

**A  
COURSE FILE  
ON  
“DATABASE MANAGEMENT SYSTEM”**

**II B-Tech II Semester (Autonomous-R20)**



**COMPUTER SCIENCE & ENGINEERING**

**CMR ENGINEERING COLLEGE**

**KANDLA KOYA (V), MEDCHAL (M), R.R.DIST.**

**A.Y.2022-23**

## **CONTENTS OF COURSE FILE:**

1. Department vision & mission
2. List of PEOs, POs, PSOs
3. List of Cos (action verbs as per blooms)
4. Syllabus copy and suggested or reference books
5. Session plan/ lesson plan
6. Session execution log
7. Lecture notes
8. Assignment Questions (samples)
9. Mid exam question papers (samples)
10. Scheme of evaluation
11. Mapping of Cos with Pos and PSOs
12. Attainment of Cos, Pos and PSOs (Excel sheet)
13. University question papers or question bank.
14. Power point presentations (PPTs)
15. Websites or URLs e- Resources

**Submitted By**

**A.L.Bhargav**

## **1. DEPARTMENT VISION & MISSION**

### **Vision:**

To produce globally competent and industry ready graduates in Computer Science & Engineering by imparting quality education with a know-how of cutting edge technology and holistic personality.

### **Mission:**

M1. To offer high quality education in Computer Science & Engineering in order to build core competence for the students by laying solid foundation in Applied Mathematics, and program framework with a focus on concept building.

M2. The department promotes excellence in teaching, research, and collaborative activities to prepare students for professional career or higher studies.

M3. Creating intellectual environment for developing logical skills and problem solving strategies, thus to develop, able and proficient computer engineer to compete in the current global scenario.

## **2. LIST OF PEOs AND Pos:**

### **2.1 Program Educational Objectives (PEO):**

**PEO 1:** Excel in professional career or higher education by acquiring knowledge in mathematical, computing and engineering principles.

**PEO 2:** To provide intellectual environment for analyzing and designing computing systems for technical problems socially and economically.

**PEO 3:** Exhibit professionalism, multidisciplinary teamwork and adapt to current trends by engaging in lifelong learning and practice their profession with legal and ethical responsibilities.

### **2.1 .Program Outcomes (PO):**

- **PO1.** An ability to apply knowledge of computing, mathematics, science and engineering fundamentals appropriate to the discipline.
- **PO2.** An ability to analyze a problem, and identify and formulate the computing requirements appropriate to its solution.
- **PO3.** An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.
- **PO4.** An ability to design and conduct experiments, as well as to analyze and interpret data.
- **PO5.** An ability to use current techniques, skills, and modern tools necessary for computing practice.
- **PO6** An ability to analyze the local and global impact of computing on individuals, organizations, and society.
- **PO7.** Knowledge of contemporary issues.
- **PO8.** An understanding of professional, ethical, legal, security and social issues and responsibilities.

- **PO9.** An ability to function effectively individually and on teams, including diverse and multidisciplinary, to accomplish a common goal.
- **PO10.** An ability to communicate effectively with a range of audiences.
- **PO11.** An understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects.
- **PO12.** Recognition of the need for and an ability to engage in continuing professional development.

### **NBA Graduate Attributes**

- PO1 Engineering knowledge
- PO2 Problem analysis
- PO3 Design/development of solutions
- PO4 Conduct investigations of complex problems
- PO5 Modern tool usage
- PO6 The engineer and society
- PO7 Environment and sustainability
- PO8 Ethics
- PO9 Individual and team work
- PO10 Communication
- PO11 Project management and finance
- PO12 Life-long learning

### **3. COURSE OUTCOMES:**

1. Gain knowledge of fundamentals of DBMS, database design and normal forms.
2. Master the basics of SQL for retrieval and management of data.
3. Be acquainted with the basics of transaction processing and concurrency control.
4. Familiarity with database storage structures and access techniques.

#### **4. SYLLABUS COPY (JNTUH):**

**B.Tech. II Year II Sem.**

**Course Code: CS404PC**

#### **UNIT-I**

Data base System Applications, purpose of data base System – View of Data – Data Abstraction –Instances and Schemas – data Models – Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data Storage and querying, database architecture, database users and administrators, history of data base system.

