Universiti Malaysia PAHANG

Engineering • • Creativity

FACULTY OF COMPUTER SYSTEMS & SOFTWARE ENGINEERING
FINAL EXAMINATION

COURSE	:	DATABASE SYSTEM
COURSE CODE	:	DCI2033
LECTURER	:	FAUZIAH ZAINUDDIN
DATE	:	12 NOVEMBER 2008
DURATION	:	2 HOURS
SESSION/SEMESTER	:	SESSION 2008/2009 SEMESTER I
PROGRAMME CODE	:	DCS

INSTRUCTIONS TO CANDIDATE:

1. This question paper consists of **THRFE (3)** questions. Answer **ALL** questions.
2. Write your answers in the answer booklet provided.
3. Answer EACH question on a new page.
4. All calculations and assumptions must be clearly shown.

EXAMINATION REQUIREMENTS:

NONE

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

This examination paper consists of **EIGHT (8)** printed pages including the front page.

QUESTION 1

(a) Distinguish between the following pair of terms.   **[8 Marks]**

       (i) Primar y key Vs Candidate key

       (ii) Partial Functional Dependency Vs Transitive Dependency

(b) Describe **TWO (2)** basic strategies of Distributed Database implementation.

                                                             [4 Marks]

(c) Identify **THREE (3)** representation differences between Object Oriented Database and Extended Entity Relationship Modeling.   **[6 Marks]**

(d) What is normalization and state **TWO (2)** reasons why data normalization process is important in designing database.   **[5 Marks]**

(e) Define **TWO (2)** advantages *AND* **ONE (1)** disadvantages of Query-By-Example (QBE).   **[3 Marks]**

QUESTION 2

MV Medical Centre, a well-known medical center in Kuantan records the information for each of the treatment. The following relations represent part of a database held in MV Medical Centre:

```
SPECIALIST      (SPES_ID,SPES_Name,SPES_Expertise,
                    SPES_JoinYear,SPES_BasicSalary,SPES_Bonus)

EMPLOYEE        (EMP_ID, EMP_Name, EMP_Position, EMP_Salary,
                    EMP_Bonus)

PATIENT         (PAT_ID, PAT_Name, PAT_ContactNum, PAT_Address,
                    PAT_City, PAT_State)

PAYMENT         (SPES_ID, PAT_ID, EMP_ID, Date, Payment)


TREATMENT       (SPES_ID, PAT_ID, Diagnosis, Date,
                    Next_Appointment_Date)
```

where

- SPECIALIST contains details of all specialists in the medical center.
- EMPLOYEE contains details of employees working at that medical center.
- PATIENT contains details of the patient.
- PAYMENT contains details of treatment received by the patient.
- TREATMENT contains details of diagnosis of a patient

Table 2.0 (i) – (v) show the example of instances of the relations:

Table 2.0 (i)

SPECIALIST

SPES_ID	SPES_Name	SPES_Contact Num	SPES_Expertise	SPES_Join Year	SPES_Basic Salary	SPES_Bonus
S101	Dr. Zulhilmi	6019-9678989	Pediatric	2007	RM40,000	RM45,000
S211	Dr. Amin	6012-3308981	Radiology	2007	RM45,000	RM10,000
S567	Dr. Arif	6017-9113221	ENT	2005	RM50,000	RM10,000
S500	Dr. Hafiz	6014-8456781	ENT	2008	RM40,000	RM7,000
S801	Dr. Faisal	6013-3125535	Hematology	2006	RM48,000	RM8,000

Table 2.0 (ii)

EMPLOYEE

EMP_ID	EMP_Name	EMP_Position	EMP_Salary	EMP_Bonus
E111	Ahmad Danial	Medical Attendant	RM2,500.00	RM2,000.00
E231	Lili Wahida	Clerk	RM2,000.00	RM500.00
E445	Rafidah	Clerk	RM2,000.00	RM500.00
E500	Hassan Naim	Medical Attendant	RM2,200.00	RM1,500.00
E345	Hani Husni	Nurse	RM2,500.00	RM1,500.00
E871	Mary Chong	Nurse	RM2,500.00	RM1,200.00

Table 2.0 (iii)

PATIENT

PAT_ID	PAT_Name	PAT_Contact Num	PAT_Address	PAT_City	PAT_State
P100	Kumar Nair	604-7718899	No 5, Lorong Sultan	Alor Setar	Kedah
P201	Isa Ahmad	603-87655432	281, Tingkat 15, Apartmen Aman	Kuala Lumpur	Wilayah Persekutuan
P099	Maimun Ali	606-7645177	No. 121, Taman Ukhuwwah,	Seremban	Negeri Sembilan
P231	Asiah Abu	609-4415673	Lot 1123, Jalan Ahmad	Pekan	Pahang
P303	Danny Chun	609-5678989	No.12, Lrg Kubang Buaya 21	Kuantan	Pahang

