

THE OPEN UNIVERSITY OF SRI LANKA  
DEPARTMENT OF COMPUTER SCIENCE  
B.Sc. DEGREE PROGRAMME : LEVEL 03  
CSU3301 - DATABASE DESIGN AND IMPLEMENTATION  
CSU4315 - DATABASE MANAGEMENT SYSTEMS  
NO BOOK TEST – 2017/2018



**DURATION: One Hour (1 Hour)**

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**Date: 05.06.2018**

**Time: 4.15 p.m. – 5.15 p.m.**

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**Answer All Questions.**

**QUESTION 01**

Read the following scenario carefully.

One of the private banks in Sri Lanka has decided to store their information in a database.

The information is as follows,

A customer has an ID, name and Phone number. A customer may hold several phone numbers. Each customer holds at least one account and an account must have only one customer. An account should have an ID, name and type.

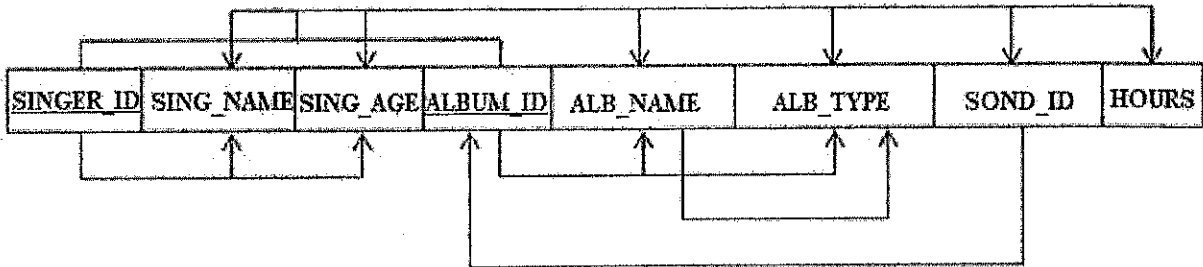
An ATM has an ID and a location. Each branch and transaction has an ID and a name. Each customer operates one ATM at a time and an ATM is operated by only one customer. A branch owns at least one account and an account is owned by only one branch.

An ATM may (may not) belongs to a branch and a branch can have at least one ATM. A customer performs at least one transaction and a transaction is performed by only one customer. Once a customer performs a transaction, the performed date should be stored appropriately.

- a) Identify entities and their attributes. Draw each entity with its attributes using the ER notation (use Chen notation). When drawing, use standard naming conventions you learned.
- b) Draw the complete ER diagram with proper relationships.
  - You don't need to show all the attributes of an entity (Because you showed them in the previous question). Show only the primary key of each Entity.
  - Show the proper connectivity of the relationships and cardinalities.
  - Represent the relationship's participation as optional or mandatory.
  - Use standard Chen notation to draw the ER diagram.
- c) Draw the relevant Relational Schema for the ER diagram.

**QUESTION 02**

Look at the following dependency diagram.



- What is the Normal Form that this table is currently in?
- What is "Partial Dependency"? If there are any partial dependencies in the above diagram, identify and mark them.
- What is "Transitive Dependency"? If there are any transitive dependencies in the above diagram, identify and mark them.
- Normalize this table conform to both Third Normal Form (3NF) and the Boyce-Codd Normal Form (BCNF).

Clearly show the steps (1NF, 2NF, 3NF and BCNF) you follow and mark the primary keys of each decomposed table.

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