Introduction to data base design ER diagrams – Beyond ER Design Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model – Conceptual Design for Large enterprises, Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying /altering Tables and Views

#### **UNIT-II**

**Relational Algebra and calculus** – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus

Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOT – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL Triggers and Active Data bases.

#### **UNIT-III**

Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – FORTH Normal Form, join dependencies, Fifth Normal form, Inclusion Dependencies.

#### **UNIT-IV**

Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability

Concurrency control-Lock Based Protocols – Timestamp Based Protocols- Validation- Based Protocols – Multiple Granularity Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems- Remote Backup systems

#### **UNIT-V**

Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability-

Concurrency control-Lock Based Protocols – Timestamp Based Protocols- Validation- Based Protocols – Multiple Granularity.

## 5. LESSON PLAN:

S.NO	Topic (JNTU syllabus)	Sub-Topic	NO. OF LECTURES REQUIRED	Suggested Books	Method Of Teaching
UNIT - I					
1	Introduction to data base design ER diagrams	Data base System Applications, purpose of data base System	L1	T1,T2,R1,R2	M4
2		View of Data – Data Abstraction	L2	T1,T2,R1,R2	M1
3		Instances and Schemas	L2	T1,T2,R1,R2	M1
4		data Models – Database Languages – DDL – DML –	L3	T1,T2,R1,R2	M1
5		database Access for applications Programs	L4	T1,T2,R1,R2	M1
6		data base Users and Administrator	L4	T1,T2,R1,R2	M1
7		Transaction Management – data Storage and querying, database architecture,	L5	T1,T2,R1,R2	M1
8		database users and administrators, history of data base system	L6	T1,T2,R1,R2	M1
9		Introduction to data base design ER diagrams –	L7	T1,T2,R1,R2	M1
10		Beyond ER Design Entities, Attributes and Entity sets – Relationships and Relationship sets	L8,L9	T1,T2,R1,R2	M4
11		Additional features of ER Model – Concept Design with the	L10	T1,T2,R1,R2	M4
12		ER Model – Conceptual Design for Large enterprises	L11	T1,T2,R1,R2	M4
13		Introduction to the Relational Model – Integrity Constraint Over relations –	L12	T1,T2,R1,R2	M1
14		Enforcing Integrity constraints	L13	T1,T2,R1,R2	M1
15		Querying relational data – Logical data base Design –	L14	T1,T2,R1,R2	M1
16		Introduction to Views – Destroying /altering Tables and Views	L15	T1,T2,R1,R2	M5
UNIT – II					
17	Introduction to	Introduction to Relational	L16	T1,T2,R1,R2	M1&M4

