The Open University of Sri Lanka
B.Sc. Degree Program – Level 05
Final Examination – 2007/2008
CSU3277: Software Engineering: Paper I
Duration: 2½ Hours

088

Date: 02.01.2008 Time: 9.30 am – 12.00 noon

Answer **FOUR** questions **ONLY**

(01)

(a) What are the reasons for the software developers to use an *Engineering Approach* in the development of Software?

(b) Illustrate the *Waterfall* and *Prototyping* models of the software development process.

(c) Differentiate between the above two models with respect to situations that they are most suitable to be used in the software development process.

(d) How can *Prototyping* be used to improve the *quality* of requirements? Use the *Prototyping* model to enhance the *Waterfall model.*

(02)

(a) Differentiate between an ***Entity Relationship Diagram*** and a *Data Flow Diagram.*

(b) Give one example for each of the following data relationship complexities:

one - to - one (1 : 1)
one - to - many (1 : M)
many - to - many (M : N)

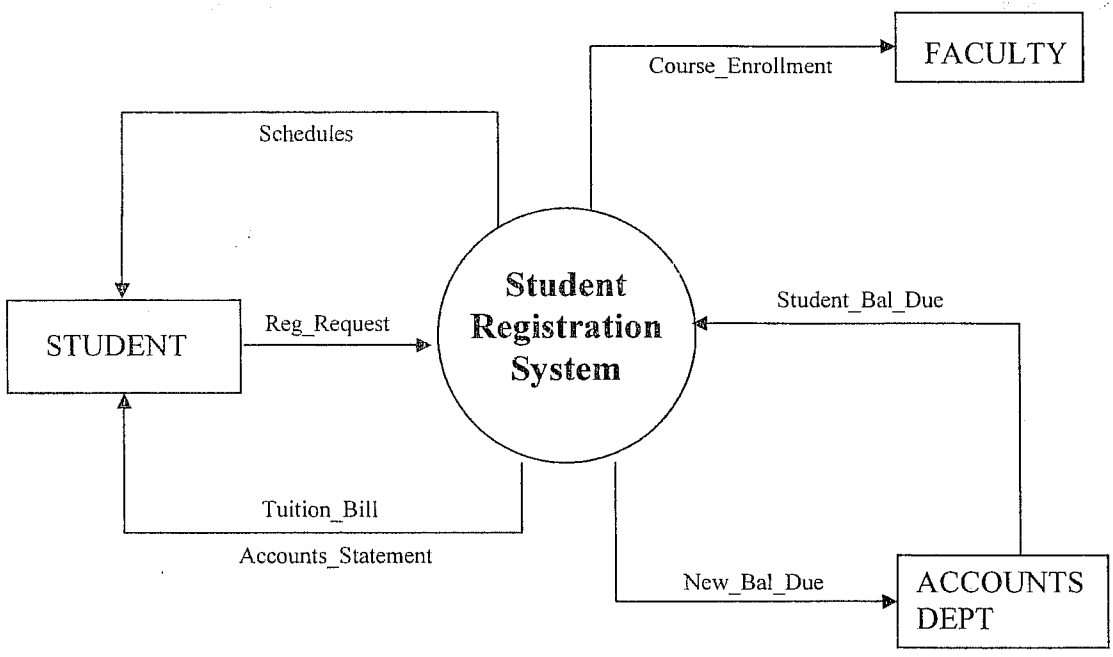
Draw an *ERD* for each of your examples. Be sure to label data entities, relationships and relationship types.

(c) Compare and contrast *process modeling* and *data modeling.* What does each model show?

(d) Differentiate between *coupling* and *cohesion.*

(03)

(a) What unique rules apply when drawing *context diagrams*?



Context Diagram: Student Registration System

The above figure illustrates a *context diagram* for the Student Registration System. Here, a student submits a registration request to the system and receives a class schedule, a tuition bill and an accounts receivable statement from the system.

(b) Explode the context diagram into Level – 0 DFD.

- The student registration is handled by the registration desk. The process handles course enquiry from the students and registers the students for the courses.
- The student affairs division does the schedule preparation. The process allocates faculty to various courses and works out the schedule for each course.
- Accounts division handles the Accounts Receivable sub system. It collects the tuition fee from the students based on the courses registered.

(c) Now, explode the Accounts Receivable module to obtain the Level -1 DFD.

- There are further three sub processes in this module, namely, Receive Student Registration Notification, Accept Tuition Fees, Process and Receive Fees Outstanding.
- Registration Desk is the interface to Accounts Receivable process.

(04)

(a) What is the difference between *data flows* and *data stores*? What is the difference between *data stores* and *data entities*? What is the difference between *data entities* and *external entities*?

(b) Consider the Student Registration System described in the above question (Question Number 03), where the entities identified as STUDENT, INSTRUCTOR, COURSE OFFERED and COURSE SCHEDULE.

(c) In this scenario, an instructor teaches more than one course in any given year, a student may register for many courses, students are taught by instructors, students get a schedule upon registration, instructors are listed in the schedule, they teach many courses and schedules lists selected course offerings.

(d) Obtain an *Entity Relationship Diagram* representing the relationships among students, instructors, courses offered and course schedules.

(05)

The following narrative represents a policy statement of customers doing business with a company. If the customer is doing business worth more than Rs. 100,000/-, he will get priority treatment by the company, whereas the customers doing business less than Rs. 100,000/- would get normal treatment. Even though a customer has business for more than Rs. 100,000/- if he/she has a bad payment history then no priority treatment is given. However, even with a bad payment history, the customers can obtain priority treatment if they have done business with the company for more than 20 years.

(a) Illustrate this scenario by means of a *Decision Tree*.

(b) Based on the *Decision Tree* drawn in part (a) answer the following:

i. What treatment would a customer receive, who has done Rs. 1.4 Million worth of business and has a good payment history?

ii. What treatment would a customer receive, who has done business with the company for 8 years, has bad payment history and gave a total business of Rs. 0.5 Million?

(06)

Draw a suitable *Decision Table* for scenario described in question (05). In this table indicate all the rules that can apply. *Hint:* You may get 8 rules

(a) Simplify the rules and obtain the reduced decision table.

(b) What type of treatment does a customer get if he has a good payment history, not doing business for more than 100,000 and with the company for more than 20 years?

(c) *The conditions and the various values each condition can take are used to draw a decision table and is the same as those for a decision tree* - True or False, justify your answer.

(d) Write the specification described in question (05) in *Structured English.*