EXAMINATIONS OF November 2018 (MIDTERM)

Code and Name of Course: **COMP 2605** **Enterprise Database Systems**   Paper: 1

Date and Time: Duration: **1:35 hours**

INSTRUCTIONS TO CANDIDATES: This paper has   **7**   pages and **3**   questions

Answer ALL Questions in ALL

Write Your Answers in The Blank Spaces Provided

Student ID:

PLEASE TURN TO THE NEXT PAGE

Total Marks = 50

Question #1

The UWI wishes to develop a database to keep track of a collection of workshops associated with an international multi-conference event. The following are the requirements:

1. Each workshop has a name, and happens on a particular date — or dates, as some workshops last more than one day.
2. There are several participants, each of which may sign up to one or more workshops.
3. For each participant, it is important to record their name, email address, and the workshops which they wish to attend.
4. There are a number of meeting rooms at the conference venue, each of a fixed capacity. Meetings rooms are identified by a floor and room number.
5. Every workshop needs an allocated meeting room; where a workshop lasts for two days, it will use the same room on both days.

(a) Draw an entity-relationship diagram suitable for representing this information, in particular the connections between participants, workshops, rooms, and dates.
(b) For each of the following concepts give a brief description of what it means, and give an example from your ER diagram.
(i) Key
(ii) Composite key
(iv) Key constraint

[18 Marks]

Write Your Answer For Question 1 Here

Write Your Answer For Question 1 Here

Question #2

Consider the following SQL query:

SELECT budget, department FROM departments WHERE budget < 1000;

    a. Draw two possible relational algebra query plans for this query.
    b. Suppose each row in the departments table is 40k and there are 3000 rows. If only 200 rows have a budget value less than 1000, explain which of the two relational algebra query plans would be more efficient.
    c. Write peuodocode for the Linear Search.
    d. Does it make sense to create an index on budget for the **departments** table. Explain your answer.

[4, 3, 2, 3]

Write Your Answer For Question 2 Here

Write Your Answer For Question 2 Here

Question #3

We consider the following relation:
Articles(ID, title, journal, issue, year, startpage, endpage, TR-ID)
It contains information on articles published in scientific journals. Each article has a unique ID, a title, and information on where to find it (name of journal, what issue, and on which pages). Also, if results of an article previously appeared in a "technical report" (TR), the ID of this technical report can be specified. We have the following information on the attributes:
• For each journal, an issue with a given number is published in a single year.
• The endpage of an article is never smaller than the startpage.
• There is never (part of) more than one article on a single page.

ID	Title	Journal	Issue	Year	StartPage	EndPage	TR-ID
42	TCP Networks	JNN	51	2004	121	138	87
33	Sensor Nodes	JNN	41	2001	69	85	62
33	Sensor Nodes	JNN	41	2001	69	85	56
39	Deep Learning	SICOMP	31	2001	111	133	47
57	NP Problems	JA	51	2008	1	3	99
77	ANT Disease	SICOMP	51	2008	1	6	98
78	ANT Disease	NAT	2222	2008	22	22	98

a. Based on the above, indicate which of the following sets of attributes is a candidate key for Articles.
   1 . {ID}; 2. {ID,TR-ID}; 3. {ID,title,TR-ID}   [1]

b. Based on the above, indicate for each of the following potential functional dependencies, whether it is indeed an FD or not.
   1. ID -> title;
   2. startpage -> endpage;
   3. journal, issue -> year
   4. title -> ID
   5. ID -> startpage, endpage, journal, issue
   6. TR-ID -> ID   [6]

c. Explain whether or not the Articles relation is in 1 NF.   [2]
d. Perform normalization into BCNF, and state the resulting relations.   [4]

Write Your Answer For Question 3 Here

Write Your Answer For Question 3 Here

END OF EXAMINATION