	Relational Algebra and calculus	Algebra and calculus			
18		Selection and projection set operations	L16	T1,T2,R1,R2	M1&M4
19		renaming – Joins – Division –	L16	T1,T2,R1,R2	M1&M4
20		Examples of Algebra overviews	L17,L18	T1,T2,R1,R2	M1&M4
21		Relational calculus – Tuple relational Calculus	L19	T1,T2,R1,R2	M1&M4
22		Domain relational calculus	L20	T1,T2,R1,R2	M1&M4
23		Expressive Power of Algebra and calculus	L21	T1,T2,R1,R2	M1&M4
24		Form of Basic SQL Query – Examples of Basic SQL Queries –	L22,23	T1,T2,R1,R2	M1&M5
25		Introduction to Nested Queries	L24	T1,T2,R1,R2	M1&M5
26		Correlated Nested Queries	L24	T1,T2,R1,R2	M1&M5
27		Set – Comparison Operators – Aggregative Operators – NULL values	L25	T1,T2,R1,R2	M1&M5
28		Comparison using Null values	L26	T1,T2,R1,R2	M1&M5
29		Logical connectivity’s – AND, OR and NOT – Impact on SQL Constructs	L27	T1,T2,R1,R2	M1&M5
30		Outer Joins Disallowing NULL values	L28	T1,T2,R1,R2	M1&M5
31		Complex Integrity Constraints in SQL Triggers and Active Data bases	L29	T1,T2,R1,R2	M1&M5
UNIT – III					
32	Introduction to Schema refinement	Introduction to Schema refinement,.	L30	T1,T2,R1,R2	M1&M4
33		Problems Caused by redundancy	L31	T1,T2,R1,R2	M1&M4
34		Decompositions – Problem related to decomposition	L32	T1,T2,R1,R2	M1&M4
35		reasoning about FDS	L32	T1,T2,R1,R2	M1&M4
36		FIRST, SECOND, THIRD Normal forms, BCNF	L33-L35	T1,T2,R1,R2	M4&M5
37		Lossless join Decomposition – Dependency preserving Decomposition	L36	T1,T2,R1,R2	M4&M5
38		Schema refinement in Data base Design	L37	T1,T2,R1,R2	M4&M5
39		Multi valued and Join Dependencies – FORTH and 5 <sup>th</sup> Normal Form	L38	T1,T2,R1,R2	M4&M5
UNIT – IV					
40	Introduction to Transaction Concept	Introduction to Transaction Concept , Transaction State-Implementation of Atomicity and Durability – Concurrent	L39	T1,T2,R1,R2	M1&M4

41		Executions – Serializability-Recoverability	<b>L40</b>	T1,T2,R1,R2,	<b>M1&amp;M4</b>
42		Implementation of Isolation – Testing for serializability	<b>L41</b>	T1,T2,R1,R2	<b>M1&amp;M4</b>
43		Concurrency control-Lock Based Protocols	<b>L42</b>	T1,T2,R1,R2	<b>M4&amp;M5</b>
44		Timestamp Based Protocols, Validation- Based Protocols	<b>L43</b>	T1,T2,R1,R2	<b>M4&amp;M5</b>
45		Multiple Granularity	<b>L44</b>	T1,T2,R1,R2	<b>M4&amp;M5</b>
46		Recovery and Atomicity, Log – Based Recovery	<b>L45</b>	T1,T2,R1,R2	<b>M1&amp;M4</b>
47		Recovery with Concurrent Transactions	<b>L46</b>	T1,T2,R1,R2	<b>M1&amp;M4</b>
48		Buffer Management – Failure with loss of nonvolatile storage	<b>L47</b>	T1,T2,R1,R2	<b>M1&amp;M4</b>
49		Advance Recovery systems-Remote Backup systems	<b>L48</b>	T1,T2,R1,R2	<b>M1&amp;M4</b>
UNIT – V					
50	Overview of storage and indexing	Overview of storage and indexing: Data on External Storage	<b>L49</b>	T1,T2,R1,R2	<b>M4</b>
51		File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes	<b>L50</b>	T1,T2,R1,R2	<b>M4,M5</b>
52		Index data Structures	<b>L51</b>	T1,T2,R1,R2	<b>M4&amp;M5</b>
53		Hash Based Indexing	<b>L52</b>	T1,T2,R1,R2	<b>M4&amp;M5</b>
54		Tree base Indexing – Comparison of File Organizations	<b>L53</b>	T1,T2,R1,R2	<b>M4&amp;M5</b>
55		Indexed Sequential Access Methods (ISAM)	<b>L54</b>	T1,T2,R1,R2	<b>M4&amp;M5</b>
56		B+ Trees: A Dynamic Index Structure	<b>L55</b>	T1,T2,R1,R2	<b>M4&amp;M5</b>
57		Hash based indexing: Static Hashing, Extendable Hashing	<b>L56</b>	T1,T2,R1,R2	<b>M4&amp;M5</b>

#### METHODS OF TEACHING:

<b>M1 : Lecture Method</b>	<b>M4 : Presentation /PPT</b>	<b>M7 : Assignment</b>
<b>M2 : Demo Method</b>	<b>M5 : Lab/Practical</b>	<b>M8 : Industry Visit</b>
<b>M3 : Guest Lecture</b>	<b>M6 : Tutorial</b>	<b>M9 : Project Based</b>

#### NOTE:

1. Any Subject in a Semester is supposed to be completed in 55 to 65 periods.
2. Each Period is of 50 minutes.
3. Each unit duration & completion should be mentioned in the Remarks Column.
4. List of Suggested books can be marked with Codes like T1, T2, R1, R2 etc.



