The Open University of Sri Lanka

Faculty of Engineering Technology

Department of Electrical and Computer Engineering

Study Programme	: Bachelor of Software Engineering Honours
Name of the Examination	: Final Examination
Course Code and Title	**: EEI4366/ EEX4366 Data Modelling and Database Systems**
Academic Year	: 2020/21
Date	: 22nd December 2021
Time	: 0930-1230hrs

General Instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **Four (4) in four (4) pages**
3. Answer All questions. Each question carries 25 marks.
4. Answer should be written in the answer book provided. Answer for each question should commence from a new page.
5. This is a Closed Book Test **(CBT).**
6. Answers should be in clear handwriting.
7. Do not use red color pen.

Answer All Questions

Question 1 [25 marks]

Explain the following with appropriate examples. **You will receive zero marks if you do not provide examples to explain the following.**

a) Discuss user-defined and predicate-defined subclasses. Highlight the differences between the user-defined and predicate-defined subclasses. (5 marks)

b) Does a relation with two or more columns always have a Multivalued Dependency? Briefly discuss. (5 marks)

c) Define the join dependency and fifth normal form. (5 marks)

d) In real world scenarios, the database designs tend to aim for BCNF not the higher normal forms. Is there any specific reason for thatBriefly explain. (5 marks)

e) Define the following terms **providing suitable examples:** (5 marks)
   I.   superclass/subclass relationship
   II.   IS-A relationship
   III. specialization
   IV.   generalization.

Question 2 [25 marks]

Consider the two tables given below, **Worker** and **Division** for writing the SQL queries for the following questions. Hint: use subquery and join statement appropriately.

Worker

Employ ee_ID	First_Na me	Last_N ame	DoB	Address	Email	Job Role	Salary (LKR)	Hire_date	Division_ID
E1111	Danial	Steves	01/02/1954	87, Sea Street	123@gmail.co m	Accountant	20,000	1987-06-17	11111
E2222	Diana	Roger	03/02/1974	11,Lee Ave	325@ gmail .com	Database_Admi n	78,000	1997-05-04	22222
E3333	Lee	John	04/02/1966	343, Gee Street	174@ gmail.com	Graphics Designer	57,000	2003-02-07	33333
E4444	Louis	Drake	07/05/1945	222,Tree Street	141@ gmail .com	Accountant	30,000	1999-02-04	11111
E5555	Willaim	Loric	03/05/1957	777,Jack Street	414@ gmail.com	Web Designer	48,000	1990-01-05	44444
E6666	Earl	Nair	01/02/1948	111,Greek Street	323@ gmail .com	Graphics Designer	14,000	1974-09-01	33333
E7777	Paris	Harry	01/08/1980	222,Dean Street	447@ gmail.com	Web Designer	62000	2003-05-01	44444

Division

Division_ID	Division_name
11111	Accounts
22222	IT
33333	Graphics
44444	Web Design

a. Select the full name (e.g. Danial Steves) and division of all the employees who earn more than LKR 60,000. (10 marks)
   Output:

Full name	Division_name
Diana Roger	IT
Paris Harry	Web Design

b. Select the last_name, hire_date, job_role, salary, division_id, email of any workers who were hired after the worker with an ID of E2222. Order the results by hire_date.
   (15 marks)
   Output:

Last_name	Hire_date	Job_Role	Salary	Division_id	Email
Harry	2003-05-01	Web Designer	62000.00	44444	447@gmail.com
John	2003-02-07	Graphics Designer	57000.00	33333	174@gmail.com
Drake	1999-02-04	Accountant	30000.00	11111	141@gmail.com

Question 3 [25 marks]

The following narrative describes a simplified version of the organization of Olympic facilities planned for the summer Olympics.

The Olympic facilities are divided into sports complexes. Sports complexes are divided into onesport and multisport types. Multisport complexes have areas of the complex designated for each sport with a location indicator (e.g., Center, North East corner, South, etc.). A complex has a location, chief organizing individual, total occupied area, and so on. Each complex holds a series of events (e.g., the track stadium may hold many different races). For each event there is a planned date, duration, number of participants, number of officials, and so on. A roster of

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all officials will be maintained together with the list of events each official will be involved in. Different equipment is needed for the events (e.g., goal posts, poles, parallel bars) as well as, another set of equipment is needed for the maintenance of each sports complex (e.g. cleaning equipment, grass cutters, etc.). The two types of facilities (one-sport and multisport) will have different types of information. For each type of facility, there are number of amenities available (e.g. internet café, gym, pool, etc.) together with an approximate budget for each amenity.

a) Draw an EER diagram that shows the entity types, attributes, relationships, and specializations for this application. Clearly state any assumptions you make.

Question 4 [25 marks]

a) What is the difference between FUNCTION, PROCEDURE and PACKAGE in PL/SQL. Explain providing appropriate examples.   (5 marks)

b) What is an exception with respect to PL/SQL and state the types of exceptions.
                                                                   (5 marks)

c) Write a single statement in PL/SQL that concatenates the following words and assign it to an appropriate variable.   (5 marks)
   The words: "Hello" and "Have a Nice Day"

d) What are the features of NoSQL and explain the difference between NoSQL and Relational database.   (10 marks)

~End of the Paper~