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The Open University of Sri Lanka  
B. Sc. Degree Programme – Level 05  
Department of Mathematics and Computer Science  
Final Examination - 2009/2010  
CSU 3277: Software Engineering – Paper I



Duration: Two and half hours

Date: 02.01.2010

Time: 9.30am. - 12.00 noon

Answer FOUR Questions ONLY.



1.
  - i. What are the functions performed by a systems analyst during the Systems Development Life Cycle (SDLC)?
  - ii. The Waterfall model is commonly used for systems development. State a different model and describe how it differs from the Waterfall model.
  - iii. "*Communication skills are very important for a systems analyst*". Justify this statement.
  - iv. Do you think that prototyping would speed up the development process? Justify your answer.
  
2.
  - i. What are the outcomes of process modeling?
  - ii. What are the principle rules for drawing Data Flow Diagrams (DFDs) for a given scenario?
  - iii. How does process modeling differ from data modeling?
  - iv. Which phase of systems development uses process modeling? Describe how it can be done using an example.

3.

- i. Explain the following terms in the context of Entity Relationship(ER -) modeling:
  - a. Data
  - b. Entity
  - c. Attribute
  - d. Relationship
- ii. The National Basketball Association (NBA) is in need of a database in order to keep track of the activities in their league.  
The entities in the database are

**People** (with attributes **id**, **name** and **age**),

**Teams** (with attributes **team name** and **manager**), and

**Courts** (with attributes **court id**, **address** and **capacity**).



Furthermore, people are specialized into **Referees** and **Players**.

**Referees** have an extra attribute **level** and

**Players** have an extra attribute **height**.

**Players** play in **teams**, and **teams** and **referees** participate in a game that takes place in a court on a certain date.

This league is quite violent and very often the players are fouled out by referees. This causes bad relationships between the teams and referees and some teams object some referees from refereeing their games. Some way of recording each game is also required. This will need to store the scores of the teams which are scored both home and away. No player plays for more than one team. Only one game is played on one court on any day.

Create an ER diagram that models the relationships in the system described above.

4.

- i. What is the importance of developing a decision table?
- ii. An offshore gas company bills its customers according to the following rate schedule:

First 500 litres Rs. 10 (flat)

Next 300 litres Rs.1.25 per 100 litres

Next 30,000 litres Rs.1.20 per 100 litres

Next 100,000 litres Rs.1.10 per 100 litres

Rs.1.00 per every additional 100 litres.

The input record has customer identification number, name, address, past and present meter reading. Write a structured English procedure and draw a decision table to obtain a bill for a customer upon entering the usage.



5.

A description of a proposed system to support the ordering of textbooks is as given below:

The system is to accept textbook requests from lecturers, along with the relevant course details and the estimated number of students for the course. When a request is received it is recorded and then, after the publisher contact details have been retrieved from the publisher file, a message is sent to the publisher to check on the book's availability. When the availability advice is received from the publisher, it is checked to see that it is for the correct textbook ordered and, if the advice says that the book is not available, an unavailability notice is sent to the requesting lecturer. If the book is available then an order is produced and sent back to the publisher and a confirmation notice is also sent to the course lecturer notifying him or her that the book has been ordered.

Develop a context diagram and a Level 0 DFD for the above textbook ordering system.

6.

- i. Develop the Program Structure Diagram (PSD) for the problem given below using the Jackson-Structured Design methodology.

A student grade file contains the grades for students offering courses at a university. Each record contains the student-id, student name, course-id, course name and the grade. The file is sorted by course-id within student-id. A report, "Student Grades", is desired to be generated that contains the grade for each student and the average for all the courses taken by him/her during the semester. In addition, the report prints a summary containing the number of students in all courses.

- ii. Develop a new PSD for the problem stated in part i) after considering the following modification.

**Modification:** Each record contains a code that indicates the subject that a student is specializing in. The file is sorted by course-id within student-id within faculty-id. Produce a summary line for each faculty-id containing the number of students specializing in the faculty.

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