

Annexure- I

CS 303 Database Management System Lab

List of Experiments

Exercise 1

Aim: To study and understand the use of Data Definition and Data Manipulation commands in Database. Consider the following schema:

Table Name: Employee

Table Name: Department

Attribute	Data Type
First Name	VARCHAR(15)
Mid Name	CHAR
Last Name	VARCHAR(15)
SSN Number	CHAR(9)
Birthday	DATE
Address	VARCHAR(50)
Sex	CHAR
Salary	NUMBER (7)
Supervisor SSN	CHAR(9)
Department Number	INT
Join Date	Date

Attribute	Data Type
Department Name	Varchar(5)
Department Number	INT
ManagerSSN	CHAR(9)
ManageStartDate	DATE

Data For Employee Table

FName	Mini t	LName	SSN	BDate	Address	Sex	Salary	SuperSSN	DepNo
Doug	E	Gilbert	554433221	09-JUN-60	11 S 59 E, Salt Lake City, UT	M	80000	NULL	3
Joyce		PAN	543216789	07-FEB-78	35 S 18 E, Salt Lake City, UT	F	70000	NULL	2
Frankin	T	Wong	333445555	08-DEC-45	638 Voss, Houston, TX	M	40000	554433221	5
Jennifer	S	Wallace	987654321	20-JUN-31	291 Berry, Bellaire, TX	F	43000	554433221	4
John	B	Smith	123456789	09-JAN-55	731 Fondren, Houston, TX	M	30000	333445555	5
Ramesh	K	Narayan	666884444	15-SEP-52	975 Fire Oak, Humble, TX	M	38000	333445555	5
Joyce	A	English	453453453	31-JUL-62	5631 Rice, Houston, TX	F	25000	333445555	5
James	E	Borg	888665555	10-NOV-27	450 Stone, Houston, TX	M	55000	543216789	1
Alicia	J	Zelaya	999887777	19-JUL-58	3321 Castle, Spring, TX	F	25000	987654321	4
Ahmad	V	Jabbar	987987987	29-MAR-59	980 Dallas, Houston, TX	M	25000	987654321	4

Data for Department table

DName	DepNo	MgrSSN	MgrStartDate
Manufacture	1	888665555	19-JUN-71
Administration	2	543216789	04-JAL-99
Headquarter	3	554433221	22-SEP-55
Finance	4	987654321	01-JAN-85
Research	5	333445555	22-MAY-78

Table Name: Project

Attribute	Data Type
Project Name	VARCHAR(15)
Project Number	INT
Project Location	VARCHAR(15)
Department Number	INT

Data for Project

PName	PNumber	Plocation	DepNo
ProjectA	3388	Houston	1
ProjectB	1945	Salt Lake City	3
ProjectC	6688	Houston	5
ProjectD	24	Bellaire	4
ProjectE	77	Sugarland	5
ProjectF	1	Salt Lake City	3
ProjectG	12	New York	2
ProjectH	34	Stafford	4
ProjectI	43	Chicago	1
ProjectJ	22	San Francisco	2

Execute the following queries:

1. Insert the data given above in both employee, department and project tables.
2. Display all the employees' information.
3. Display Employee name along with his supervisor name.
4. Display the employee names whose bdate is '29-MAR-1959'.
5. Display salary of the employees without duplications.
6. Display name and salary of all female employees.
7. Display the MgrSSN, MgrStartDate of the manager of 'Finance' department.
8. Display all the employee names who are working with a manager having id '987654321'.
9. Modify the city name of an employee having fname as 'Joyce'.

10. Alter Table department add column DepartmentPhoneNum of NUMBER data type and insert values into this column only.
11. Alter table orders modify the size of DepartmentPhoneNum.
12. Modify the field name DepartmentPhoneNum of Customer table to PhNo.
13. Rename Table Department as DEPT.
14. Alter Table department remove column DepartmentPhoneNum.
15. Create a table COPYOFDEPT as a copy of the table DEPT.
16. Delete all the rows from COPYOF DEPT table.
17. Remove COPYOF DEPT table.

Exercise:2

Aim: To know how the constraints are used to make table is consistent.

