

Tutorial Week 11 – Etc.

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- 1 (a) A spreadsheet and a relational database system both manage rectangular data structures. List **five** main differences between them.
- (b) In a banking system, three transactions start at the same time which are intended to:
- Tx1: Move £20 from account 1234 to account 4321
 - Tx2: Move £40 from account 4321 to account 5678
 - Tx3: Move £60 from account 5678 to account 1234

Describe how a transaction system is used to:

- preserve any constraints which are imposed on the database;
- prevent conflicts between the transactions
- deal with any problems recovering from a system crash which happens during the processing of the transactions

- (c) Describe the problems which might arise when building a database which is distributed around a network of computers.
- (d) Describe the process by which a transaction is committed in a distributed database
- (e) Explain the term deadlock in database concurrency control and what a DBMS must do to overcome it.
- (f) The series of transactions which are presented below:

T1	T2	T3
read X	read Z	read Y
write X	read Y	read Z
read Y	write Y	write Y
write Y	read X	write Z
	write X	

are managed by a Transaction Manager which administers shared and exclusive locks as required and releases them as soon as the object is not going to be used again. Given that the Transaction Manager permits each transaction to try one of its sub-actions what will be the sequence of lock issuing and action execution which occurs. Assume a deadlock detection mechanism which rolls back the conflicting transaction which has executed least.

- (g) Give one advantage and one disadvantage of providing a secondary index to a database table. Which kinds of column typically benefit from secondary indexes?
- (h) Distinguish heap, ISAM and hash structures for the storage of a table and describe the kinds of table which best suit each structure.
- (i) In supporting programming an application to use a database, what are drivers, connection objects, statement handles and result sets?
- (j) Describe the process which a server side program, such as a Servlet, JSP page or PHP program, follows to add a new web site customer to a database.