Tuesday, August 23, 2005
4.15p.m. – 6.00p.m.

University of Glasgow

DEGREES OF MSc and PG Dip in Adv. CS, MSci., M.Eng., B.Eng., B.Sc., M.A. and M.A. (Social Sciences)

COMPUTING SCIENCE 2U:
INFORMATION MANAGEMENT 2

(Answer all 4 questions.)

1. With the aid of examples, provide short descriptions of any five of the following terms:

a) The degree and cardinality of a relation

b) Multi-valued attributes in an ER diagram and how they are mapped into a relation schema.

c) The Cartesian Product operation in Relational Algebra

d) First Normal Form

e) <head> in XHTML

f) The ORDER BY clause in an SQL query

g) An expression tree used for Query Optimisation

h) Two methods of information output

i) The Lie Factor of a graphic

j) Any two Data Protection Act Principles

[20]

2 a) The following database describes data about in-house training of staff. It comprises details of courses, their offerings, and the employees who take and give these courses.

Course (CourseID, Title, Length)

Offerring (CourseID, OfferringNumber, Term,Year, Location)

PreRequisites (CourseId, PreCourseID)

Employee (EmpID, Name, Departement, Salary)

Teaches (CourseID, OfferringNumber, EmpID)

Attends (CourseID, OfferringNumber, EmpID, Mark, Grade)

(i) Answer the following queries in Relational Algebra

(a) The length of all courses taught by Mike Brown

[2]

(b) The name of all employees who have taught or attended course B102

[2]

(c) The title of all courses without prerequisites

[2]

(ii) Answer the following queries in SQL

(a) The average salary of employees who attended courses in the third term of 2004.

[2]

(b) The location of the first offering of D106 in 2005

[2]

b) The diagram shows the physical storage (index and data) of information about movies.

index:

75	2
102	85
403	64

data:

2	Mary Poppins & 75 & children
37	Life of Brian & 210 & comedy
64	Orange County & 403 & teen
85	Elizabeth & 102 & costume drama

Using this example, describe how movies can be inserted into, deleted from, and updated in this database.

[12]

3 **a)** Information about properties of objects can be represented in XML by either "attributes" or "children". With the aid of an example, explain how this is the case: your example should give both the DTD and the relevant XML text. Give at least one reason why one might want to use children rather than attributes, and at least one reason why one might want to use attributes rather than children.

[6]

b) Provide the XHTML for a form, using at least three different types of input methods.

[7]

c) The ACID principle of Isolation states that a transaction must complete its execution without interference from other transactions. Explain why this principle is important, and how database management systems can ensure that it is followed. What problem often occurs, and how can it be solved?

[7]

4 **a)** Discuss the usefulness of each of Task Analysis, Dialogue Design and Storyboarding in interactive system design.

[6]

b) Should National Identity Cards be introduced? State your own opinion and justify it.

[4]

c) You and three other students have been asked by the Department of Computing Science to create a web site for former students of the department's MScIT programme over the summer. The web site will be hosted on one of the department's servers. Describe, at a high (non-technical) level how you would go about it, starting from your first day in the job.

[8]