

**CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ**

Semester 1 Examinations 2013/2014

Module Title: Database Systems 3

Module Code: COMP8017

School: Computing

Programme Title:

Bachelor of Science (Honours) Software Development – Year 3

Bachelor of Science (Honours) Software Development and Networking – Year 3

Bachelor of Science (Honours) Web Development – Year 3

Bachelor of Science (Honours) IT Management – Year 3

Bachelor of Science Information Technology Support – Year 3

Programme Code: KSDEV_8_Y3
KDNET_8_Y3
KDWEB_8_Y3
KITMN_8_Y3
KITSP_7_Y3

External Examiner(s): Mr Padraig McCarthy

Internal Examiner(s): Mr Byron Treacy

Instructions: Answer any four questions.

Duration: 2 Hours

Sitting: Winter 2013

Requirements for this examination:

Note to Candidates: Please check the Programme Title and the Module Title to ensure that you have received the correct examination paper.
If in doubt please contact an Invigilator.

Q1 Database Systems: General terms and concepts

25 Marks

Indexing and Index Management:

- Explain why you would not recommend creating indexes on every attribute in a table? (12 Marks)
- Explain why a Query processor/optimiser may not opt to use an index on a column even though it is available? Mention the role of Statistics. (13 Marks)

Q2. Database Systems: General terms and concepts

25 Marks

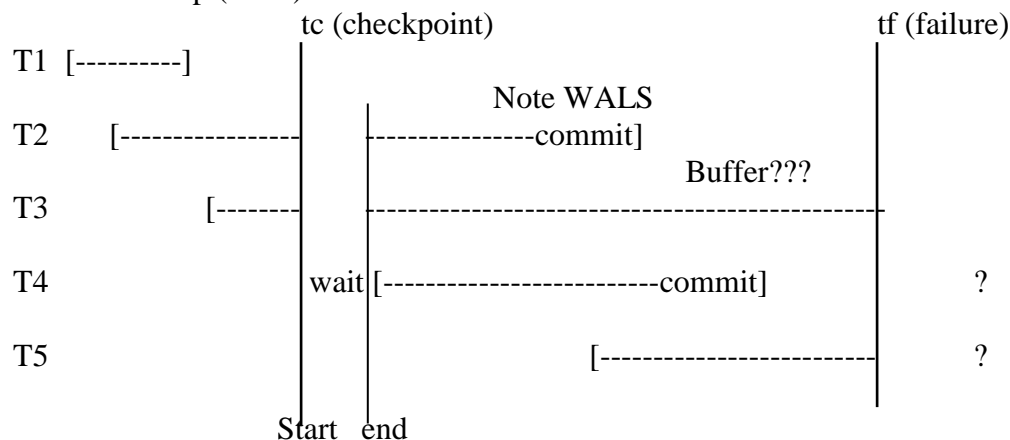
Threads

- Explain the term multi-threading. (13 Marks)
- Explain how multi-threading is of significance to DBMS architecture e.g. load balancing, availability. (12 Marks)

Q3. Recovery: Undo/Redo using ACC.

25 Marks

Action Consistent Ckp (ACC)



The diagram above shows a concurrent transaction schedule using Action Consistent checkpoint.

- Write the Undo/Redo recovery procedure that would be able to process this type of transaction schedule for recovery. (15 Marks)
- Explain how the Undo/redo procedure will work if applied to the transaction schedule above with the failure at the given time. (10 Marks)

Q4. Concurrency:**25 Marks**

Data Access Protocol(DAP): There are two versions of the DAP, one basic or weak, and the second strong.

- a) State the basic DAP. (8 Marks)
- b) Explain using an example how this basic DAP is weak in terms of concurrency? That is, devise concurrent transactions to show that database integrity can be compromised if the weak version of the DAP is used. (10 Marks)
- c) Explain how the strong version of DAP prevents the problem(s) outlined in part b above. (7 Marks)

Q5. Security:**25 Marks**

- Discuss Authentication of users for Access Control (types and effectiveness) (17 Marks)
- Proliferation of rights (8 Marks)