

Guidelines

February 7, 2020

B.Sc. Program Computer Science **Core Course- Database Management Systems (42341202)**

Sr. No.	Topic	Chapter	# of Lecture	Reference
1.	Introduction to DBMS: Introduction to Database Management Systems, characteristics of database approach, data models, DBMS architecture and data independence.	Chapter 1 (1.1-1.6) Chapter 2 (2.1-2.3)	8	1
2.	Conceptual Modelling using ERD and EERD: Entity Relationship (ER) and Enhanced ER (EER) modeling, entity types, relationships, relationship constraints, and object modeling.	Chapter 3 (Except 3.8) Chapter 4 (4.1-4.3)	10	1
3.	Relational Data Model and Relational Algebra: Relational data model concepts, relational constraints, queries in relational algebra .	Chapter 5 (Complete) Chapter 8 (8.1-8.3.4)	10	1
4.	Introduction to SQL: Data definition and data manipulation queries in SQL.	Chapter 6 (6.1-6.4) Chapter 7 (7.1.1 to 7.1.8 and 7.4)	8	1
5.	Database Design: Mapping of ER and EER diagrams to relational database, functional dependencies, Normalization and normal forms up to third normal form.	Chapter 9 (9.1-9.2.2) Chapter 14 (14.1-14.3)	10	1

References

1. Elmasri, R., & Navathe, S. (2017). *Fundamentals of Database Systems*. 7th edition. Pearson Education.

Additional References

1. Ramakrishnan, R., & Gehrke, J. (2002). *Database Management Systems (3rd Edition)*. McGraw-Hill.
2. Silberschatz, A., Korth, H.F., & Sudarshan, S. (2011). *Database System Concepts (6th Edition)*. McGraw Hill.

List of Practicals

Note: MyAccess/MySQL may be used.

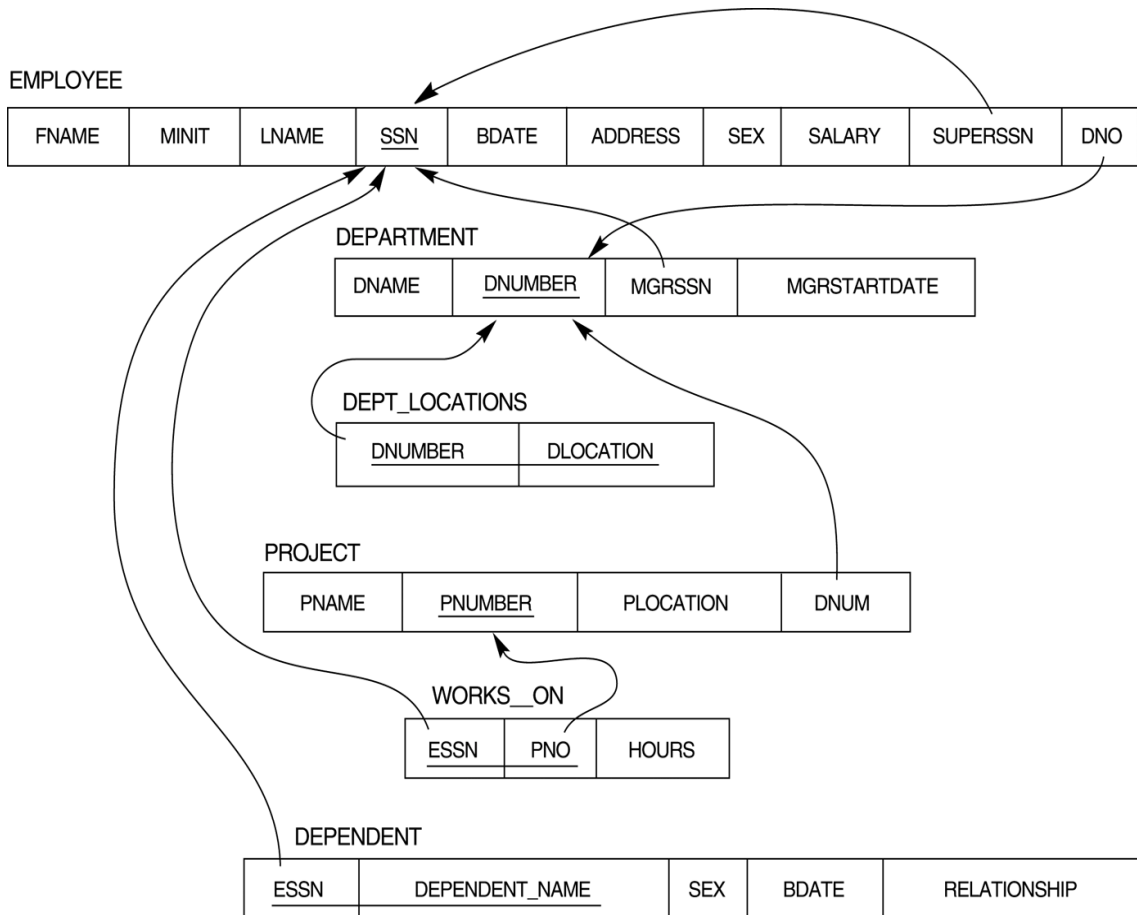
The following concepts must be introduced to the students:

DDL Commands

- Create table, alter table, drop table

DML Commands

- Select, update, delete, insert statements
- Condition specification using Boolean and comparison operators (and, or, not, =, <>, >, <, >=, <=)
- Arithmetic operators and aggregate functions(Count, sum, avg, Min, Max)
- Multiple table queries (join on different and same tables)
- Nested select statements
- Set manipulation using (any, in, contains, all, not in, not contains, exists, not exists, union, intersect, minus, etc.)
- Categorization using group by.....having
- Arranging using order by



Refer figure 5.7 of Reference [1]

List of sample queries to be done using above schema

1. Create tables with relevant foreign key constraints
2. Populate the tables with data
3. Perform the following queries on the database :
 1. Display all the details of all employees working in the company.
 2. Display ssn, lname, fname, address of employees who work in department no 7.
 3. Retrieve the birthdate and address of the employee whose name is 'Franklin T. Wong'
 4. Retrieve the name and salary of every employee
 5. Retrieve all distinct salary values
 6. Retrieve all employee names whose address is in 'Bellaire'
 7. Retrieve all employees who were born during the 1950s
 8. Retrieve all employees in department 5 whose salary is between 50,000 and 60,000(inclusive)
 9. Retrieve the names of all employees who do not have supervisors
 10. Retrieve SSN and department name for all employees
 11. Retrieve the name and address of all employees who work for the 'Research' department
 12. For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birthdate.
 13. For each employee, retrieve the employee's name, and the name of his or her immediate supervisor.
 14. Retrieve all combinations of Employee Name and Department Name
 15. Make a list of all project numbers for projects that involve an employee whose last name is 'Narayan' either as a worker or as a manager of the department that controls the project.
 16. Increase the salary of all employees working on the 'ProductX' project by 15%. Retrieve employee name and increased salary of these employees.

17. Retrieve a list of employees and the project name each works in, ordered by the employee's department, and within each department ordered alphabetically by employee first name.
18. Select the names of employees whose salary does not match with salary of any employee in department 10.
19. Retrieve the name of each employee who has a dependent with the same first name and same sex as the employee.
20. Retrieve the employee numbers of all employees who work on project located in Bellaire, Houston, or Stafford.
21. Find the sum of the salaries of all employees, the maximum salary, the minimum salary, and the average salary. Display with proper headings.
22. Find the sum of the salaries and number of employees of all employees of the 'Marketing' department, as well as the maximum salary, the minimum salary, and the average salary in this department.
23. Select the names of employees whose salary is greater than the average salary of all employees in department 10.
24. For each department, retrieve the department number, the number of employees in the department, and their average salary
25. For each project, retrieve the project number, the project name, and the number of employees who work on that project.
26. Change the location and controlling department number for all projects having more than 5 employees to 'Bellaire' and 6 respectively.
27. For each department having more than 10 employees, retrieve the department no, no of employees drawing more than 40,000 as salary.
28. Display employee names having no dependent in descending order.
29. For each department find number of female and number of male employees .
30. Find the name and age of youngest employee in each department.