## INDIVIDUAL TIME TABLE (A.L.Bhargav)

	I	II	III		IV	V
MON		DBMS				
TUE	DBMS					DBMS
WED			DBMS			
THU						
FRI	DBMS					
SAT					DBMS	

### 6. Session Execution Log:

S no	Units	Scheduled started date	Completed date	Remarks
1	I	10-10-22	24-10-22	COMPLETED
2	II	25-10-22	19-11-22	COMPLETED
3	III	22-11-22	22-12-22	COMPLETED
4	IV	23-12-22	10-1-23	COMPLETED
5	V	11-1-23	26-1-23	COMPLETED

## 7. Lecture Notes – (hand written)

## 8. ASSIGNMENT QUESTIONS ALONG WITH SAMPLE ASSIGNMENT SCRIPTS

### DBMS ASSIGNMENT QUESTIONS MID-1

1. Explain all the commands of following with examples  
A. DDL B. DML
2. Explain about Database Architecture
3. a. Explain primary key and foreign key constraints with example?  
b. Demonstrate the methods of handling violations of key constraints.
- 4.a. Explain following operators used in Relational algebra with examples  
i. Selection ii. Projection iii. Rename Operator  
b. Consider the below schemas  
Sailors(sid, sname, age, rating)  
Boats(bid, bname, color)  
Reserves(sid,bid,day)  
Solve the following relational algebra queries.  
i. Find the names of sailors whose rating is above 7

- ii. Find the names of sailors who reserved red boat
  - iii. Find the sid's of sailors with age over 20 and who have not reserved a red boat.
- (CO 2)

5. a. Explain the syntax and formulas used in Tuple Relational calculus?
- b. Solve the following queries using TRC
- i. Find the names of sailors whose rating is above 7
  - ii. Find the names of sailors who reserved boat 103
  - iii. Find the names of sailors who reserved all boats

### **DBMS ASSIGNMENT QUESTIONS MID-2**

1. Define the normalization ? Explain the 1NF ,2NF ,3NF and BCNF with an example ? (CO2)
2. a) Explain the properties of transaction and states of transaction. (CO3)
  - b) Explain the process of testing view serializability and conflict serializability with an example (CO3)
3. a) Explain the lock based protocol 2PL and Strict 2PL (CO3)
  - b) Briefly Explain Multiple granularity protocol and lock comparison (CO3)
4. Explain B+ Tree index structure with an example (CO4)
5. Describe the extendable hashing technique with an example. (CO4)

## **9. MID QUESTION PAPERS**

### **MID-1 Question Paper**



**CMR ENGINEERING COLLEGE**  
**UGC AUTONOMOUS**

(Approved by AICTE - New Delhi. Affiliated to JNTUH and Accredited by NAAC & NBA)  
 Kandlakoya (V), Medchal (M), Medchal - Malkajgiri (D)-501401



**Date: 29-01-2021.**

**II.B. TECH- I-SEM -I MID EXAMINATIONS**

**Ac.YR:2022-23**

**Subject: DBMS**

**Branch: CSE**

**Marks: 25 M**

***Note: Question paper contains two parts, Part - A and Part - B.***

***Part-A is compulsory which carries 10 marks. Answer all questions in part-A.***

***Part-B consists of (2½) units. Answer any one full question from each unit. Each question carries 5 marks and may have a,b,c sub questions.***

**PART-A****5x2=10****5\*2=10 Marks**

1. **Define** the term cardinality and degree of a relation? (CO 2)
2. **Define** Database Schema and Instances? (CO 1)
3. What is a weak entity how to **demonstrate** it in ER Diagram? (CO 1)
4. **Demonstrate** the uses of selection and Projection operators in Relational Algebra? Give Examples. (CO 2)
5. **Define** Tuple Relational calculus and list the formulas used in Tuple Relational Calculus (CO 2)

