Daffodil International University

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Final Exam Examination, Fall 2020 @ DIU Blended Learning Center

Course Code: CSE311 (Day), Course Title: Database Management System

Level: 3 Term: 3 Section: O-1

Instructor: ZH Modality: Open Book Exam

Date: Thursday 23 December, 2020 Time: 02:00pm-06:00pm

Four hours (4:00) to support online open/case study based assessment Marks: 40

Directions:

- **Students need to go through the CASE STUDY shown in this exam paper.**
- **Analyze and answer specific section based on your own thinking and work.**
- **Do not share as this will be treated as plagiarism by Blended Learning Center.**

Consider the following scenario to answer Q1:

There are many conferences that are held in the world. It is a gathering of delegates representing several groups. Each conference is known by its name and the year of the conference. The conference has beginning and closing dates, fields, and conference location (country, venue where that conference is held, and country international telephone code). The conference may also arrange some social movements. For each activity, the system stores the name of the place to be visited, date, duration, and the price of visiting that specific place. **[10]**

A conference would receive lots of papers to be submitted to the conference, but only a selected number of these papers will be accepted. Each paper is identified by its main author and title. The paper also has several pages and secondary authors (if any). Besides, each paper is given a type (e.g. S: Survey, B: Brief, F: Full, P: Poster). A paper can be submitted in only one conference and many papers may be submitted to the same conference. Once a paper is submitted at a conference, the system sends a message to the author acknowledging the paper submission. For each submitted paper, the system stores whether this paper is accepted or not.

If a paper is accepted, at least one author should attend the conference to present the paper. We want to keep information about the author who presented the paper at the conference. Each author is identified by a unique AID, has a name, address, affiliation, and contact telephone number of this affiliation. An author can write one or more research papers and a paper have one main author and one or more secondary authors. Furthermore, an author may attend many conferences, for each attendance we need to store the attendance type (presenting a paper, visitor, student,.) and if the attendee has any disability needs.

The system should also store the number of papers submitted and accepted for each conference, in addition to the number of attendees. Authors attending the conference may register for one more of the activities offered by the conference. For each registration, the system store number of persons accompanying the author with pays a registration fee declared by the conference.

Q1: Now, propose an Entity Relationship diagram that represents above information. Document all assumptions that you make about the mapping constraints. Make sure cardinalities and primary keys are clear.

Q2: (a) In the following entities, there are two relations: employee_details and log_employee respectively. Create a trigger to add some information into employee_details relation the same data will be inserted into log_ employee table. **[5]**

(b) Create a trigger when information will be inserted in employee_details relation, it will check the salary value. If the value is greater than 15000, then it will provide 0.50 percent commission otherwise provide 0.25 percent commission automatically.

EMPLOYEE_ID	FIRST_NAME	LAST_NAME	JOB_ID	SALARY	COMMISSION_PCT
100	Steven	King	AD_PRES	24000.00	0.10
101	Neena	Kochhar	AD_VP	17000.00	0.50
102	Lex	De Haan	AD_VP	17000.00	0.50
103	Alexander	Hunold	IT_PROG	9000.00	0.25
104	Bruce	Ernst	IT_PROG	6000.00	0.25
105	David	Austin	IT_PROG	4800.00	0.25

emp_details	SALARY	EDTTIME
100	24000.00	2011-01-15 00:00:00
101	17000.00	2010-01-12 00:00:00
102	17000.00	2010-09-22 00:00:00
103	9000.00	2011-06-21 00:00:00
104	6000.00	2012-07-05 00:00:00
105	4800.00	2011-06-21 00:00:00

Q3. Normalize the following table up to 3rd Normal form. Be certain to indicate necessary constraints. **[8]**

Stu_ID	Stu_Name	City	Zip_Code	Age	Course_Code	Teacher
1000	Anik	Khulna	9201	22	CSE101	Mr. A
					CIS102	Mrs. B
1400	Rahim	Dhaka	1205	25	CSE101	Mr. A
					ETE104	Mr. C
1800	Shimu	Chittagong	4217	20	SWE103	Mrs. E
1700	Tuhin	Rajshahi	6000	26	ETE104	Mr. C
1200	Mehedi	Khulna	9201	21	MAT105	Mr. D
1300	Jemi	Dhaka	1205	24	ETE104	Mr. C
					CIS102	Mrs. B
1500	Rumi	Mymensingh	2200	23	MAT105	Mr. D

Q4. **[2.5+ 2.5]**

a) Define Database Transaction with their ACID properties & States.

b) Suppose, there are N number of operations that have to be performed for a transaction. Now describe, in which state the (N-1) operations will be executed and what's the name of N^{th} operation for that specific transaction.

Q5. Consider the following relational schema: **[1+2+2]**

Movies(<u>movieid</u>, title, year)
People(<u>pid</u>, name)
Genres(<u>gid</u>, genre)
ActsIn(pid, <u>movieid</u>)
HasRole(<u>pid, movieid, role</u>)
HasGenre(<u>gid, movieid</u>)

a) Discuss what problems this database may suffer due to data redundancy.
b) Write a SQL view to show the pid and movieid where the name of the actor is 'Tom Hanks' and the movie must belong to the 'Action' Genre.
c) Write an SQL query that produces output of the form genre, total (that counts the number of movies associated with a pair of distinct genres). Each pair of genres should only appear once in the result. Show them according to the ascending order to total number.

Q6. Consider the following relational schema from Q5. Write Relational Algebra for the following questions. **[4]**

a. Find the name of all movies released in the year 2016.
b. Find the name of those movies that are from the 'horror' genre.
c. Find the actor's name who was cast in the leading role of the movie 'ABC'.
d. Find the name of movies released in 2018 and from the 'Thriller' genre.

Q7. Consider the following tables: **[3]**

Student

sid	sname
1234	joe
4000	hector
2000	ling
6000	tom

enrolledIn

sid	code
1234	cs1500
1234	cs1200
2000	cs2001
1234	cs2001
4000	cs3010
4000	ma3000

Subject

code	instructor
cs1500	curtis
cs2001	dave
cs3010	curtis
cs2001	olivier
ma3000	roger

Figure out which SQL operations were used to obtain each of the following tables.

a)

sid	sname	code
1234	joe	cs1500
1234	joe	cs1200
1234	joe	cs2001
4000	hector	cs3010
4000	hector	ma3000
2000	ling	cs2001
6000	tom	NULL

b)

sid	No_of_courses
1234	3
4000	2

c)

Code	instructor
cs1500	curtis
cs3010	curtis
cs2001	dave