Code No: 134AP

R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, April - 2018
DATABASE MANAGEMENT SYSTEMS
(Common to CSE, IT)

Time: 3 Hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a) How to represent the strong Entity set and Weak entity set in ER-Model? [2]
  b) Explain about various integrity constraints in relational model. [3]
  c) What are the SQL statements are used to retrieve and modify the database? [2]
  d) Let R =(ABC) and S=(DEF) let r(R) and s(S) be relations on schema R and S. Give an expression in the Domain relational calculus that is equivalent to each of the following.
i) $\sigma_{B=25}(r)$ ii) $\prod_{A,F,}(\sigma_{C=D}(rXs))$ [3]
  e) What is schema refinement? [2]
  f) Define Multi valued dependencies and join dependency. [3]
  g) What is serilizabuilty? [2]
  h) Explain Failure with loss of nonvolatile storage. [3]
  i) What is primary and secondary indexing? [2]
  j) What is the difference between indexing and hashing? [3]

PART-B

(50 Marks)

2. Give an overview of database architecture. [10]

OR

3.a) Give an overview of database languages – DDL and DML.
  b) What are speciality databases? Explain. [5+5]

4.a) Explain the fundamental operations in relational algebra with examples.
  b) What aggregate operators does *SQL* support? Explain with examples. [5+5]

OR

5.a) What is trigger? Explain how to implement triggers in SQL?
  b) Explain the following Operators in SQL with examples:
i) SOME   ii) IN   iii) EXCEPT   v) UNION. [5+5]

6.a) What do you mean by scheme refinement? Explain how it can be accomplished?
  b) What are the problems caused by redundancy and decomposition of relation?   [5+5]

OR

7.a) Compute the closure of the following set of functional dependencies for a relation scheme. R(A,B,C,D,E,F,G,H), F={ AB→C, BD→EF, AD→G,A→H}
  List the candidate keys of R.
  b) Explain 4NF, 5NF normal forms with examples.   [5+5]

8.a) What is transaction? Explain the properties of transaction.
  b) Give an overview of validation based protocol.   [5+5]

OR

9.a) Explain about the Multiple granularity Concurrency Control protocol.
  b) Explain about remote backup system.   [5+5]

10.a) Give acomparison of various file organizations.
   b) Describe the Insertion and Deletion Operations in B+ trees.   [5+5]

OR

11. How does *Extendable hashing* use a directory of buckets? How does it handles the insert and delete operations?   [10]

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Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

                                                                                                          (25 Marks)
1.a)   Define select and create statements.   [2]
  b)   How would you map N-ary relationship into relations?   [3]
  c)   What are Nested Queries?   [2]
  d)   Explain with an example about aggregate operators.   [3]
  e)   What are the properties of Decomposition?   [2]
  f)   Give an example of a relation scheme R and a set of dependencies such that R is in
        BCNF but not in 4 NF?   [3]
  g)   What happens if system crashes during analysis? How do you limit the amount of work
        in UNDO?   [2]
  h)   What are the ACID Properties of a transaction?   [3]
  i)   What is an index on a file of records? Why is it needed?   [2]
  j)   What are the features of B^+ trees?   [3]

PART-B

                                                                                                          (50 Marks)
2.a)   How are different schema layers related to the concepts of logical and physical data
        independence?
  b)   What are the functions of database manager?
  c)   What are statements used to update and alter the table contents?   [3+4+3]

OR

3.a)   Draw ER diagram for the following:
        A teacher can teach many courses. A student can enroll in many courses. A course may
        be a part of one or many programmes. A teacher can be mentor for many students,
        however a student can have only one mentor.
  b)   Refer to the relation schemas given below and answer the questions asked after schema
        description.
        Suppliers (S.No., Sname, City)
        Parts(P.No., Pname, Colour, City)
        Projects (ProjectNo., ProjectName, City)
        Sup-Par-Proj(S.No., P.No., ProjectNo., Quantity)
        What are the entity integrity constraints in the relations?
        What are the referential integrity constraints in the relations?   [5+5]

