Database Design and Development

2 June 2015

Examination Paper

Answer ALL questions.
Clearly cross out surplus answers.

Time: 3 hours

The maximum mark for this paper is 100.

Any reference material brought into the examination room must be handed to the invigilator before the start of the examination.
Answer ALL questions

Question 1

a) What are the implications of a functionally dependent relationship whereby ‘Attribute A determines Attribute B’ (also written as A -> B)?  
   Marks: 3

b) State SEVEN (7) properties that define a relation in the relational model.  
   Marks: 7

Total: 10 Marks

Question 2

a) Identify and briefly describe THREE (3) different types of anomaly that may occur with data in an un-normalised state.  
   Marks: 6

b) State FOUR (4) features of iterative development.  
   Marks: 4

Total: 10 Marks

Question 3

a) Briefly define a CASE tool and state THREE (3) of its features that can support database development.  
   Marks: 4

b) State SIX (6) advantages of using a CASE tool for database development.  
   Marks: 6

Total: 10 Marks

Question 4

a) Briefly explain what is meant by an SQL sub-query and state whether it is shown in brackets.  
   Marks: 2

b) Distinguish between a left outer join, right outer join and a full outer join in SQL.  
   Marks: 6

c) What is scalability in the context of databases?  
   Marks: 2

Total: 10 Marks

Questions continue on next page
Question 5

a) Briefly explain the use of aggregate functions in SQL and provide ONE (1) example of such a function.  

b) What is the purpose of the GROUP BY clause in an SQL query?  

c) What is the purpose of the HAVING clause in an SQL query?  

Total: 10 Marks

Question 6

a) Explain the concept of a business rule and provide ONE (1) example of this concept.  

b) Briefly describe FIVE (5) ways in which a business rule can be enforced in a database management system.  

Total: 10 Marks

Question 7

a) Explain the process of enforcing referential integrity within a database system.  

b) What would be the result of retrieving data in an SQL query from two tables without using a join condition?  

Total: 10 Marks

Question 8

a) Explain the difference between a transaction and an operation.  

b) Briefly describe the purpose of de-normalisation and provide ONE (1) example of the process.  

c) Identify TWO (2) disadvantages of using indexes in a database.  

Total: 10 Marks

Questions continue on next page
Question 9

a) State FIVE (5) reasons why a business might invest in a distributed database. You should discuss changes and developments within a business. 5

b) Explain how performance is impacted upon when implementing a distributed database. 5

Total: 10 Marks

Question 10

a) Explain how online transaction processing (OLTP) works and provide ONE (1) example of this processing. 4

b) Briefly explain how online analytical processing (OLAP) works. 3

c) Define the term integration and briefly explain why the process of integration is important in data warehouses. 3

Total: 10 Marks

End of Examination Paper