Constraints

Table Name: Employee

Attribute	Data Type	Constraint
First Name	Var Char (15)	Not Null
Mid Name	Char	
Last Name	Var Char (15)	Not Null
SSN Number	Char (9)	Primary Key
Birthday	Date	
Address	Varchar (50)	
Sex	Char	Sex In (M,F,m,f)
Salary	INT(7)	Default 800
Supervisor SSN	Char (9)	Foreign Key Employee (SSN) on delete set null
Department number	INT	Foreign key to department number of department table on delete cascade

Table name : Department

Attribute	Data type	Constraint
Department Name	Varchar(15)	Not Null
Department number	INT	Primary key
Manager SSN	Char (9)	Foreign key-Employee (SSN) on delete set null
Manage start date	Date	

Table name : Dept_locations

Attribute	Data type	Constraint
Department Number	INT	Department (dep no) onDelete Cascade
Department Location	Varchar (15)	

Table Name: Project

Attribute	Data type	Constraint
Project Name	Varchar(15)	Not Null
Project number	INT	Primary key
Project Location	Varchar	
Department Number	INT	Foreign Key –Department (dep no) on delete set null

Table Name: Works_On**The combination of Employee SSN and Project Number must be a Primary Key**

Attribute	Data type	Constraint
Employee SSN	Char (9)	Foreign Key Employee (SSN) on delete cascade
Project number	INT	Foreign Key project (Pnumber) on delete cascade
Hours	Decimal (3,1)	Not null

Name: Dependent**The combination of Employee SSN and Dependent Name must be a Primary Key.**

Attribute	Datatype	Constraint
Employee	Char (9)	Foreign Key- Employee (SSN) on Delete Cascade
Dependent Name	Varchar(15)	
Sex	Char	Check Sex in (M,F,m,f)
Birthday	Date	
Relationship	Varchar(8)	

Insert data into each table, interactively. Check the functionality of constraints

Fname	Minit	Lname	SSN	Bdate	Address	Sex	Salary	SuperSSN	DepNo
Dong	E	Gilbert	554433221	09-Jun-60	11 S 59 E Salt Lake City UT	M	80000	Null	3
Joyce		PAN	543216789	07-Feb-78	35 S 18 E Salt Lake City UT	F	70000	Null	2
Frankin	T	Wong	333445555	08-Dec-45	638 Voss Houston TX	M	40000	554433221	5
Jennifer	S	Wallace	987654321	20-Jun-31	291 Berry Bellaire TX	F	43000	554433221	4
John	B	Smith	123456789	09-Jan-55	731 Fondren Houston TX	M	30000	333445555	5
Ramesh	K	Natayan	666884444	15-Sep-52	975 Fire oak	M	38000	333445555	5

					Humble TX				
Joyce	A	English	453453453	31-Jul-62	5631 Rice Houston TX	F	25000	333445555	5
James	E	Borg	888665555	10-Nov-27	450 Stone Houston TX	M	55000	543216789	1
Alicia	J	Zelaya	999887777	19-Jul-58	3321 Castle Spring TX	F	25000	987654321	4
Ahmad	V	Jabbar	987987987	29-Mar-59	980 Dallas Houston TX	M	25000	987654321	4

Table Name: Department

Dname	DepNo	MgrSSN	MgrDate
Manufacture	1	888665555	19-Jun-81
Administration	2	543216789	04-Jan-99
Headquarter	3	554433221	22-Sep-55
Finance	4	987654321	01-Jan-85
Research	5	333445555	22-May-78

Table Name: Dept_Locations

Dep No	D Location
1	Houston
1	Chicago
2	New York
2	San Francisco
3	Salt Lake City
4	Stafford
4	Bellaire
5	Sugarland
5	Houston

Table Name: Project

Pname	Pnumber	Plocation	DepNo
ProjectA	3388	Houston	1
ProjectB	1945	Salt Lake City	3
ProjectC	6688	Houston	5
ProjectD	24	Bellaire	4
ProjectE	77	Sugarland	5
ProjectF	1	Salt Lake city	3
ProjectG	12	Newyork	2
ProjectH	34	Stafford	4
ProjectI	43	Chicago	1
ProjectJ	22	San Francisco	2

Table Name: Works_On

ESSN	Pno	Hours
123456789	3388	32.5
123456789	1945	7.5
666884444	3388	40.0
453453453	77	20.0
453453453	22	20.0
333445555	77	10.0
333445555	6688	10.0
333445555	43	35.0
333445555	22	28.5
999887777	1	11.5
999887777	12	13.0
543216789	22	17.0
554433221	1945	21.5

Table Name: Dependent

ESSN	Dependent_name	Sex	Bdate	Relationship
333445555	Alice	F	05-Apr-76	Daughter
333445555	Theodore	M	25-Oct-73	Son
333445555	Joy	F	03-May-48	Spouse
987654321	Abner	M	29-Feb-32	Spouse
123456789	Alice	F	31-Dec-78	Daughter
123456789	Elizabeth	F	05-may-57	Spouse