Table 2.0 (iv)

PAYMENT

SPES_ID	PAT_ID	EMP_ID	date	charge
S101	P201	E231	04/08/2008	RM180.00
S500	P099	E445	04/08/2008	RM280.00
S211	P100	E231	30/07/2008	RM210.00
S500	P303	E231	28/06/2008	RM110.00

Table 2.0 (v)

TREATMENT

SPES_ID	PAT_ID	Diagnosis	Diagnosis_Date	New_Appointment Date
S101	P201	Ekzema	04/08/2008	11/08/2008
S500	P099	Meniere Disease	04/08/2008	18/08/2008
S211	P100	Back Pain	30/07/2008	-
S500	P303	Sinus	28/06/2008	05/07/2008

(a)   Based on the above relations, write the following queries in **QBE**:

   (i)   List the name of all ENT specialists in ascending order.

[3 Marks]

   (ii)   Patient ID 'P055' has moved to a new address at: No. 32, Lrg 80, Taman Kampus Damai, Kuantan Pahang. Update all the relevant information about this patient.

[3 Marks]

   (iii)   Calculate the average payment of all patients who received the specialist treatment 'Dr. Amin'   [5 Marks]

   (iv)   Find the number of employees who work as Nurse.

[4 Marks]

(b)   Based on the above relations, formulate the following queries in **SQL**:

   (i)   List the name of all ENT specialists who join this medical center in the year 2008.

[3 Marks]

   (ii)   The current bonus rates for all employees are increased by 5%.

[4 Marks]

(iii)   Dr. Haaris As-Saifi with `Specialist ID` S678 was one of the specialists in MV Medical Centre. However, this specialist's contract ended five months ago. Delete all records of this specialist from the database.   **[4 Marks]**

(iv)   List the ID of all patients of Pediatric Specialist who earned the bonus more than basic salary (*hint: Bonus > Basic_Salary*).   **[4 Marks]**

(v)   List the name of all specialists who got paid more than RM200.00 for a treatment in alphabetical order and list also the name of their patients.

                                                    [5 Marks]

(vi)   List the name of all patients who are from the East Coast region.

                                                    [5 Marks]

(vii)   Name the patients (s) who has no appointment for treatment with Dr. Zulhilmi.

                                                    [5 Marks]

QUESTION 3

The Table 3.0 below shows data of employee details Al Ehsan Sdn Bhd.

Table 3.0

ATTRIBUTE NAME	SAMPLE VALUE	SAMPLE VALUE	SAMPLE VALUE	SAMPLE VALUE
EMP_NUMBER	A0123	A0253	T1253	A1351
EMP_NAME	MOHD ALI	AMINAH SAMAD	WONG AH TING	AMAN SHAH AHMAD
EMP_EDUCATION	DEGREE	DIPLOMA	SPM	MASTER
JOB_CLASS	EXECUTIVE	JUNIOR EXECUTIVE	NON-EXECUTIVE	SENIOR EXECUTIVE
EMP_DEPENDENTS	SITI (SPOUSE) AMIR (SON) LAILA (DAUGTER)		AIREEN (SPOUSE)	NORA(SPOUSE) DAFI (SON)
DEPT_CODE	MKTG	MKTG	SVR	INFS
DEPT_NAME	Marketing	Marketing	General Service	Info. System
DEPT_MANAGER	MARIAM SALAM	MARIAM SALAM	MOHD SAUFI SAIF	MANIAM A/L MANIAPAN
EMP_TITLE	SALES EXECUTIVE	JR SALES EXECUTIVE	CLEANER	DB ADMINISTRATOR
EMP_DOB	20 JAN 1976	15 MAC 1981	01 JAN 1972	16 APRIL 1975
EMP_HIRE_DATE	12 JAN 1999	23 MAY 2003	15 JAN 2000	18 FEB 1998
EMP_TRAINING	L1, L2	L1	L1	L1,L3,L8,L13
EMP_BASE_SALARY	RM3,500	RM2,500	RM1,200	RM5,500

(a)   Provide **ONE (1)** example EACH on how insertion, deletion, and modification anomalies could occur in this table.   **[6 Marks]**

(b) Write the relational scheme and construct Functional Dependency diagram and clearly identify:

  (i)   The Primary key

  (ii) All Partial dependencies

  (iii) All Transitive dependencies

State any assumptions you make about the data shown in Table 3.0 (if necessary).

[8 Marks]

(c) Using the functional dependencies identified in part (a), describe and illustrate the process of normalization by converting the table to Third Normal Form (3NF). Identify the primary and foreign keys in your 3NF relations.

[15 Marks]

END OF QUESTION PAPER