**PART-B****3\*5=15 Marks**

6. **Explain** all the commands of following with examples (CO1)  
A. DDL B. DML  
(or)
7. **Explain** about Database Architecture? (CO 1)  
8. a. **Explain** primary key and foreign key constraints with example?  
b. **Demonstrate** the methods of handling violations of key constraints. (CO 2)  
(or)
9. **Define** views? Explain how to create and destroy views? (CO2)
10. Consider the below schemas  
Sailors(sid, sname, age, rating)  
Boats(bid, bname, color)  
Reserves(sid, bid, day)  
**Solve** the following relational algebra queries.  
iv. Find the names of sailors whose rating is above 7  
v. Find the names of sailors who reserved red boat  
vi. Find the sid's of sailors with age over 20 and who have not reserved a red boat.  
(CO 2)  
(or)
11. **Demonstrate** following set operations with examples? (CO 2)  
i. Union ii. Intersection iii. Set Difference iv. Cross Product



**CMR ENGINEERING COLLEGE**  
**UGC AUTONOMOUS**

(Approved by AICTE - New Delhi. Affiliated to JNTUH and Accredited by NAAC & NBA)  
Kandlakoya (V), Medchal (M), Medchal - Malkajgiri (D)-501401

**II.B. TECH- I-SEM -II MID EXAMINATIONS****Time: 10:00-11:30 AM****Subject: DBMS****Branch: CSE****Marks: 25 M****Note: Question paper contains two parts, Part - A and Part - B.****Part-A is compulsory which carries 10 marks. Answer all questions in part-A.****Part-B consists of (2½) units. Answer any one full question from each unit. Each question carries 5 marks and may have a,b,c sub questions.****PART-A****5x2=10**

1. Explain properties of decomposition (CO2)
2. Explain the properties of transaction. (CO3)
3. Write about join dependencies (CO2)
4. Discuss about primary indexes (CO4)
5. Discuss the three types of File Organization (CO4)

**PART-B**

**3X5=15**

6. Define the normalization ? explain the 1NF and 2NF with an example ? (CO2)

OR

7. Compute the closure of the following set of FDs for a relation schema R (A, B, C, D, E, F, G, H), F = {  $AB \rightarrow C$ ,  $BD \rightarrow EF$ ,  $AD \rightarrow G$ ,  $A \rightarrow H$  }. List the candidate keys of R. (CO2)

8. Explain the lock based protocol 2PL and Strict 2PL (CO3)

OR

9. Explain the process of testing view serializability and conflict serializability with an example (CO3)

10. Explain B+ Tree index structure with an example (CO4)

OR

11. Describe the extendable hashing technique with an example. (CO4)

## 10. Mid-1 Scheme of evaluation

COURSE: **B.Tech**

YEAR: **II**

SEM: **I**

A-Y: **2021-22**

NAME OF SUBJECT: **DBMS**

MID: **I**

DATE: 08/11/2021

Sl. No.	NO.OF QUESTIONS	MARKS	TOTAL
1	5	2	10





**12. ATTAINMENT OF CO's, PO's AND PSO's (EXCEL SHEET):**

Relationship of Course outcomes to Program Outcomes (PO AVG)													
PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2
2		3	2	3				2	3	3	3	3	3
3	1	2	3	3			2	2		1	1	2	2
1	1	1	2	3				1		2	1	-	-
1	2	2	2	1								1	1

ASSESSMENT OF PO'S & PSO'S THROUGH THE COURSE			
PO	CO	Value	Final PO Value
PO1	CO1	2.84	2.84
	CO2	2.84	
PO2	CO1	2.84	2.88
	CO2	2.79	
	CO3	2.87	
	CO4	2.92	
PO3	CO1	2.84	2.88
	CO2	2.79	
	CO3	2.87	
	CO4	2.92	
PO4	CO1	2.84	2.86
	CO2	2.79	
	CO3	2.87	
	CO4	2.92	
PO5	CO2	2.73	2.73
PSO1	CO1	2.84	2.89
	CO2	2.79	
	CO4	2.92	
PSO2	CO3	2.87	2.93
	CO4	2.92	

