

**DUBLIN INSTITUTE OF TECHNOLOGY
KEVIN STREET DUBLIN 8**

CMPH 4061

**DT265 Higher Diploma in Computing
DT265B Higher Diploma in Computing
DT265C Higher Diploma in Computing
DT217P Postgraduate School of Computing
(CPD)**

SEMESTER 2 EXAMINATIONS 2013-2014

**INFORMATION SYSTEMS
[DT265, DT265B, DT265C, DT217P]**

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Monday 26th May

9.30 a.m. – 11.30 a.m.

Answer **two** questions.

All questions carry equal marks.

1. (a) **TotalFit** is a keep-fit and health club for members only. The club offers classes for Swimming, Yoga and Aerobics, and facilities and equipment for other keep fit sessions for individual use. Members pay a flat annual fee that entitles them to unlimited use of facilities and equipment provided they are available. However, they are required to make additional payments for each Swimming and/or Yoga and/or other classes they may want to attend.

The data stored on members includes the member number, name (of the person), gender, address, phone number, and date of birth. The member number uniquely identifies each member and the information stored relates to all members who have signed as members and all the extra classes they have attended.

The data stored on classes includes the class number, the class type, extra fee, class-running period, start time, end time, teacher, staff assistant and location.

Information is stored on the staff including: staff number, name, home address, date of birth (DOB), RSI number, job title and salary.

Using the details given in the above statement:

Create an Entity – Relationship (ER) diagram (Diamond notation) to represent the library data requirements described above. State any assumptions you made when creating the ER diagram. Be sure to include attributes as part of your ER design.

(15 Marks)

Convert your Diamond notation diagram into a Crows feet notation diagram.

(15 Marks)

Write SQL statements to create the tables for each entity

(10 Marks)

- (b) “In addition to entities and their inter-relationships, a great deal of additional design information can be inferred from ERDs”.

Discuss this statement, using examples from the ERD drawn for part (a) above.

(10 Marks)

2. (a) *Database Normalisation* aids the designer in ensuring that the semantically correct attributes are in the correct relations.

Using examples, discuss how normalisation achieves this.

(15 Marks)

- (b) A medium-size company with small branches in Dublin and London is determining the best way to manage its customer and sales data requirements. Both sites have local customers with whom they will be generating sales. The Chief Technology Officer (CTO) for the organisation is assessing the following options:

- (i) Local file storage of customer and sales data at each site.
- (ii) Local database of customer and sales data at each site.
- (iii) Central database of customer and sales data at one of the sites, holding data from both sites.
- (iv) Outsourcing of data management to the cloud (i.e. a third party)

Discuss the points that the CTO may raise both for and against each of the above choices.

(25 Marks)

- (c) One of the most important functions of a database is to ensure and preserve *Data Integrity*. Consider any two general database topics discussed in class which you feel have relevance to integrity preservation and illustrate how they achieve that goal.

(10 Marks)

3. (a) A school has primary pupils, secondary pupils and teachers. Each teacher has a permanent classroom with unique number. Each primary pupil is taught by a single teacher, where each secondary pupil is taught by number of teachers. A unique exam code is allocated to each secondary pupil.

- I. List the set of relations based on the description.
(10 marks)
- II. Write a query in SQL to find the exam code of secondary pupil John Smith who is taught by David Copperfield.
(5 marks)
- III. Write a query in SQL to find names of teacher whose classroom number is greater than 200.
(5 marks)
- IV. Write the query in SQL to find all details of primary pupils who have lessons in classroom 103 and age over ten.
(5 marks)

- (b) List the classes of DB users, and give a simple explanation of their roles.
(10 Marks)
- (c) Give the detailed three phases involved in the development of the “Lifecycle of an Information System”. Illustrate your answer with appropriate diagrams.
(15 Marks)