

CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Autumn Examinations 2010

Module Title: Database Design & Programming

Module Code: **SOFT 7002**

School: Computing and Mathematics

Programme Title: Bachelor of Science in Computing in Information Technology Support
 Bachelor of Science (Honours) in IT Management

Programme Code: **KITSU_7_Y3**
 KITMN_7_Y2

External Examiner(s): **Mr. Ken Carroll**

Internal Examiner(s): **Mr. Byron Treacy**

Instructions: **Answer all questions. Internal choice in questions 2 and 3.**

Duration: 2 Hours

Sitting: Autumn 2010

Requirements for this examination:

Note to Candidates: Please check the Programme Title and the Module Title to ensure that you have received the correct examination paper.
If in doubt please contact an Invigilator.

Q1. Database Design

33 Marks

Database design: normalisation:

You are to design a database for a computer repair shop.

- The shop manages the repairs for different clients.
- A client must be known (e.g. register their details) before they can hand in a repair;
- The system records the start date of the repair (when it is handed in) and an employee is assigned to do the repair.
- An employee identified by their prsi# and can have many repairs on the go at the same time. The system stores the employee name and date of birth(DOB).
- The finish date of each assignment is recorded. Note this will be null/blank for current repairs and is only filled in upon repair completion.
- Each client has a unique name with an address and phone number
- For each repair the list of faults is recorded; each fault has a set description and repair cost associated with it.

Repair

Prsi#	EName	Client	Address	Phone	RepNo	FaultId	FtDesc	Cost€	FinDate	DOB	StartDate
132	Smith.J	EMC	Douglas	293445	R121	F1	Fan	20	12/12/09	1/1/70	12/12/09
132	Smith.J	UCC	Cork	362600	R125	F1	Fan	20	3/3/10	1/1/70	01/03/10
145	Treacy.B	DIT	Dublin	362666	R200	F1	Fan	20	Null	2/2/50	15/05/10
145	Treacy.B	DIT	Dublin	362666	R200	F23	Disk	100	Null	2/2/50	15/05/10
132	Smith.J	EMC	Douglas	293445	R125	F2	RAM	50	3/3/10	1/1/70	01/03/10

Note: you should have enough information to make a design but if you are confused about any aspect of the problem, discuss the confusing issue(s) and then proceed with a design.

- a) Use normalisation to make a new design for the above application that adheres to at least 3NF.

Define primary keys in the new tables.

- b) The database application above contains a general list design component. All applications that contain a list are conceptually equivalent from a design perspective.

- Give another example of a database application that contains a list
- Discuss how both of the designs are equivalent, e.g. identify the elements in both of the designs that adhere to the standard list design.

Q2. SQL: Database Manipulation (Answer 3 of 4)

33 Marks

Using the Project Management database described below, answer the questions following

STAFF (**SNo**, SName, Sec_level, Address, Salary)

JOB(**JNo**, Role, Skill_Level)

PROJECT(**PNo**, Pname, Budget, StartDate, Pstatus)

WORKS(**SNo**, **PNo**, **JNo**, Attitude)

Keys: underlined and in bold print.

Staff have a security clearance level and have a basic salary. Projects have a initial Budget, start date and current status (Active; On-Hold; Pending; Over). You can work on the same project in different Job roles e.g. act as designer and programmer on one project. Also you can work on different projects in the same job role e.g. admin on a number of projects.

JOB

JNo	Role	Skill_Level
J1	Admin	Low
J2	Designer	High
J3	Programmer	High
J4	Writer	Low

Project				
PNo	Pname	Budget	StartDate	Pstatus
P1	Air Lingus	10000	02/04/2008	Active
P2	Guinness	150000	02/06/2007	Pending
P3	EMC	125000	08/09/2007	Over
P4	CIT	11110	1/1/2010	Active

Staff				
SNo	Sname	Sec_level	Address	Salary
S1	Smith	20	London	50000
S2	Jones	10	Paris	65000
S3	Blake	20	Paris	28000
S4	Clark	30	London	32000
S5	Adams	30	Athens	24000

Works			
Sno	Pno	Jno	Attitude
S1	P1	J1	Good
S1	P1	J4	Bad
S2	P2	J1	null
S2	P3	J2	Excellent
S2	P3	J3	Bad
S2	P3	J4	Good
S3	P3	J1	Bad
S5	P1	J4	Bad
S5	P4	J2	Excellent

Answer 3 of the following

2.1 Find the **number of staff** that have shown bad attitude on any work assignments on projects that started this year (i.e. since 1/1/2010)

2.2 Find the name of projects that have a budget that is less than the total salary for staff assigned to work on it.

2.3 Find names of Staff that can work in all job high skill job positions (i.e. they appear somewhere in the works table for each of the high skill level jobs). S2 Jones is the only staff member that has worked assignments for each of the high skill level jobs

2.4. Views: Describe using an example, SQL views using the following guidelines

- Why use Views
- View Definition
- View Resolution

Q3. General Concepts (Answer 2 of 3)

34 Marks (2 * 17)

3.1 UML : Explain the advantages and disadvantages of using data modelling (UML) in database design; include discussion on a Chasm or Fan trap.

3.2 Information Systems can be programmed using a traditional programming system such as C++/JAVA, or alternatively using a Database Management System (DBMS). Explain the Advantages/disadvantages of each approach?

3.3 Embedded SQL

- Explain why Embedded SQL is required? (or why does SQL need to connect to another language?)
- Describe the fundamental system services required for embedded SQL