## **II B SECTION MID 1 MARKS**

## **II B SECTION MID 2 MARKS**

### **13. University Question Papers or Question Bank (new subject no question paper)**

Code No: 135CA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, November/December - 2018 DATABASE MANAGEMENT SYSTEMS

(Common to CE, EEE, ME, ECE, EIE, MCT, CEE, MSNT)

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. Define the terms: Relational Databases, Tables.[2]
- b) Write down the applications of DBMS.[3]
- c) Define Trigger and give an example.[2]
- d) Write down the various aggregate operators of SQL.[3]
- e) Mention the properties of decomposition.[2]
- f) Define BCNF. Write down its basic properties.[3]
- g) Define multiple granularity.[2]



- h) What do you mean by 2PL?[3]
- i) Differentiate Extendible vs. Linear Hashing.[2]
- j) What are the advantage and disadvantages of B+ trees? [3]

**PART - B**

(50 Marks)

- 2 .a) Explain the Database system structure.
- b) Explain various DDL and DML commands. [5+5]

**OR**

3.a) Define ER model and explain the following kinds of constraints that can be specified in the ER diagram, and give an example of each: i) key constraint ii) participation constraint.

- b) How to destroy and alter tables in a DBMS? [6+4]
- 4. Explain about the following:
  - a) Domain relational calculus.
  - b) Specifying foreign key constraints in SQL with an example. [5+5]

**OR**

5. Consider the following relations Sailors (sid, sname, rating, age) Boats (bid, bname, color) Reserves (sid, bid, day)

Write the statements in Relational Algebra, Relational Calculus, Domain Relational Calculus and SQL for the following questions.

- a) Find the names of sailors who have reserved a Red boat.
- b) Find the names of sailors who have reserved at least one boat.
- c) Find the names of sailors who have reserved both red and Green boat
- d) Find the names of sailors who have reserved a Red or a White boat.
- e) Find the names of sailors who have reserved all boats.

6.a) When is the decomposition of a relation schema R into two relation schemas X and Y said to be lossless-join decomposition? Why is this property so important? Give a necessary and sufficient condition to test whether a decomposition is lossless-join.

b) Explain 3NF with examples. [5+5]

OR

7. Discuss the need for schema refinement. Explain the fourth and fifth normal form and inclusion dependencies. [10]

8.a) Discuss the impact of early lock release and logical undo operations in recovery system.

b) Explain about Concurrent execution of transactions. [5+5]

OR

9. Write and explain the Time stamped and optimistic concurrency control algorithms. [10]

10. State and explain various file organisation methods. Give suitable examples to each them. [10]

OR

11.a) Discuss insert, delete, search operations on and B+ trees.

b) What are the Pros and Cons of ISAM? [5+5]

Code No: 135CA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year II Semester Examinations, December – 2019

DATABASE MANAGEMENT SYSTEMS

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)

Define data mining. [2]

- b) Contrast procedural DML and declarative DML. [3]
- c) Why is intersection a derived operation in Relational Algebra? [2]
- d) What is an active database? List challenges associated with it. [3]
- e) Define join dependency. [2]
- f) What is meant by spurious tuples? Give example. [3]
- g) Define serializability. [2]
- h) What is the role of remote backup systems in database recovery? [3]
- i) Define unclustered index. [2]
- j) How to measure the disk access time? [3]

PART – B

(50 Marks)

- 2.a) Classify the data models.
- b) What is the importance of integrity constraints in database? Explain with illustrations. [5+5]

OR

- 3. Construct an entity relationship diagram to perform conceptual database design of online e-commerce application such as Mynthra.com. [10]
- 4.a) Analyze the expressive power of relational algebra.
- b) Compare tuple relational calculus and domain relational calculus. [5+5]

OR

- 5. Consider the following database schema to write queries in SQL.