Execute the following Query on the Db to display and discuss the integrity constraints violated by any of the following operations

1. All the employee details.
2. Name and DOB of dependent table.
3. Insert ('Robert', 'F', 'Scott', '943775543', '21-JUN-42', '2365 Newcastle Rd, Bellaire, TX', M, 58000, '888665555', 1) into EMPLOYEE.
4. Insert ('ProductA', 4, 'Bellaire', 2) into PROJECT.
5. Insert ('Production', 4, '943775543', '01-OCT-88') into DEPARTMENT.
6. Insert ('677678989', null, '40.0') into WORKS_ON.
7. Insert ('453453453', 'John', M, '12-DEC-60', 'SPOUSE') into DEPENDENT
8. Delete the WORKS_ON tuples with ESSN= '333445555'.
9. Delete the EMPLOYEE tuple with SSN= '987654321'.
10. Delete the PROJECT tuple with PNAME= 'ProductX'.
11. Modify the MGRSSN and MGRSTARTDATE of the DEPARTMENT tuple with DNUMBER=5 to '123456789' and '01-OCT-88', respectively.
12. Modify the SUPERSSN attribute of the EMPLOYEE tuple with SSN= '999887777' to '943775543'.
13. Modify the HOURS attribute of the WORKS_ON tuple with ESSN= '999887777' and PNO= 10 to '5.0'.

Alter the tables to

1. Add Foreign Keys using Alter Table [if not done earlier].
2. Drop Foreign key defined on SuperSSN and Add it using Alter table command.
3. Insert values to check the functionality of referential integrity constraints.

4. Make name of Project as Unique and sex of employee as not null.
5. Make Address as a new type containing door no, street, city, State, Continent.
6. Increase the size of project name.
7. Make salary of employee to accept real values.
8. Decrease the size of department name.

Exercise: 3

Operators and Functions

Aim: To understand different operators and types of function in MySQL

Execute the following queries based on the schema specified in exercise 1

1. Find the employee names having salary greater than Rs.25000.
2. Find the employee names whose salary lies in the range between 30000 and 70000.
3. Find the employees who have no supervisor.
4. Display the bdate of all employees in the format 'DDthMonthYYYY'.
5. Display the employee names whose bdate is on or before 1978.
6. Display the employee names having 'salt lake' in their address.
7. Display the department name that starts with 'M'.
8. Display the department names that ends with 'E'.
9. Display the names of all the employees having supervisor with any of the following SSN
554433221, 333445555.
10. Display all the department names in upper case and lower case.
11. Display the first four characters and last four of the department names using ltrim and rtrim.
12. Display the substring of the Address (starting from 5th position to 11th position) of all employees.
13. Display the Mgrstartdate on adding three months to it.
14. Display the age of all the employees rounded to two digits.
15. Find the last day and next day of the month in which each manager has joined.
16. Print the Employee names with first letter alone in uppercase.
17. Print a substring from the string 'Harini'.
18. Replace the string 'ni' from 'Harini' by 'sh'.
19. Print the length of all the department names.
20. Print the system date in the format 25th May 2007.
21. Display the date after 10 months from current date.
22. Display the next occurrence of Friday in this month.
23. Print a substring from the string 'Lake' from Dlocation where Depno=3.
24. Replace the string 'Ram' with 'Din' from the firstname of the employee having
SSNNumber= 666884444.
25. Display the employees names whose address has 'Voss'.
26. Find the last day of this month.
27. Convert SSNNumber of employee to Number format and display.
28. Display the project location padded with **** on left side.
29. Remove the word 'Project' from the project name and display it.
30. Select the SSNNumber of the employee whose dependent name is either Michael or Abner.
31. Display the employees names whose address does not end with 'UT'.
32. Display the employees SSNNumber whose work on the project does not lie in the range of 10 hrs to 20 hrs.

