

UNIVERSITY OF COLOMBO, SRI LANKA



UNIVERSITY OF COLOMBO SCHOOL OF COMPUTING

DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY (EXTERNAL)

Academic Year 2014/2015 -3rd Year Examination - Semester 6

IT6404 - Database Systems II Structured Question Paper

19th July, 2015 (TWO HOURS)

To be completed by the car	<u>ndidate</u>
BIT Examination Index No	:

Important Instructions:

- The duration of the paper is 2 (two) hours.
- The medium of instruction and questions is English.
- This paper has 4 questions and 16 pages.
- Answer all questions (25 marks each).
- Write your answers in English using the space provided in this question paper.
- Do not tear off any part of this answer book.
- Under no circumstances may this book, used or unused, be removed from the Examination Hall by a candidate.
- Note that questions appear on both sides of the paper.
 If a page is not printed, please inform the supervisor immediately.

Questions Answered

Indicate by a cross (x), (e.g. |x|) the numbers of the questions answered.

	Ques				
To be completed by the candidate by marking a cross (x).	1	2	3	4	
To be completed by the examiners:					

(a) Why do databases use indexing techniques?	
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ANSWER IN THIS BOX	
(1) Diefly describe the following three indexing types	
(b) Briefly describe the following three indexing types.	
(i) Primary Index	
(ii) Secondary Index	
(iii) Clustering Index	
(III) Clustering much	
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SELECT DISTINCT sname FROM supplier S, sh	
WHERE s.sno = sh.sno AND s.city = 'Colon AND sh.shipment_date = '01/06/2015'; Assume that no indices are used for non-key fields. WI	hat is the most expensive way
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Consider the following schedule. \[\begin{align*} \text{M_1(a); r_2(a); \text{W_1(b); \text{W_2(c); r_2(c); r_4(b); \text{W_2(d); \text{W_4(e); r_5(d); \text{W_5(e)}}} \end{align*} \] Draw the precedence graph for the above schedule. Indicate if the graph has cycles of the above schedule is a serializable schedule determine all the equivalent serial schedul not serializable, indicate why it is non-serializable and identify the type of conflict. \text{Yr} and W1 denote respectively the read and write operations of transaction T1 for cap. b, c, d & e. \] ANSWER IN THIS BOX (07)		(04 1
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Index 1	No:					 			

(ii)Assume that each transaction will commit at the earliest possible point of time soon after completing its last transaction in the schedule given in (i) above. If the schedule was executed under two phase locking protocol, write down the locks acquired, released or changed (i.e. 'Release S(a)' to indicate release of shared lock for a) including any waiting for locks, commits or deadlocks at each of the times starting at t1.

							(08 marks)
ANSW	ER IN	THIS BO	X				
Time	T1	T2	Т3	Т4	T5	Acquire Locks/Wait for	Release or Change Locks

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(b) Consider the following transaction log from the start of the run of a database system that is using
undo/redo logging with checkpointing (CKPT) for crash recovery. The log entries for database
updates are in the format: <transaction id,="" new="" old="" value="" value,="" variable,=""></transaction>

- 1) <START T1>
- 2) <T1, A, 30, 10>
- 3) <T1, B, 20, 0>
- 4) <START T2>
- 5) <T1, A, 60, 30>
- 6) <T2, C, 10, 20>
- 7) < COMMIT T1>
- 8) <START T3>
- 9) <T3, D, 50, 40>
- 10) <T2, E, 40, 50>
- 11) < CKPT (T2, T3) >
- 12) $\langle T2, C, 70, 10 \rangle$
- 13) < COMMIT T2>
- 14) <START T4>
- 15) <T4, F, 80, 70>
- 16) < COMMIT T3>
- 17) <T4, F, 100, 80>
- 18) < COMMIT T4>
 - (i) Using the notations defined in (a) above, i.e. r_i and w_i produce the corresponding schedule for the above transaction log for all its entries.

(05 marks)

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ANSWER IN THIS BOX		

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ANSV	WER IN THIS BOX	
(;;;)	What are the values of the data items A. R. C. D. E. and E. on disk	ofter recovery
(iii)	What are the values of the data items A, B, C, D, E, and F on disk system crashes just before line 18 is written to disk?	after recovery
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ANSWER IN THIS BOX	(02 110)
ii) Now suppose the end user wants to list all employees the SQL statement to retrieve the above information und	
ANSWER IN THIS BOX	(========
The design of a distributed database introduces three neutralised database. Identify the three new issues and dequate details to identify how they are handled by a distributed by a distribute of the control of the co	briefly explain each of them give
	(09 ma)
ANSWER IN THIS BOX	
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	Index No:
onsider a multidimensional data model for students focussing on conducted by lecturers. Assume there are three dimension tables for	student attendance for classor this data model.
) What data could be selected to form the Fact table and what wou	ald be its dimension tables? (02 mark
ANSWER IN THIS BOX	(02 mark

Cuagast massible attaibutes for Dimension Table manasad	Index No:
) Suggest possible attributes for Dimension Table proposed	in (i) above. (03 ma
ANSWER IN THIS BOX	(00 3330)
ii) Draw a star schema for the above student data model.	(05
ANSWER IN THIS BOX	(05 ma)
ANOWER IN TING BOX	
v) For the above Student model propose an attribute hierarch	hy for Location of students and s
how it can be used to retrieve data.	(02 ma
ANSWER IN THIS BOX	(02 ma
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hese phases giving examples where applicable.	(05 m
ANSWER IN THIS BOX	