

The Open University of Sri Lanka



Department of Electrical & Computer Engineering

ECI3266- Information Systems and Data Management

Final Examination - 2014/15

(Closed Book Test)

Date: 2nd October 2015

Time: 13.30 - 16.30hrs

Answer FIVE questions ONLY.

Q1.

- (i) Describe the importance of having a Management Information System in an organization with a real world example. [04 marks]
- (ii) The present manager at the "Good Food" Supermarket is not much concerned about the availability of products but concerned more on the appearance of the supermarket. Therefore sometimes many products are not available at the supermarket. When the senior management identified this drawback at the super market they immediately decided to go for an automated solution. Propose a system that will allow to overcome the present situation and explain the benefits of implementing such a system. [06 marks]
- (iii) A large scale transaction processing company with branches all over the world automated most of their business processes. In doing so the senior management gave freedom to each branch to implement it's own system. After some time the main branch faced a dilemma due to operational difficulties arisen in branches.
- (a) Critically analyze this scenario and identify the problems that could have arisen due to having isolated systems at branches. [06 marks]
- (b) Propose a method to overcome the dilemma and justify your answer. [04 marks]

Q2.

- (i) Briefly describe three advantages of DBMS approach. [05 marks]
- (ii) Using suitable diagrams explain the components of Two-Tier Client/Server Architecture with the functionalities. [05 marks]
- (iii) What is a data model in Database system architecture? Briefly describe one type of data model. [05 marks]

- (iv) Compare and contrast Data Manipulation Language (DML) with Storage Definition Language (SDL). [05 marks]

Q3.

- (i) Identify the entities and relationships for each of the following systems and draw separate ER diagrams for each system
- (a) Suppliers supply Parts
 - (b) Teams have Players, and Managers manage Teams
- [06 marks]
- (ii) “OnTime Cargo” is a freight company that relies on a company-wide information system that enables the company to have up-to-date information on the processing and current location of each shipped item.

Shipped items can be characterized by item number (unique), weight, dimensions, insurance amount, destination, and final delivery date. Shipped items are received into the “OnTime Cargo” system at a single retail center. Retail centers are characterized by their type, uniqueID, and address. Shipped items make their way to their destination via one or more standard “Ship Cargo” transportation events (i.e., flights, truck deliveries). These transportation events are characterized by a unique scheduleNumber, a type (e.g, flight, truck), and a delivery Route.

- (a) Create an Entity Relationship diagram to capture the above information about the “On Time Cargo” system. [10 marks]
- (b) Indicate the various attributes of each entity and relationship set identifiers and the cardinality of relationships. [04 marks]

Q4.

- (i) Draw separate ER diagrams for each of the systems described below
- (a) Each and every Supplier has many Phone numbers.
 - (b) The Supplier Address consists of Number, Street Name and Town Name. [2×2=4 marks]
- (ii) Normalization is a process to ensure that a schema is good.
- (a) Describe how you ensure that a schema is good through normalization. [02 marks]
 - (b) Describe the three Normal forms and what you achieve in each form. [06 marks]

(iii) Consider the following relation,

Project (projName, payID, payAmount, payDate, projMgr, teamLead, city)

And assume the following set of functional dependencies,

$$F = \{ \begin{array}{l} (\text{projName} \rightarrow \text{projMgr, teamLead, city}), \\ (\text{payID} \rightarrow \text{payAmount, payDate}), \\ (\text{projMgr} \rightarrow \text{city}) \end{array} \}$$

The key of the relation is (**projName, payID**).

Normalize above, step by step removing functional dependencies and explain which Normal Form it is. [08 marks]

Q5.

Consider the following relations in a movie database.

Movie (title:char(25), year:int, length:float, language:char(15), filmtyp:char(1))

MovieStar (name:char(15), address:varchar(40), gender:char(1), birthday: date)

StarsIn (movieTitle:char(25), movieYear:int, starnam:char(15), role:varchar(15))

The attributes of the *Movie* relation are *title* of the movie, *year* it was made, *length* of the movie, *language*, and *filmtyp* which may be 'F' or 'D' for feature or documentary respectively. The *MovieStar* relation has attributes to record the *name*, *address*, *gender* ('M' or 'F'), and *birthday* of stars. *StarsIn* relation associates the movie with stars that acted in them and contains the *role* ('lead', 'support', or 'other') they played. The primary keys of all relations are underlined.

Write SQL statements for the followings.

- (i) Print the star name and address of all movie stars if they were born after "1980/3/31". [05 marks]
- (ii) Print the star name, address, and movie title for all movie stars if they have birth day after "1980/3/31" and played the role "lead". [05 marks]
- (iii) Print the star name, address, movie title and film type for all movie stars if their birth dates are after "1980/3/31" and played the role "lead". [05 marks]
- (iv) For each English language feature movie, get the title, year, and the number of stars who acted in the movie. [05 marks]

Q6.

(i) Identify the entities and Cardinality of each relationship listed below and draw the ER diagram relevant for each system separately

- (a) One student may register with many courses and one course has many students
- (b) A Supplier may supply many Parts but any Part is supplied by only one Supplier

[3×2=6 marks]

(ii) Describe what is meant by an inner join. [04 marks]

(iii) Compare and contrast structured data vs unstructured data using an example. [04 marks]

(iii) Consider the following table:

Student_Enrollment (studentID: integer, course:varchar(10), grade:varchar(2))

Student_Enrollment contains the students' current enrolment. The student id (*studentID*), the courses registered in the current semester (*course*) and grade for the course (*grade*).

- (a) Write a SQL statements to extract the student id (*studentID*) of those who have obtained three or more 'A' grades for any subjects and have not failed ('F' grade) a single subject.

[06 marks]

Q7.

(i) Describe two categories of Electronic Commerce systems with real world examples.

[04 marks]

(ii) Briefly describe the three different stages of data mining.

[06 marks]

(iii) Describe the Data Management Sequence with respect to a real world example.

[05 marks]

(iv) Describe the impact of having a good Database management system integrated to an electronic website that perform online transactions.

[05 marks]

End of Paper