Student (Snum: integer, Sname : string, major: string, level: string, age: integer) Class (Cname: string, meets\_at: time, room: string, fid: integer)

Enrolled (Snum: integer, Cname: string)

Faculty (Fid: integer, Fname: string, deptid: integer)

- a) List the students' numbers taught by faculty member "Mohan".
  - b) Find the list of faculty ids taking class in same room.
  - c) Find the student details of CSE major. [10]
6. What is redundancy? Explain the problems caused by redundancy with suitable example relation. [10]

OR

- 7.a) How to compute closure of set of functional dependency?
  - b) How to compute closure of set of functional dependency? Discuss fourth normal form with illustration. [5+5]
- 8.a) Explain ensuring atomicity and durability properties for a transaction by DBMS.
  - b) Explain ensuring atomicity and durability properties for a transaction by DBMS. Compile the compatibility matrix for multiple granularity schemes. [5+5]

OR

- 9.a) Elaborate the sequence of steps in buffer management for a transaction commit.
  - b) Explain timestamp based protocol for concurrency control. [5+5]
- 10.a) Make a comparison of sorted file organization and heap file organization.
  - b) Distinguish between extendible and linear hashing. [5+5]

OR

11. A student coding club file with Stu\_ID as the key field includes records with the following Stu\_ID values: 23, 65, 37, 60, 46, 92, 48, 71, 56, 59, 18, 21, 10, 74, 78, 15, 16, 20, 24, 28, 39, 43, 47, 50, 69, 75, 8, 49, 33, 38. Suppose that the search field values are inserted in the given order in a B+ -tree of order  $p=3$  and  $pleaf=2$ ; show how the tree will expand and construct the final tree. [10]

## 14. PPTs AND PRESENTATION:

### Transforming E-R Diagrams into Relations

#### 1. Mapping Regular Entities to Relations

- Simple attributes
  - E-R attributes map directly onto the relation
- Composite attributes
  - use only their simple, component attributes
- Multi-valued attribute
  - becomes a separate relation with a foreign key taken from the original entity

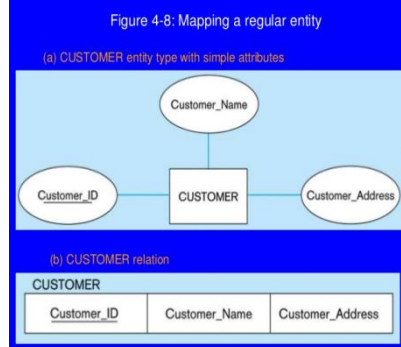
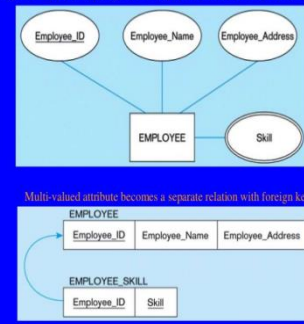


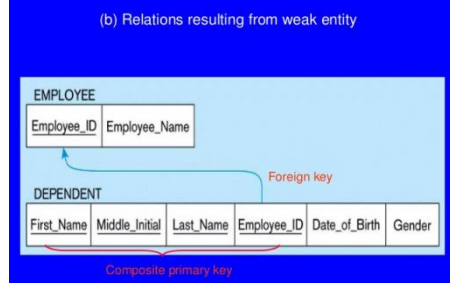
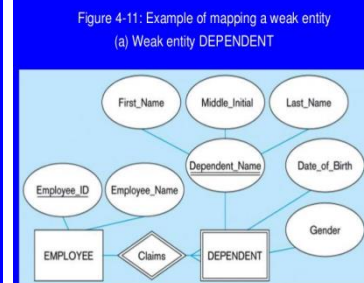
Figure 4-10: Mapping an entity with multi-valued attribute



### Transforming E-R Diagrams Into Relations

#### 2. Mapping Weak Entities

- becomes a separate relation with a foreign key taken from the identifying entity
- primary key composed of
  - partial identifier of weak entity
  - primary key of identifying relation (strong entity)



