

PHASE TEST A

THE NOTTINGHAM TRENT UNIVERSITY

SCHOOL OF COMPUTING AND TECHNOLOGY

**SOFT20101: INFORMATION & DATABASE ENGINEERING**

Date: Friday 26th January 2007

Time: 3.15 pm – 4.15 pm

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INSTRUCTIONS TO CANDIDATES:

The paper consists of three sections.

Section A is worth 48 marks; answer **all** questions.

Section B is worth 18 marks; answer **one** question.

Section C is worth 8 marks; answer **one** question.

Section D is worth 26 marks; answer **one** question.

Time allowed: 1 hour.

No calculators or additional materials are allowed for this paper.

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The following tables are for the questions in **SECTION A** and **SECTION B**.

Publisher			Author	
name	location	noOfTitles	name	location
BudgetBooks	London	1	Smith	London
Zone	Glasgow	0	Patel	Manchester
TechBooks	London	2	Davies	London
Universal	New York	2	Chan	London

  

Book				
title	isbn	cost	authorName	publisherName
Swimming	2356	2.00	Smith	BudgetBooks
Cricket	4414	18.50	Davies	Universal
Physics	1098	29.99	Chan	TechBooks
Databases	1045	34.99	Patel	TechBooks
Athletics	4425	17.50	Smith	BudgetBooks

The tables **Publisher** and **Author** represent data about book publishers and authors. The published books are recorded in table **Book** by using the **name** column from **Author** and the **name** column from **Publisher**. Both **name** columns and **isbn** have unique values.

### SECTION A - Answer all questions

- Write a SQL command to create the Book table. Include the primary keys and foreign keys apparent in the tables specified above.  
(16 marks)
- Write a SQL command to display the location of the author of books titled 'Databases'.  
(8 marks)
- Write a SQL command to decrease the cost of all books published by 'TechBooks' by 5.  
(8 marks)
- Write a SQL command to display for each publisher with more than one author, the publisher's name, the publisher's location and the average cost of the books that the publisher sells.  
(16 marks)

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**SECTION B - Answer one question.**

5. Write an SQL command to create a stored procedure BookDetails. The stored procedure should take the isbn as an input and output (to the SQLPlus command line) the author and the publisher for this isbn. Show the command to execute this stored procedure for isbn = 4414. (18 marks)
6. Write an SQL command to create a trigger in table Book. The trigger should add one to the noOfTitles for a publisher (in table Publisher), after each time a new book row is entered in table Book with that publisher's name. (18 marks)

**SECTION C - Answer one question.**

7. Write an SQL command to create an object type called Product to represent details of products sold by a company. The Product type should have: three attributes name, cost and numberSold, and one method getTotalSales that returns the cost multiplied by the numberSold. Write an SQL commands to create the Product type and Product type body. The Product type may have subtypes. (8 marks)
8. Write an SQL command to create a table Customer. The table should have a name column to store a string and an addressDetails column of type XMLType. Write a second SQL command to select the name and, from addressDetails, the XML node '/address/street' where the XML node '/address/postcode' is 'NG1 6BB'. (8 marks)

**Turn over the page for Section D.**

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**SECTION D - Answer one question.**

9. (a) What are checkpoint records and what actions does a RDBMS perform on its logs and buffers when they are created?  
(13 marks)
- (b) Using an example, show how checkpoint records are used in the restart of a database after a system failure.  
(13 marks)
10. (a) Give an example of the 'Lost Update' problem and describe the main characteristics of the problem.  
(13 marks)
- (b) Describe how the various types of locks work. By using your example from part (a), demonstrate how locks can be used to resolve the 'Lost Update' problem.  
(13 marks)
11. (a) Explain how a secondary index works and why it can reduce query execution time for un-ordered table columns.  
(13 marks)
- (b) What disadvantages are there when using a secondary index and hence in what circumstances should they ideally be used?  
(13 marks)

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