Exercise: 4

Group Functions

1. How many different departments are there in the 'employee' table
2. Determine the minimum and maximum employee salaries
3. Print the average annual salary.
4. Count the number of employees over 30 age
5. Print the name and average salary of each department
6. Count the number of employees over 30 in each department
7. Calculate the average salary by department and age
8. Count separately the number of employees in the It and CSE department.
9. Group the list employees according to their departments
10. List out the employees based on their seniority.
11. List out the employees who works in cse department based on their first name
12. Find the total number of employees in the finance department

Exercise:5

Sub query and view

Aim: To understand the concept of Sub queries and logical tables

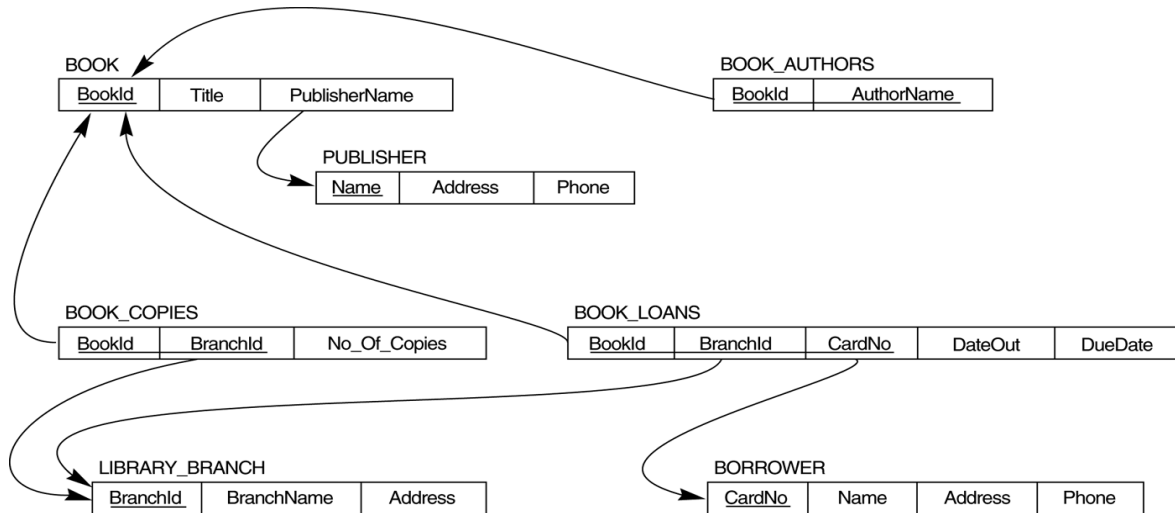
1. Find the employee who is getting highest salary in the department research
2. Find the employees who earn the same salary as the minimum salary for each Department
3. Find the employee whose salary is greater than average salary of department 2
4. Find the total number of employees in the finance department
5. List out all the department names with their individual employees strength
6. Find out the name and department name of the manager getting the highest salary
7. Find out the department name having highest employee strength
8. List out all the departments and average salary drawn by their employees
9. Find maximum average salary for each department.
10. Create a view to display the employee details who is working in IT department.
11. Create a logical table to store employee details who is getting salary more than 10000.
12. Create a table to store the employees details based on the department no

Exercise:6

Joins

Aim: To understand how to relate and access data from multiple tables.

Consider the following schema and create the table as per the query requirements and execute the following queries



6.a)

1. How many copies of the book titled The Lost Tribe are owned by the library branch whose name is "Sharpstown"?
2. How many copies of the book titled The Lost Tribe are owned by each library branch?
3. Retrieve the names of all borrowers who do not have any books checked out .
4. For each book that is loaned out from the "Sharpstown" branch and whose DueDate is today, retrieve the book title, the borrower's name, and the borrower's address.
5. For each library branch, retrieve the branch name and the total number of books loaned out from that branch.
6. Retrieve the names, addresses, and number of books checked out for all borrowers who have more than five books checked out.
7. For each book authored (or co-authored) by "Stephen King", retrieve the title and the number of copies owned by the library branch whose name is "Central"

6.b)

1. Retrieve the names of all employees in department 5 who work more than 10 hours per week on ProductX project.
2. List the names of all employees who have a dependent with the same first name as themselves.
3. Find the names of all the employees who are directly supervised by 'Franklin Wong'.
4. Retrieve the names of all who do not work on any project.
5. Find the names and addresses of all employees who work on atleast one project located in Houston but whose department has no location in Houston.
6. List the names of all managers who have no dependents.
7. List the employees names and the department names if they happen to manage a department.
8. Select all the details of employees who have supervisors as well as who doesn't have supervisors.
9. Select employee name ,project name on which they work and also show those

employee names if they do not work on any project.

10. For each project retrieve the project number, project name and the number of employees who work on that project.
11. For each project, list the project name and the total hours per week (by all employees) spent on that project.
12. Retrieve the names of the employees who have 2 or more dependents.