### Transforming E-R Diagrams Into Relations

#### 3. Mapping Binary Relationships

- One-to-Many
  - primary key on the one side becomes a foreign key on the many side
- Many-to-Many
  - create a new relation with the primary keys of the two entities as its primary key
- One-to-One
  - primary key on the mandatory side becomes a foreign key on the optional side
  - avoids the need to store null values in the foreign key
  - any attributes associated with the relationship are also included in the same relation as the foreign key

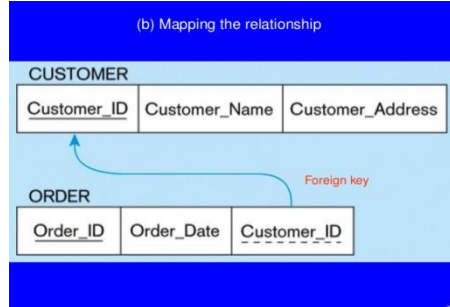
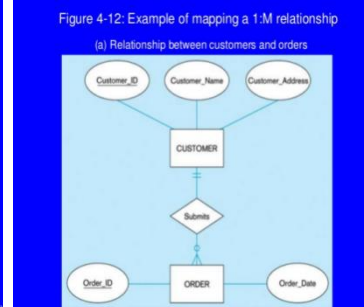
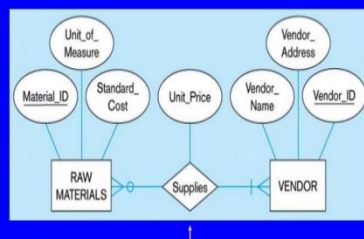


Figure 4-13: Example of mapping an M:N relationship

(a) Supplies relationship (M:N)



Note: The *Supplies* relationship will become a separate relation

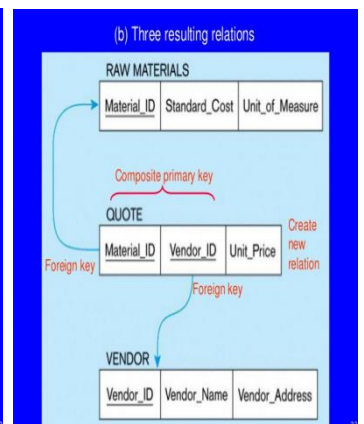
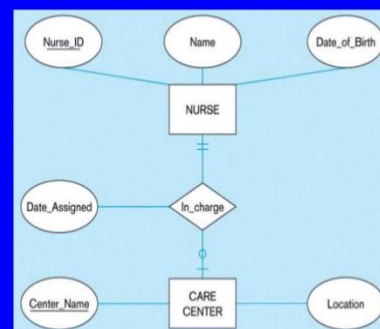


Figure 4-14a: Mapping a binary 1:1 relationship



## 15. WEBSITES :

1. <https://docs.google.com/file/d/0B00naP9qt-O5X2NRd2RQbFQxT2s/edit>
2. <http://www.c4campus.in/2014/08/dbms-questions-and-answers-1.html>
3. <http://cs.ulb.ac.be/public/media/teaching/infoh303/dbmsnotes.pdf>
4. <http://www.ddegjust.ac.in/studymaterial/mca-3/ms-11.pdf>
5. <http://www.bcanotes.com/Download/DBMS/Rdbms/database.pdf>
6. <http://studentstudyhub.com/wp-content/uploads/2013/12/DBMS-Full-notes-Download-Part-1.pdf>
7. <http://studentstudyhub.com/wp-content/uploads/2013/12/DBMS-full-notes-Download-Part-2.pdf>
8. [www.ieee.org](http://www.ieee.org)
9. [www.ntpel.com](http://www.ntpel.com)
10. <http://elearning.vtu.ac.in/17/e-Notes/10CS54/Unit1-KRA.pdf>
11. <http://www.eazynotes.com/pages/database-management-system/notes.html>
12. <http://codex.cs.yale.edu/avi/db-book/db4/slide-dir/ch1-2.pdf>
13. [http://www.tutorialspoint.com/dbms/dbms\\_tutorial.pdf](http://www.tutorialspoint.com/dbms/dbms_tutorial.pdf)
14. [www.geeksforgeeks.org](http://www.geeksforgeeks.org)