Dr Arun Kumar Yadav 29/11/2022 (9) (8)

National Institute of Technology Hamirpur

End Semester Examination

Database Management System (CS-312)

Branch: CSE+DD
Time: 02.30 PM 05.30 PM
Duration: 3 Hrs

Year/Semester: 3/5th
Date: 29-11-2022
Max. Marks = 50

Note: Attempt all questions from question no. 1 to 5

1. (a)What is EE-R Model? Discuss the generalization and Aggregation in E-R model with suitable example
(b)A relation R (A, B, C, D) having two FD sets $FD1 = A \rightarrow B, B \rightarrow C, A \rightarrow C$ *and* $FD2 = A \rightarrow B, B \rightarrow C, A \rightarrow D$. Check the equivalence relation in both the functional dependencies.
[5+5=10 marks]

2. (a) Consider the following relations with key underlined
lives (person_name, street, city)
works (person_name, company_name, salary)
located (company_name, city)
manages (person_name, manager_name)
Answer the following using SQL:
(i) Find the names and city of persons who work for manager John.
(ii) Find the names of persons who live in the same city as the company they work for.
(iii) John's manager has changed. The new manager is Anna.
(iv) Susan doesn't work anymore.
(v) Create a view BangWork (person_name, company_name, manager_name) of all people who work in Bangalore in ascending order of person name.
(b) Suppose you are given a relation R with four attributes ABCD. For each of the following sets of $FDs, AB \rightarrow C, AB \rightarrow D, C \rightarrow A, D \rightarrow B$, assuming those are the only dependencies that hold for R, do the following:
(a) Identify the candidate key(s) for R.
(b) Identify the best normal form that R satisfies (1NF, 2NF, 3NF, or BCNF).
(c) If R is not in BCNF, decompose it into a set of BCNF relations that preserve the dependencies.
[5+5=10 marks]

3. (a)What is concurrent execution? Explain the Thom's write rule with suitable example.
(b)Let transactions T1, T2 and T3 be defined to perform the following operations:
T1 : Add one to A
T2 : Double A
T3 : Display A on the screen and then set A to one.
(where A is some item in the database)
Suppose transactions T1, T2 and T3 are allowed to execute concurrently. If A has initial value zero, how many possible correct results are there? Enumerate them . **[3+7=10 marks]**

4. (a) What are the spanned and un-spanned indexing strategies? Discuss the application of clustered and secondary indexes with example.
(b)Assume that you have built a dense primary B+ tree index on a heap file containing 20,000 records. The key field for this B+ tree is a 40-byte string and it is candidate key. Pointers are 10-byte values. The size of one disk page is 1,000 bytes. The index was built in a bottom-up fashion using the bulk-loading algorithm, and the nodes were filled up as much as possible. Find the number of levels and blocks in each level in the tree. **[5+5=10 Marks]**

5. (a) What are the types of Recovery Techniques in DBMS? Differentiate Differed and Immediate update with suitable example.
(b)Differentiate the distributed database and real time database with suitable example.
[7+3=10 marks]