4.a) Consider the following schema:
Suppliers(sid: integer, sname: string, address: string)
Parts(pid: integer, pname: string, color: string)
Catalog(sid: integer, pid: integer, cost: real)
The Catalog relation lists the prices charged for parts by Suppliers. Write the following queries in Tuple relational calculus:
1. Find the pnames of parts for which there is some supplier.
2. Find the snames of suppliers who supply every part.
3. Find the pnames of parts supplied by Acme Widget Suppliers and by no one else.
4. Find the sids of suppliers who charge more for some part than the average cost of that part (averaged over all the suppliers who supply that part).
5. For each part, find the sname of the supplier who charges the most for that part.

b) With relevant examples discuss any 6 operations in Relational Algebra. [7+3]

OR

5.a) Consider the following relations:
Hotel (Hotel_no, Hotel_name, City)
Room (Room_no, Hotel_no, Type, Price)
Booking (Hotel_no, Guest_no, DateFrom, DateTo, Room_no)
Guest (Guest_no, GuestName, GuestAddress)
Write the appropriate queries in SQL for the following:
i) Find the average price of a room
ii) List the names and address of all guests with bookings for a hotel in London, alphabetically ordered by name
iii) Find the total income from all the rooms of the hotels in NewYork
iv) List the Name(s) of Guest(s) at the winner hotel, who are paying highest price for a room.

b) For the relations given below:

R1:	A	B
	A1	B1
	A7	B7
	A2	B2
	A4	B4

R2:	A	B
	A1	B1
	A2	B2
	A3	B3
	A4	B4

R3:	B
	B1
	B2

Find R_1 / R_3, $R_1 \cap R_2$, $R_1 \times R_2$ [4+6]

6. Explain in detail about 1NF, 2NF and 3NF with suitable examples. Find the highest normal form in R(A, B, C, D, E) under following functional dependencies.
ABC -> D
CD -> AE [10]

OR

7.a) Write the need for schema refinement in relational database design.
b) Define Join dependency. Explain 5NF with suitable example. [3+7]

8.a) Explain the Remote Backup system.
 b) How transaction management supported in SQL? [5+5]

OR

9.a) How will you determine whether a schedule is serializable or not. Discuss any locking protocol how it resolves conflicts during concurrent execution of transactions?
 b) Differentiate Transaction Recovery and Media Recovery? [7+3]

10.a) Discuss in detail about all file organization methods.
 b) Construct a B^+ tree to insert the following key elements (order of the tree is 3)
 5, 9, 12, 16, 21, 25, 32, 34, 38, 42, 51, 55, 61, 65 [6+4]

OR

11.a) Compare and contrast Hash based indexing and tree based indexing.
 b) Suppose that we are using extendible hashing on a file containing records with the following search-key values: 5, 9, 12, 16, 21, 25, 32, 34, 38, 42, 51, 55, 61, 65
 Show that the extendible hash structure for this file if the hash function is $h(x) = x \bmod 3$ and bucket can hold five records. [5+5]

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R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, July/August - 2021
DATABASE MANAGEMENT SYSTEMS
(Common to CSE, IT)

Time: 3 Hours   **Max. Marks: 75**

Answer any Five Questions
All Questions Carry Equal Marks
- - -

1.   What is E-R Model? Draw an E-R Diagram for any Banking system.   [15]

2.a) What is Trigger? How to implement Triggers in SQL?
  b) What is the difference between tuple relation calculus and domain relation calculus?
                                                                                       [7+8]

3.   What is normalization? What are the conditions required for a relation to be in 3NF and
     BCNF. What is the difference between 3NF and BCNF explain with example.   [15]

4.   Describe the steps in crash recovery ARIES algorithm.   [15]

5.a) What is indexing? Explain B+ index with example.
  b) Discuss the relationship between Extendible and Linear Hashing.   [7+8]

6.a) Explain the following:
     i) Database Users   ii) Database Administrator.
  b) Distinguish between super key, Candidate key, Primary Key for a relation with examples.
                                                                                       [8+7]

7.   Define the terms primary key foreign key, and check constraints. How are these
     expressed in SQL?   [15]

8.a) What are the applications of DBMS?
  b) List all DDL and DML commands with suitable examples.   [7+8]

