UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2009/ 2010

SUBJECT NAME	:	DATABASE SYSTEMS
SUBJECT CODE	:	BIT 2083
COURSE	:	2 BIT
DATE	:	APRIL/MEI 2010
DURATION	:	2 HOUR AND 30 MINUTES
INSTRUCTION	:	ANSWER **ALL** QUESTIONS.

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Instruction: Answer **ALL** questions

Q1 Define each of the following terms

    (a)   multivalue attribute

                                     (2 marks)

    (b)   composite attribute

                                     (2 marks)

    (c)   alternate key

                                     (2 marks)

    (d)   primary key

                                     (2 marks)

    (e)   derived attribute

                                       (2 marks)

Q2 (a) Give a difference between a view and a base relation.

                                     (4 marks)

    (b) Discuss **THREE (3)** differences between Hierarchical Database and Relational Database.

                                     (6 marks)

Q3 (a) Explain the multiplicity constraint that is represented in a relationship.

                                     (2 marks)

    (b) Describe **TWO (2)** types of multiplicity constraints on a relationship.

                                     (4 marks)

    (c) Describe the difference with appropriate example between strong and weak entity.

                                     (4 marks)

Q4 Consider the following relation:

```
OrderForm (orderID, orderDate, productID, productDesc, quantity,
           productPrice, grandTotal)
```

(a) Explain the purpose of normalization.

(2 marks)

(b) Show all the functional dependencies in this relation.

(3 marks)

(c) Show the transformation of this relation in 1NF, 2NF and 3NF.

(5 marks)

Q5 The following tables form part of a database held in a relational DBMS:

```
Staff(staffNo, name, position, salary, branchNo)
Branch (branchNo, street, city, postcode)
PropertyForRent (propertyNo, address, type, rent)
Client(clientNo, clientName, phoneNo)
Viewing(clientNo, propertyNo, viewDate, comment)
```

Based on the above schema, construct the correct SQL command for each of the following questions

(a) List all staff with a salary greater than RM5000

(2 marks)

(b) Find all branches which are located both in Kluang and Pontian

(2 marks)

(c) Find the number of staff in each branch

(2 marks)

(d) List the types of property available in Parit Raja.

(2 marks)

(e) Increase the rent for condominium to 10%.

(2 marks)

(f) Find all information on properties that has been viewed in January 2010.

(3 marks)

(g) Find the number of properties that cost higher than RM 450 per month to rent

(2 marks)

(h) List those whose salary is greater than the average staff's salary, and show by how much.

(5 marks)

Q6   Given the case study of a video rental company.

> The DVD rental company has several branches throughout Malaysia. The data held on each branch is the branch address made up of street, city, state, and postcode, and the telephone number. Each branch is given a branch number, which is unique throughout the company. Each branch is allocated staff, which includes a Manager. The Manager is responsible for the day-to-day running of a given branch. The data held on a member of staff is his or her name, position, and salary. Each member of staff is given a staff number, which is unique throughout the company. Each branch has a stock of DVDs. The data held on a DVD is the catalogue number, DVD number, title, category, daily rental, cost, status, and the names of the main actors, and the director. The catalogue number uniquely identifies each DVD. However, in most cases, there are several copies of each DVD at a branch, and the individual copies are identified using the DVD number. A DVD is given a category such as Action, Adult, Children, Drama, Horror, or Sci-Fi. The status indicates whether a specific copy of a DVD is available for rent. Before borrowing a DVD from the company, a customer must first register as a member of a local branch. The data held on a member is the first and last name, address, and the date that the member registered at a branch. Each member is given a member number, which is unique throughout all branches of the company. A member can be registered in several branch using the given member number. Once registered, a member is free to rent DVDs, up to maximum of ten at any one time. The data held on each DVD rented is the rental number, the full name and number of the member, the DVD number, title, and daily rental, and the dates the DVD is rented out and date returned. The rental number is unique throughout the company.

(a)   Identify the main entity types of the video rental company.

(3 marks)

(b)   Identify the main relationship types between the entity types described in **Q6 (a)**.

(4 marks)

(c)   Determine the multiplicity constraints for each relationship described in **Q6 (b)**.

(4 marks)

(d)   Identify attributes and associate them with entity described in **Q6 (a)**.

(4 marks)

(e)   Determine primary key attributes for each (strong) entity type.

(2 marks)

(f)   Using your answers in **Q6 (a)** to **Q6 (e)** represent the data requirements of the DVD rental company as a single ER diagram

(3 marks)

Arahan: Jawab **SEMUA** soalan.

S1   Berikan definisi bagi setiap istilah berikut:

(a)   Atribut berbilang nilai

(2 markah)

(b)   Atribut composite

(2 markah)

(c)   Kunci alternatif

(2 markah)

(d)   Kunci utama

(2 markah)

(e)   Atribut terbitan

(2 markah)

S2   (a)   Jelaskan perbezaan di antara pandangan dan *base relation.*

(4 markah)

(b)   Bincangkan **TIGA (3)** perbezaan di antara Pangkalan Data Hierarki dan Pangkalan Data Hubungan

(6 markah)

S3   (a)   Huraikan *multiplicity constraint* yang diwakilkan dalam hubungan.

