

CS-8: Database Systems

Introduction:

Database concepts, characteristics of database approach, data models, data independence, database users, and database system architecture. 5L

[1]: [1.1 to 1.8, 2.1 to 2.6]

Relational Data Model:

Relational model concepts, relational database constraints. 6L

[1]: [3.1 to 3.4]

The Relational Algebra and Relational Calculus 6L

[1]: [6.1 to 6.5]

SQL Programming: 8L

Data Definition Language, Data Manipulation Language, basics of SQL, query designing in SQL using aggregate functions and nested queries.

[1]: [4.1 to 4.5]

Entity Relationship (ER) Modeling:

Entity types, entity set, attribute and key, relationships, relation types, entity relationship, ER modeling, ER diagrams, database design using ER diagrams. 5L

[1]: [7.1 to 7.7]:

Enhanced Entity-Relationship (EER) model. 5L

[1]: [8.1 to 8.5]

Database Design:

Relational database design by ER and EER-to-Relational Mapping. 3L

[1]: [9.1 to 9.2]

Functional dependencies, Normal forms. 8L

[1]: [15.1 to 15.7]

Transaction Processing:

2L

Introduction to Transaction Processing Concepts and Theory.

[1]: [21.1 to 21.3]

Recommended Reading Material

Text Books

1. R. Elmasri, S.B. Navathe, *Fundamentals of Database Systems*, 6th edition, Pearson Education, 2010.

Reference Books

2. A. Silberschatz, H. Korth and S. Sudarshan, *Database System Concepts*, 5th Edition, McGraw Hill, 2010.
3. R. Ramakrishnan, J. Gehrke, *Database Management Systems*, 3rd edition, McGraw Hill International Edition, 2007.

PRACTICAL LIST OF CS-8: DATABASE SYSTEMS

Create and use the following database scheme to answer the given queries.

EMPLOYEE Scheme

Field	Type	NULL	KEY	DEFAULT
Eno	Char(3)	NO	PRI	NIL
Ename	Varchar(50)	NO		NIL
Job_type	Varchar(50)	NO		NIL
Manager	Char(3)	Yes	FK	NIL
Hire_date	Date	NO		NIL
Dno	Integer	YES	FK	NIL
Commission	Decimal(10,2)	YES		NIL
Salary	Decimal(7,2)	NO		NIL

UNDERGRADUATE PROGRAMME IN COMPUTER SCIENCE

EMPLOYEE State

Eno	Ename	Job_type	Manager	Hire_date	Dno	Commission	Salary
765	Martin	Sales_man	198	1981-04-22	30	1400.00	1250.00
756	Jones	Manager	783	1981-04-02	20	0.00	2300.00
752	Ward	Sales_man	769	1981-02-22	30	500.00	1300.00
749	Allan	Sales_man	769	1981-02-20	30	300.00	2000.00
736	Smith	Clerk	790	1980-12-17	20	0.00	1000.00
793	Miller	Clerk	788	1982-01-23	40	0.00	1300.00
792	Ford	Analyst	756	1981-12-03	20	0.00	2600.00
790	James	Clerk	769	1981-12-03	30	0.00	950.00
787	Adams	Clerk	778	1983-01-12	20	0.00	1150.00
784	Turner	Sales_man	769	1981-09-08	30	0.00	1450.00
783	King	President	NULL	1981-11-17	10	0.00	2950.00
788	Scott	Analyst	756	1982-12-09	20	0.00	2850.00
778	Clark	Manager	783	1981-06-09	10	0.00	2900.00
769	Blake	Manager	783	1981-05-01	30	0.00	2870.00

DEPARTMENT Scheme

Field	Type	NULL	KEY	DEFAULT
Dno	Integer	No	PRI	NULL
Dname	Varchar(50)	Yes		NULL
Location	Varchar(50)	Yes		New Delhi

DEPARTMENT State

Dno	Dname	Location
10	Accounting	New York
20	Research	Dallas
30	Sales	Chicago
40	Operation	Boston
50	Marketing	New Delhi

UNDERGRADUATE PROGRAMME IN COMPUTER SCIENCE

Query List

S. No.	Query
1.	Query to display Employee Name, Job, Hire Date, Employee Number; for each employee with the Employee Number appearing first.
2.	Query to display unique Jobs from the Employee Table.
3.	Query to display the Employee Name concatenated by a Job separated by a comma.
4.	Query to display all the data from the Employee Table. Separate each Column by a comma and name the said column as THE_OUTPUT.
5.	Query to display the Employee Name and Salary of all the employees earning more than \$2850.
6.	Query to display Employee Name and Department Number for the Employee No= 7900.
7.	Query to display Employee Name and Salary for all employees whose salary is not in the range of \$1500 and \$2850.
8.	Query to display Employee Name and Department No. Of all the employees in Dept 10 and Dept 30 in the alphabetical order by name.
9.	Query to display Name and Hire Date of every Employee who was hired in 1981.
10.	Query to display Name and Job of all employees who don't have a current Manager.
11.	Query to display the Name, Salary and Commission for all the employees who earn commission. Sort the data in descending order of Salary and Commission.
12.	Query to display Name of all the employees where the third letter of their name is 'A'.
13.	Query to display Name of all employees either have two 'R's or have two 'A's in their name and are either in Dept No = 30 or their Manger's Employee No = 7788.
14.	Query to display Name, Salary and Commission for all employees whose Commission Amount is greater than their Salary increased by 5%.
15.	Query to display the Current Date.
16.	Query to display Name, Hire Date and Salary Review Date which is the 1 st Monday after six months of employment.
17.	Query to display Name and calculate the number of months between today and the date each employee was hired.
18.	Query to display the following for each employee:- <E-Name> earns < Salary> monthly but wants < 3 * Current Salary >. Label the Column as Dream Salary.
19.	Query to display Name with the 1 st letter capitalized and all other letter lower case and length of their name of all the employees whose name starts with 'J', 'A' and 'M'.
20.	Query to display Name, Hire Date and Day of the week on which the employee started.
21.	Query to display Name, Department Name and Department No for all the employees.
22.	Query to display Unique Listing of all Jobs that are in Department # 30.
23.	Query to display Name, Dept Name of all employees who have an 'A' in their name.

UNDERGRADUATE PROGRAMME IN COMPUTER SCIENCE

24.	Query to display Name, Job, Department No. And Department Name for all the employees working at the Dallas location.
25.	Query to display Name and Employee no. Along with their Manger's Name and the Manager's employee no; along with the Employees' Name who do not have a Manager.
26.	Query to display Name, Dept No. And Salary of any employee whose department No. And salary matches both the department no. And the salary of any employee who earns a commission.
27.	Query to display Name and Salaries represented by asterisks, where each asterisk (*) signifies \$100.
28.	Query to display the Highest, Lowest, Sum and Average Salaries of all the employees
29.	Query to display the number of employees performing the same Job type functions.
30.	Query to display the no. Of managers without listing their names.
31.	Query to display the Department Name, Location Name, No. Of Employees and the average salary for all employees in that department.
32.	Query to display Name and Hire Date for all employees in the same dept. As Blake.
33.	Query to display the Employee No. And Name for all employees who earn more than the average salary.
34.	Query to display Employee Number and Name for all employees who work in a department with any employee whose name contains a 'T'.
35.	Query to display the names and salaries of all employees who report to King.
36.	Query to display the department no, name and job for all employees in the Sales department.