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R16

Time: 3 Hours   **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a) What is DBMS? What are the advantages of DBMS? [2]
  b) Explain generalization, specialization and aggregation in E-R Model. [3]
  c) Define the terms primary key constrains and foreign key and check constraints. [2]
  d) Explain the following Operators in SQL with examples: i) SOME ii) NOT IN. [3]
  e) What is normalization? What are the conditions required for a relation to be in 1NF,
     2NF? [2]
  f) Explain what are the problems caused by redundancy. [3]
  g) What is locking Protocol? [2]
  h) Explain the ACID Properties of transaction with examples. [3]
  i) What is Indexing and Hashing? [2]
  j) Explain what are the differences between tree based and Hash based indexes. [3]

PART – B

(50 Marks)

2.a) Develop an E-R Diagram for Banking enterprise system.
  b) Explain the functions of Database Administrator. [5+5]

OR

3.a) Compare between super key, Candidate key, Primary Key for a relation with examples.
  b) Construct an ER-Diagram for a hospital with a set of patients and set of medical doctors.
     Associated with each patient a log of the various tests and examinations conducted. [5+5]

4.a) Explain the fundamental operations in relational algebra with examples.
  b) Explain various Domain constraints in SQL with examples. [5+5]

OR

5.a) Let R =(ABC) and S=(DEF) let r(R) and s(S) both relations on schema R and S.
     Formulate an expression in the Tuple relational calculus that is equivalent to each of the
     following.
     i) $\prod_A(r)$ ii) $\sigma_{p=19}(r)$ iii) rXs   iv) $\prod_{A,F}(\sigma_{C=D}(rXs))$.
  b) Explain various DML functions in SQL with examples. [5+5]

6.a) When is a decomposition said to be dependency preserving? Why this property Useful? Explain.

b) Determine the closer of the following set of functional dependencies for a relation scheme. R(A,B,C,D,E,F,G,H),
F={ AB→C, BD→EF, AD→G,A→H}
List the candidate keys of R. [5+5]

OR

7.a) Suppose that we decompose the schema $R = (A, B, C, D, E)$ into R_1 (A, B, C) and R_2 (A, D, E). Determine that this decomposition is a lossless-join decomposition or dependency preserving if the following set F of functional dependencies holds:
$A \rightarrow BC, CD \rightarrow E, B \rightarrow D, E \rightarrow A$

b) Explain 2NF, 3NF and BCNF Normal forms with example. What is the difference between 3NF and BCNF? [5+5]

8.a) Explain the Time Stamp - Based Concurrency Control protocol. How is it used to ensure serializability?

b) Explain the Check point log based recovery scheme for recovering the data base. [5+5]

OR

9.a) Explain multiple granularity of locking protocol with example.

b) What is serializability? Explain. [5+5]

10.a) Explain about Validation-Based Protocol.

b) Explain the Insertion and deletion Operations in B+ trees with example. [5+5]

OR

11.a) Explain Deletion and insertion operations in ISAM with example.

b) Explain how does it handles insert and delete operations *Extendable hashing*? [5+5]

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Code No: 134AP

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, November/December - 2020
DATABASE MANAGEMENT SYSTEMS
(Common to CSE, IT)

Time: 2 hours   **Max. Marks: 75**

Answer any Five Questions
All Questions Carry Equal Marks
- - -

1.   Explain how to build an ER model for university with entities department, instructor, student, and class. Instructors and students belong to one department only. Instructors and students related to a class with many to many relations. Assume suitable attributes. Explain how the ER model can be translated into relations.   [15]

2.a)   Describe the set operations of relational algebra, including union (U), set difference (-), and cross-product (X). For each, what can you say about the cardinality of their input and output tables.
  b)   Explain the Triggers.   [10+5]

3.a)   Define Functional Dependency. State and prove Arm strong's inference rules.
  b)   Explain 2NF and 3NF Normal forms with examples.   [8+7]

4.a)   Discus the Remote Backup systems.
  b)   Explain the time stamp based protocols.   [7+8]

5.a)   How is data organized in a hash-based index? When would you use a hash-based index?
  b)   Explain the difference between the hash indexes and B+ tree indexes.   [7+8]

6.a)   Give a brief note on the History of Database Systems.
  b)   Discuss the Database Users and Administrators.   [7+8]

7.a)   Define the relation. Differentiate between the relational schema and a relation instance.
  b)   Give a tuple relational calculus expression to find the maximum value in relation r (A).
                                                                                  [8+7]

8.   List and explain the Properties of Decompositions.   [15]

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