THE UNIVERSITY OF ZAMBIA
School of Natural Sciences
Department of Computer Science

FINAL EXAMINATION

DATABASES AND INFORMATIONS MANAGEMENT SYSTEMS
CSC 2702

Date:	26th NOVEMBER 2021
Time:	14:00hrs – 17:00hrs
Duration:	3 Hours
Venue:	NSLT

Instructions

1. *Answer **all** the questions in Section A.*
2. Choose ***any THREE** (3) questions in Section B.*

SECTION A

Answer ALL Questions in this section. Both questions carry an equal weight of **20 Marks**.

Question 1 [20 Marks]

i. Define the following terms briefly in not more than 3 lines: [**5 Marks**]

   a. *Database*

   b. *Database program*

   c. *Database System*

   d. *Record*

   e. *Attribute*

ii. What is a DBMS, and what are its functions? (list at least 3 functions) [**5 Marks**]

iii. Describe the main components you are likely to find in a DBMS environment? **[5 Marks]**

iv. Give at least 5 reasons why the file based system approach is desirable over the database approach. **[5 Marks]**

Question 2 [20 Marks]

i. Explain what it means to say a database displays both *entity integrity* and *referential integrity*? [**4 Marks**]

ii. Define the following terms in relation to the database: [**4 Marks**]

   a. Intentions

   b. Extension

iii. Draw a well labelled diagram of the ANSI-SPARC DBMS architecture and describe the different aspect of it. [**6 Marks**]

iv. In relation to databases, explain what a data model is. Also state three components that describe a data model? [**3 Marks**]

v. State three categories in which you can classify data models? [**3 Marks**]

SECTION B

There are FOUR questions in this section. All questions carry an equal weight of **20 Marks.**

Choose only **three (3)** question!

Question 3

i. In relation to Relational Database Model, list at least five (5) attributes that differentiate relations from tables. **[5 Marks]**

ii. Suppose you wanted to apply for a Job in a database computing environment, what are the five (5) different roles you may likely find? **[5 Marks]**

iii. What do you mean when you say "cardinality of the relation" and "degree of the relation" when you are talking about relational databases? **[4 Marks]**

iv. What two conditions must be met before an entity can be classified as a weak entity? Give an example of a weak **[2 Marks]**

v. Discuss the difference between a composite key and a composite attribute. How would each be indicated in an Entity Relationship Diagram? **[4 Marks]**

Question 4

i. Define the following terms: **[5 Marks]**

   a. *Composite key*
   b. *Super key*
   c. *Candidate key*
   d. *Foreign key*
   e. *Primary key*

ii. Briefly describe the four (4) integrity constraints that are associated with relational database model? **[4 Marks]**

iii. What is the difference between a "view" and "base relation"? **[2 Marks]**

iv. Give at least 3 reasons why the file based system approach is undesirable over manual filing system? **[3 Marks]**

v. What three data anomalies are likely to be the result of data redundancy? **[6 Marks]**

Question 5

i. What is a partial dependency? With what normal form is it associated? **[4 Marks]**

ii. Explain the difference between "Functional Dependency" and "Transitive Dependency". **[4 Marks]**

iii. When is a relationship in ER modelling said to be "recursive"? **[2 Marks]**

iv. Define the following attributes and give example of each: **[6 Marks]**

   a. Derived
   b. Simple
   c. Composite
   d. Multi-valued

v. Briefly, but precisely, explain the difference between single-valued attributes and simple attributes. Give an example of each. **[4 Marks]**

Question 6

i. In database development process, what does the term "fact-finding" mean? **[2 Marks]**

ii. State when "fact-finding" in Q6 (i) is particularly important during database development life cycle? **[2 Marks]**

iii. Explain why "fact-finding" is crucial to the database development process? Especially to phase you have stated in Q6 (ii). **[4 Marks]**

iv. State and briefly explain the five (5) most used fact-finding techniques you may adopt for your database design.**[10 Marks]**

v. Why is a table whose primary key consists of a single attribute automatically in 2NF when it is in 1NF? **[2 Marks]**

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