**WS A-1 – DATABASE NORMALIZATION**

TOPIC

6



**TIME TO COMPLETE: 1.5 HOURS**

Please show your work, that way I know you’re able to replicate it on the exam.

***MAX MARKS: 62***

1. What is database normalization? [5]
2. Why is database normalization important? [5]
3. **Match the normal form with its description** (write the correct number):
   1. 1st Normal Form (1NF) [2]
   2. 2nd Normal Form (2NF) [2]
   3. 3rd Normal Form (3NF) [2]
4. Every non-key attribute must depend on the whole primary key (no partial dependency).
5. Remove repeating groups and ensure atomic values.
6. Remove transitive dependencies (non-key attributes must depend only on the key).
7. Here is a table: BookID | BookTitle | AuthorID | AuthorName | ProofReader | BorrowerID | BorrowerName | DateBorrowed |
   1. What normal form is this currently in? Why? [3]
   2. Normalize it into Third Normal Form step by step. Show your new tables. [10]
8. In a CarRental table, the following attributes are stored: RentalID | CarID | CarModel | CustomerID | CustomerName | RentalDate |
   1. Which attributes are functionally dependent on CarID? [3]
   2. Which are dependent on CustomerID? [3]

c. What new tables would you create to remove partial dependencies? [5]

1. In a CarRental table, the following attributes are stored: RentalID | CarID | CarModel | CustomerID | CustomerName | RentalDate |
   1. Which attributes are functionally dependent on CarID? [3]
   2. Which are dependent on CustomerID? [3]
   3. What new tables would you create to remove partial dependencies? [5]
2. Examine the following database: EmployeeID | EmployeeName | DepartmentID | DepartmentName | ManagerName
   1. What transitive dependency exists here? [3]
   2. Why does this prevent the table from being in 3NF? [3]
   3. Show the tables that would result from converting this to 3NF. [5]