the following business transactions carried out in a small scale garage.

The customers bring their cars to the garage for servicing and repair. The attendant must check the car in, record details about the owner and the car, along with any specific customer requests. The workshop manager inspects each car and creates a job specification for it. He then schedules the job and assigns a mechanic to complete the specified tasks. During the process, if any new problems are discovered a new job specification is created by the workshop manager, before carrying out the work. When the job is finished the mechanic completes a report detailing the time spent, work done and materials used. This information is used by the attendant to create an invoice, for the customer, when he comes to collect the car.

Draw *a level zero (level 0) data flow diagram* for the above scenario.

Q2)

(i) What are the characteristics of External Design.

(ii) *Modularity* is a very important concept in Software Engineering.

(a) Briefly explain what *modularity* is and give its advantages.
(b) Explain the terms *coupling* and *cohesion*.

(iii) Software design techniques are based on two design strategies.

(a) What are the *two design strategies*?
(b) Compare and contrast these two strategies.
(c) Which kind of strategy is the most successful when a well defined environment exist?

(iv) A *structure chart* shows how an information system is organized in a hierarchy of components called as modules.

(a) What is the purpose of drawing a structure chart?
(b) Illustrate the following basic operations in structure charts using correct notations.

(i) Sequence of operation
(ii) If else
(iii) Case
(iv) Repetition

Q3)

(i) Describe the software crisis that encountered during the development of computer software.

(ii) What are the six properties that software should consist of? Briefly describe four of them.

(iii) (a) Briefly describe the four types of information systems.

(b) How do they differ from each other?

(iv) (a) What is *Computer Aided Software Engineering (CASE)*?

(b) Why are CASE tools used in organizations?

Q4).

Consider the following description of an insurance policy scheme.

The company wishes to give discount to the customers. The discount rate given for a customer for a particular month is decided based on the premium (Monthly payment), total of discount amount added by the company so far (Total discount), and the fact whether the customer pays his premium within the first seven days of the particular month or later.

- If the premium is less than Rs. 10,000/=, then a usual discount of 5% is given.
- Such customers are categorized into two groups: special discount holders and normal discount holders.
- The special discount holders receive a discount rate of 7.5% if the premium is above Rs.2000/=, else it will be 6%.
- For the customers who's premium is either Rs.10, 000/= or above, the usual discount rate is 8%.
- Any customer who pays his/her premium within the first seven days of the month will receive an extra 1% discount if the "Total discount" is above or equal to Rs.25,000.

Construct *a decision table* for the above case and obtain its reduced decision table.

Q5)

(i) What is the difference between an *Entity Relationship Diagram* and *Data Flow Diagram*?

(ii) Give one example for each of the following data relationship complexities.

(a) One – to - one (1:1).
(b) One – to - many (1: M).
(c) Many – to - many (M: N).

Draw Entity Relationship Diagrams for each of your examples. Be sure to label data entities, relationships and relationship types.

(iii) Briefly describe the following terms.

(a) Entities.
(b) Entity type.
(c) Attribute.
(d) Primary Key.

(iv) Develop Entity Relationship Diagrams for the following statements.

(a) Patients see Doctors.
(b) Boy owns Caps
(c) People work Projects
(d) Girl draws pictures.

Q6)

(i) What is the objective of *software testing*?

(ii) Briefly explain the following.

(a) System testing.
(b) Acceptance testing.
(c) Unit testing
(d) Integrated testing.

(iii) State and discuss the types of software maintenance.

(iv) What are the main problems associated with software maintenance?

(v) What does *software reuse* mean?