The Open University of Sri Lanka
Department of Mathematics and Computer Science
B.Sc. Degree Programme: Level 04
Closed Book Test 1 - 2011/2012
CPU2241 – Database Management Systems
Duration: One and Half Hours

Date: 23/09/2011   **Time: 4.00pm – 5.30pm**

Answer All Questions

QUESTION 1

1.1) What is the difference between *data* and *meta data*? Briefly explain using an example.

1.2) Name the 5 components of a database system environment? Explain the tasks of the *database administrator*, *database designer* and *end user*.

1.3) Compare and contrast the *network database model* and the *hierarchical database model*.

1.4) Draw a suitable hierarchical database diagram taking project team as parent and project student as child. Use *kamal, saman, nimal, kumara* as project student names and *3D man, othello game, computational cloud* as project team names. Each team has minimum of two students.

QUESTION 2

2.1) Explain the 3 types of relationships that can exist between tables in a relational model with suitable examples.

2.2)

Table A			Table B			Table C			Table D
name	Age		name	age		name	salary		item
Kamal	25		Suman	23		Kamal	20000		Cinnamon
Janaka	20		Sarath	24		Janaka	25000		Garlic
Nimal	40		Kamal	25		Nimal	30000		
Priya	15		Nimal	40		Priya	10000		

Give the output of the following relational algebraic operations carried out on the above tables.

    (i) A union B
    (ii) project name of A
    (iii) A intersect B
    (iv) A join C
    (v) A difference B
    (vi) C product D

QUESTION 3

A system is to be developed to record and monitor the information of a secondary school.

Student records have to be maintained in respect of personal, guardians, academic information, class enrollment (one class per year) and extracurricular activities. Teacher records are maintained for personal, subjects taught, class schedule and being a patron for clubs etc.

A student record contains information such as name (initials, surname, names denoted by initials), address (address line1, address line2, home town etc), student number etc. Parent / Guardian can have information recorded on guardian id, contact numbers, address etc. A teacher also could have personal information recorded with a teacher id and specialization.

A teacher can teach up to 3 subjects but he or she is the class teacher of a single class. A subject could be taught by many teachers in different classes. Students learn about 10 subjects per year. The school is having a maximum of 6 classes per year (eg. 9A to 9F) with a maximum of 40 students per class. The marks of 2 examinations per subject have to be recorded each year per student.

Students can participate in a maximum of 3 sports and could be a member of a maximum of 5 clubs. A club should have a name, student ids of members, patron, start date and committee member information.

A class time table with subjects, teacher and time slot(s) of a subject per week has to be recorded for each class.

3.1) Based on the above information list out the possible entities and relationships between them in following tabular format or any other clear format.

Entity 1	Relationship (action verb)	Connectivity (1:1, 1:M etc)	Entity 2

3.1) Draw the attributes corresponding to each of the Entity using appropriate symbols.

3.2) Draw a Complete E-R Diagram for above description showing all Entities, Relationships and types, Cardinalities. State assumptions if any. (do not draw attributes in diagram)

-------All Rights Reserved-------