Course code:CS309

Information and Database Systems

Assignment 5

This is a practice assignment. 5 marks for timely submission and discussion with TA.

Firstly, check the questions and solutions (given for some of them) given in slides 204-216, then solve the following questions.

1. Which of the following Functional Dependencies are satisfied by the instances. write the answer with proper explanation.

A	B	C	D	E
8	2	7	4	Z
2	8	5	4	Z
8	2	7	6	Z
8	2	7	6	6

a) A → BC

b) DE → C

c) C → DE

d) BC → A

2.

Consider the following relation:

CAR_SALE (Car_id, Option_type, Option_listprice, Sale_date, Option_discountedprice)

This relation refers to options installed in cars (e.g., cruise control) that were sold at a dealership, and the list and discounted prices of the options.

If CarID → Sale_date and Option_type → Option_listprice and CarID, Option_type → Option_discountedprice, argue using the generalized definition of the 3NF that this relation is not in 3NF. Then argue from your knowledge of 2NF, why it is not even in 2NF.

3. Let's consider a company where employees work in more than one department.
a. write all the possible functional dependencies in the above table.

EMPLOYEE table:

EMP_ID	EMP_COUNTRY	EMP_DEPT	DEPT_TYPE	EMP_DEPT_NO
264	India	Designing	D394	283
264	India	Testing	D394	300
364	UK	Stores	D283	232
364	UK	Developing	D283	549

b. Identify all the candidate keys accordingly.

c. Decompose the above table into BCNF.

4. Consider a relation R(A,B,C,E,F,G) given the functional dependency below:

AB⟶ C

C ⟶ EF

CF⟶G

a. Identify the candidate key or candidate keys.

b. Identify the non prime attribute/s.

c. Calculate the number of superkeys in the relation R.

d. Write all the possible superkeys in the relation R.