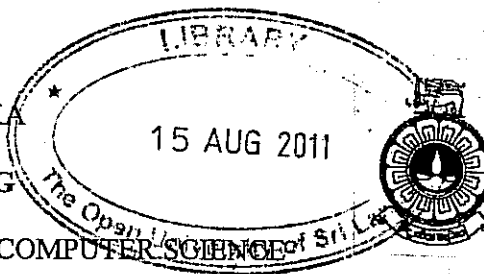


THE OPEN UNIVERSITY OF SRI LANKA
B.Sc. DEGREE PROGRAMME
CSU3277: SOFTWARE ENGINEERING
FINAL EXAMINATION – 2010/2011
DEPARTMENT OF MATHEMATICS & COMPUTER SCIENCE
DURATION: 3 HOURS



Date: 15.12.2010

Time: 01.00p.m. to 04.00 p.m.

ANSWER FOUR QUESTIONS ONLY

1.

- i. The waterfall model is commonly used for systems development.
 - a. Identify the five phases of the waterfall life cycle.
 - b. State two different types of System Development Life Cycles (SDLC) and describe them.
- ii. What is the purpose of a feasibility study and why it is important in system development?
- iii. Describe the purposes of the analysis phase.
- iv. Prototyping is the process of building a small scale functional version of the desired system.
 - a. When prototyping is most suitable in the process of software development?
 - b. What are the benefits that the users get from prototyping?
 - c. Describe the two prototyping techniques and indicate their similarities and differences.
 - d. Write two advantages of prototyping.
- v. State the six properties that software should consist of and briefly explain three of them.
- vi. Define the acronym CASE. How do CASE tools help in the process of software development?

2.

- i. Process modeling, logical modeling and conceptual data modeling are used to structuring of system requirements.
 - a. Differentiate between *Data Flow Diagrams* and *Entity Relationship Diagrams*.
 - b. What is a figure n diagram?
- ii. Explain the following terms.
 - a. Data flow
 - b. External entity
 - c. Data Store
 - d. Process
- iii.
 - a. What is a Context diagram?
 - b. What unique rules applying when drawing a Context diagram?

- iv. A system is to be built to assist Accounting and Business Information Systems (ABIS), to school administrative staff in the booking of classrooms. A more detailed description of the system is as follows.

System Description

The system is to accept classroom booking requests from ABIS administrative staff. When a request is received and it is checked to see that all the required information is included (e.g. date, the details of the course, time and duration of time for which it is required, the number of students, facilities needed and so on). If the request is incomplete or invalid in some other way then an "invalid request" message is sent to the requestor. On the other hand, for a valid request, the booking file is used to generate a list of rooms that are available at the required date and time. If no rooms are available at that time, then a booking failure notice is sent to the requestor. If one or more rooms are available, these are then checked to see if it is of sufficient size and have the facilities required. If it does not satisfied the conditions and if there are no rooms suitable, a booking failure notice is sent to the requestor. Finally, if only one room is available then it is booked. If more than one room is available then the room that can accompany the total number of students is selected out of the available rooms and it is booked, and will be the smallest one out of the others. In either case, a booking confirmation notice is sent to the requestor as well as to the course lecturer giving the information about the room that has been booked.

Construct a Context Diagram and level zero Data Flow Diagram for the above class room booking system.

- 3.
- i. Explain the following terms;
 - a. Data Entity
 - b. Relationship
 - c. Attribute
 - d. Primary Key
 - ii. Develop Entity Relationship Diagrams for the following statements;
 - a. LADY draws PICTURES
 - b. COUNTRY has CITIES
 - c. KING Rules KINGDOM
 - d. GIRL owns HATS
 - e. HORSES push the COACH
 - iii. We use three techniques of logical modeling. These techniques are Decision trees, Decision tables and Structured English.
 - a. What is the main advantage of Decision tree/Decision table over Structured English?
 - b. What are the three types of Decision tables? Explain each by giving an example.
 - iv. Differentiate between *Process Modeling* and *Logical Modeling*.

- v. A description about students grading in Prince and Princess Collage is given below. Using the information constructs a decision table for the above scenario.

A student may receive a final course grade of A, B, C, D, or F. In deriving a student's final course grade, the instructor first determines an initial or tentative grade for the student, which is determined in the following manner:

- If a student received a total of not lower than 75 percent on the first three assignments and received a score not less than 70 percent on the fourth assignment will receive a grade of "A".
- If a student who received a total of not less than 75 percent on any two out of the first three assignments and received a score not less than 70 percent on the fourth assignment will receive a grade of "B".
- If a student who received a total of not less than 75 percent on any one out of the first three assignments and received a score not less than 70 percent on the fourth assignment will receive a grade of "C".
- If a student who received a total of less than 75 percent on three assignments and received a score not lower than 70 percent on the fourth assignment will receive a grade of "D".
- If a student who received a total of lower than 40 percent on any assignment will receive a grade of "F".
- Other score combinations results a grade of "F".

4.

- i. Modularity is a very important concept in software engineering.
 - a. Briefly explain this concept, and give its advantages.
 - b. Explain the terms *coupling* and *cohesion* and give the least desirable types.
- ii. 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 most successful when a well defined environment exists?
- iii. Describe four types of information systems.
- 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 operations (ii).If else (iii).Case (iv). Repetition
 - c. A program is required to retrieve bank account record from a file, on a request from an operator at a terminal. The operator will supply an account number and the programme will display the details of the account. An error message will be displayed if the program is unable to find the record. Draw a structure chart to illustrate the above bank account enquiry system.

- 5.
- i. A file contains records of students in a primary school. The records are sorted into the ascending order of the grades. A program is required to count the number of grade three students who have paid their school fees.
 - a. Describe the difference between physical and logical data structure diagrams.
 - b. Draw physical and logical data structure diagrams for the above scenario.
 - ii. State the four stages of Jackson Structure Diagram (JSD).
 - iii. A student's subject average file contains records which are sorted into terms within year. The records in the terms are also sorted into grades. It is required to produce a report to show the subject's average details within appropriate highlighting for pass students and fail students. If the average is less than 30 is fail, otherwise pass. Headings are required for each year, term and grade. Totals are needed at relevant points in the report at the change of year, term and grade.
 - a. Construct the input and output logical structure diagrams.
 - b. Construct the program structure diagram.
 - c. Write the schematic logic of the programme.
- 6.
- i. What is software coding? What are the input and output of the coding & module testing phase?
 - ii. Code inspection, Syntax checking, Code walkthroughs, Desk checking, Unit test, Integration test & system check are different tests used in the testing phase.
 - a. What is the main difference between static testing and dynamic testing?
 - b. Categorize the above given tests in part ii as static or dynamic.
 - c. Distinguish between *Code inspection* and *Code walkthroughs*.
 - d. Why does Integration test still needed after all modules undergo unit test and when they work well?
 - iii. What are the two types of acceptance tests? Who do these tests? State the difference between these two types.
 - iv. Discuss the four different approaches of software installation by using relevant diagrams.
 - v. What is the difference between system documentation and user documentation?
 - vi. Maintenance is the last phase of System Development Life Cycles (SDLC).
 - a. Explain the four types of software maintenance and state which type is given the lowest priority.
 - b. What is the difference between system maintenance and when a new system is developed?