(2 markah)

(b)   Jelaskan **DUA (2)** jenis *multiplicity constraints* dalam hubungan.

(4 markah)

(c)   Bincangkan perbezaan di antara jenis entiti kuat dan lemah dan sediakan contoh bagi setiap entiti yang tersebut.

(4 markah)

S4 Berdasarkan hubungan yang diberikan

```
OrderForm (orderID, orderDate, productID, productDesc, quantity,
          productPrice, grandTotal)
```

(a) Terangkan tujuan proses penomalan.

(2 markah)

(b) Tunjukkan kesemua kebersandaran fungsian yang terlibat dalam hubungan ini.

(3 markah)

(c) Tunjukkan transformasi hubungan kepada bentuk 1NF, 2NF dan 3NF.

(5 markah)

S5 Skema dibawah membentuk sebahagian daripada sebuah pangkalan data

```
Staff(staffNo, name, position, salary, branchNo)
Branch (branchNo, street, city, postcode)
PropertyForRent (propertyNo, address, type, rent)
Client(clientNo, clientName, phoneNo)
Viewing(clientNo, propertyNo, viewDate, comment)
```

Berpandukan kepada skema yang diberikan, bina arahan SQL yang tepat untuk setiap soalan berikut

(a) Senaraikan semua staf yang bergaji lebih daripada RM5000

(2 marks)

(b) Cari cawangan yang terletak di Kluang serta Pontian

(2 marks)

(c) Cari bilangan staff untuk setiap cawangan yang ada.

(2 marks)

(d) Senaraikan jenis-jenis hartanah yang terdapat di kawasan Parit Raja.

(2 marks)

(e) Naikkan harga sewa kondominium kepada 10%.

(2 marks)

(f) Dapatkan semua maklumat hartanah yang telah dilihat pada Januari 2010.

(3 marks)

(g) Dapatkan bilangan hartanah yang mempunyai harga sewaan lebih daripada RM 450 sebulan

(2 marks)

(h) Senaraikan rekod-rekod staf yang mempunyai gaji lebih besar daripada gaji purata dan tunjukkan nilai gaji mereka

(5 marks)

S6 Diberi kajian kes, menghuraikan keperluan data bagi syarikat sewaan DVD dan jawab soalan yang berikut.

> Syarikat sewaan DVD mempunyai beberapa buah cawangan di seluruh Malaysia. Data berkenaan cawangan adalah alamat cawangan yang terdiri daripada jalan, bandar, negeri dan poskod dan nombor telefon. Setiap cawangan diberi nombor cawangan, di mana ianya adalah unik bagi keseluruhan syarikat. Setiap cawangan diberi pekerja termasuk seorang Pengurus. Pengurus bertanggungjawab untuk menguruskan aktiviti harian bagi cawangan tersebut. Data berkenaan pekerja adalah nama, jawatan dan gaji. Setiap pekerja diberi nombor pekerja yang mana ia adalah unik bagi keseluruhan syarikat. Setiap cawangan mempunyai stok DVD. Data berkenaan DVD adalah nombor katalog, nombor DVD, tajuk, kategori, sewaan harian, kos, status dan nama pelakon utama dan pengarahnya. Nombor katalog adalah unik dalam mengenal pasti setiap DVD. Bagaimanapun, dalam banyak kes, terdapat beberapa salinan DVD yang sama di satu cawangan dan salinan individu DVD dikenal pasti menggunakan nombor DVD. Satu DVD diberi kategori tertentu seperti Aksi, Dewasa, Kanak-kanak, Drama, Seram atau Sains Fiksyen. Status pula menunjukkan sama ada salinan DVD yang spesifik sedia ada untuk disewa. Sebelum menyewa DVD daripada syarikat, seorang pelanggan perlu mendaftar sebagai ahli di cawangan setempat. Data ahli adalah nama pertama dan akhir, alamat, dan tarikh ahli tersebut mendaftar di cawangan tersebut. Setiap ahli diberi nombor ahli yang mana ia unik bagi seluruh syarikat. Seorang ahli boleh mendaftar di beberapa cawangan menggunakan nombor ahli yang telah diberikan. Selepas mendaftar, seorang ahli dibenarkan menyewa DVD sehingga maksimum 10 keping

(3 markah)

(b) Kenal pasti jenis hubungan utama di antara jenis entiti yang telah dikenal pasti dalam **S6 (a)**.

(4 markah)

(c) Tentukan *multiplicity constraints* untuk setiap hubungan yang dikenal pasti dalam **S6 (b)**.

(4 markah)

(d) Kenal pasti atribut terlibat dan kaitkan dengan entiti yang telah dikenal pasti dalam **S6 (a)**.

(4 markah)

(e) Tentukan kunci utama bagi atribut untuk setiap jenis entiti (kuat).

(2 markah)

(f) Gunakan jawapan **S6 (a)** hingga **S6 (e)** untuk mewakilkan keperluan data syarikat sewaan DVD dalam satu gambar rajah ER.

(3 markah)