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MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2018/2019

TIS3351 – Advanced Database
(All sections / Groups)

02 MARCH 2019
2.30 pm – 4.30 pm
(2 hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of 6 pages, including the cover page, with four questions only.
2. Attempt **ALL** questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please write all your answers in the answer booklet provided.

Question 1 [10 marks]

A data warehouse is created to record the policy insurance of SMILE AUTOMOBILE INSURANCE Company. The table below shows some sample records in the fact table.

Fact Table – POLICY_PREMIUM

<u>TimeID</u>	<u>PolicyID</u>	<u>CustomerID</u>	<u>AgentID</u>	Total_Insured
11/10/18	W1002-01	C1001	B1234	200,000
11/10/18	W1002-02	C1001	B1234	100,000
14/10/18	D1001-01	C1002	C1111	200,000
16/10/18	D1003-01	C1004	C1111	100,000
18/11/18	D1002-11	C1005	N1111	200,000
19/11/18	W1005-01	C1006	B1234	30,000
20/11/18	W1007-01	C1010	N1111	40,000

- a) Based on the fact table given above, draw **star schema** for the data warehouse, including the dimension tables. Include all the appropriate attributes in the dimension tables. [5 marks]
- b) Assume that there are 60 records in each of the four dimension tables, calculate the size for the fact table in terms of number of rows. [1 mark]
- c) Write the SQL extension for OnLine Analytical Processing (OLAP) using GROUP BY ROLLUP to display total premium (total_insured) per month by agent by policy type. [2 marks]
- d) Explain what Snowflake schema is. In your opinion, should one implement the above example into Snowflake? Justify your answer. [2 marks]

Continued...

Question 2 [10 marks]

- a) Draw the typical architecture of a Distributed Database Management System (DDBMS). Make sure the FIVE main components of DDBMS are shown in your figure. [2 marks]
- b) Explain what distributed request is. Based on your answer in Q2(a), describe how a distributed request can be performed. [2 marks]
- c) Draw the object representation for the following business rules: *A patient may be treated by one and only one physician, but a physician may treat many patients.* [2 marks]
- d) Define temporal data in the context of temporal database. [1 mark]
- e) Draw the temporal relation for *Appointment_log* based on the following: Physicians are identified by *DocID*, Patients are identified by *PatID*, while the number of hours are indicated in integer.
- On 11th January, Physician D1003 seen Patient P1001 for 2 hours, and Patient P1002 for 3 hours.
 - On 13th January, Physician D1010 has seen Patient P1001 for 1 hour.
 - From 16th January to 18th January, Physician D1001 seen Patient P1001 for 3 hours every day.

[3 marks]

Continued...

Question 3 [10 marks]

- a) Convert the following EVENT table into XML Version 1.0 representation.

[2 marks]

Table name: EVENT

EventID	EventName	CustID	FromDateTime	ToDateTime
E9999	Family Day	C7788	10-12-18 08:00	10-12-18 22:00
E8810	Sport Carnival	C5555		

- b) Answer Question b(i) to b(ii) based on figure below.

<orderlist>	1
<order id = "Q1/20015 A">	2
<customer>Gary Smith </customer >	3
<tableno> 33 </tableno>	4
<food>	5
<menu>Set 3</menu >	6
<beverage> Ice Lemon Tea </ beverage >	7
</food2>	8
<time/>	9
</order>	10
</orderlist>	11

- (i) There is a well-formedness error in the XML file. Identify by stating which line that causes the error.

[1 mark]

- (ii) Express the query to retrieve the customer whom has ordered the beverage of 'Ice Lemon Tea' as an XPath query.

[2 marks]

- c) Elaborate the role of metadata in the case of multimedia database.

[2 marks]

Continued...

- d) List and describe ANY ONE of the backup strategy that would be performed by Database Administrator.
[1 mark]
- e) Write an example of SQL command for each of the following operations: (i) Backup, and (ii) Restore database.
[2 marks]

Question 4 [10 marks]

- a) Graph database is one of the NoSQL databases. Describe and illustrate what graph database is.
[3 marks]
- b) Indicate whether each following sentence or statement is TRUE or FALSE.
- (i) Cassandra is one of the examples of NoSQL databases.
 - (ii) In document-based NoSQL, documents can contain many different key-value pairs, or key-array pairs, or even nested documents.
 - (iii) In MongoDB, the READ operations modify the data of a single collection.
- [3 marks]

Continued...

- c) Suppose you have a collection of **PropertyAgent** as follows in the MongoDB database. Answer Question c(i) to c(iv) based on the collection.

```
{
  "_id" : ObjectId("50d598e59787887g5f92edb92"),
  "agent_name" : "Joseph Tan",
  "commission_rate" : "20",
  "location_covered" : [
    "Subang Jaya",
    "Bukit Bintang",
    "Klang",
    "Cyberjaya",
  ]
}
```

- (i) Write the command to insert the collection into **PropertyAgent**.
[1 mark]
- (ii) Write the command to find the agent that has commission rate less than 30.
[1 mark]
- (iii) Write the command to count the location covered by each employee.
[1 mark]
- (iv) Write the command to remove the documents where the agent name is Joseph Tan.
[1 mark]

End of Page.

