UNIVERSITY

UNIVERSITY EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE AWARD OF

DIPLOMA IN COMPUTER SCIENCE

COSC 0251: DATABASE SYSTEM II

STREAMS: DIP COMP SCI Y2S2

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 22 /09/ 2021   **2.30 PM – 4.30 PM**

SECTION A: COMPULSORY

QUESTION ONE (30 MARKS) COMPULSORY

a) Explain why a three-tire database systems architecture is preferable to a two-tire (2 marks)

b) Describe any **TWO** threats to database systems   (4 marks)

c) Differentiate between homogeneous and Heterogeneous distributed databases (4marks)

d) Discuss any **TWO** consequences of security breaches to organizational database systems

(4marks)

e) Differentiate between passive and active attacks to database systems   (4 marks)

f) Discuss the following terms as used in database security

  i.   Database availability   (2 marks)

  ii.   Database integrity   (2 marks)

  iii. Database confidentiality   (2 marks)

g) Differentiate between system and object privileges   (4 marks)

h) Discuss how you would recovery from a catastrophic failure such as a disk crash

(2 marks)

SECTION B: ANSWER ANY TWO QUESTIONS FROM THIS SECTION

QUESTION TWO (20 MARKS)

a) Distributed databases can be fragmented in many ways.

    i.   Define the term fragmentation (1 mark)

    ii.   Using real world examples, Explain **THREE** types of fragmentation that can be carried out. (9 marks)

b) State three advantages of fragmenting tables in a database system (4 marks)

c) With the aid of a diagram, explain the Client/Server Database architecture (6 marks)

QUESTION THREE (20 MARKS)

a) Define the term server security (2 marks)

b) As a server security professional, discuss **FOUR** common mistakes that create vulnerabilities in servers (8 marks)

c) DCL commands are used to enforce database security in a multiple user database environment. Write a SQL command to assign user "Mark" the SELECT and UPDATE privileges on student table in the student_database (5 marks)

d) As a database administrator enumerate **FIVE** ways of protecting databases against threats (5 marks)

QUESTION FOUR (20 MARKS)

a) Chuka university is in the process of computerizing the student data management. You have been approached as a consultant to advice on the issue.

    i.   Clearly explain why distributing the data would be a better option than consolidating it at one point. (3 marks)

    ii.   Advice the management on data replication as a method used in distributing (2 marks)

    iii.   Clearly explain **THREE** merits and **TWO** demerits of data replication (5 marks)

    iv.   Finally, explain to the management **THREE** types of data replication that exist (6 marks)

b) What is data backup, briefly describe any **TWO** types of data backup (4 marks)

QUESTION FIVE (20 MARKS)

a) Discuss **THREE** methods a database administrator can use to ensure high availability of databases in an organization   (6 marks)

b) Discuss **TWO** types of SQL joins   (4 marks)

c) Discuss the following dimensions of distribution transparency

    i.   Location transparency   (2 marks)

   ii.   Fragmentation transparency   (2 marks)

  iii.   Replication transparency   (2 marks)

d) With the aid of diagrams discuss the following replication schemes   (4 marks)

       a. Full replication

       b. Partial replication

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