

RAJALAKSHMI ENGINEERING COLLEGE  
RAJALAKSHMI NAGAR, THANDALAM – 602 105



RAJALAKSHMI  
ENGINEERING  
COLLEGE

CS23332 DATABASE MANAGEMENT  
SYSTEMS LAB

Laboratory Record Note Book

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**RAJALAKSHMI  
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**BONAFIDE CERTIFICATE**

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ACADEMIC YEAR 2025-26 SEMESTER III.....BRANCH CSE:- Cyber Security.

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Certified that this is the bonafide record of work done by the above student in the  
Database Management  
System Laboratory during the year 2025- 2026

Signature of Faculty - in - Charge

Submitted for the Practical Examination held on .....

**Internal Examiner**

**External Examiner**

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CSE -

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### Definition of a Relational Database

A relational database is a collection of relations or two-dimensional tables.

### Terminologies Used in a Relational Database

1. A single **table** or table representing all data required for a particular employee. Each row should be identified by a primary key which allows no duplicate rows.
2. A **key** or attribute containing the employee number which identifies a unique employee. Here Employee number is designated as a primary key ,must contain a value and must be unique.
3. A column may contain foreign key. Here Dept\_ID is a foreign key in employee table and it is a primary key in Department table.
4. A Field can be found at the intersection of a row and column. There can be only one value in it. Also it may have no value. This is called a null value.

EMP_ID	FIRST NAME	LAST NAME	EMAIL
100	King	Steven	Skings
101			
102	Neena	Bai	Neenba
103	Eex	De Haan	Ldehaan

### **Relational Database Properties**

#### A relational database :

- Can be accessed and modified by executing structured query language (SQL) statements.
- Contains a collection of tables with no physical pointers.
- Uses a set of operators

### Relational Database Management Systems

RDBMS refers to a relational database plus supporting software for managing users and processing SQL queries, performing backups/restores and associated tasks. (Relational Database Management System) Software for storing data using SQL (structured query language). A relational database uses SQL to store data in a series of tables that not only record existing relationships between data items, but which also permit the data to be joined in new relationships. SQL (pronounced 'sequel') is based on a system of algebra developed by E F Codd, an IBM scientist who first defined the relational model in 1970. Relational databases are optimized for storing transactional data, and the majority of modern business software applications therefore use an RDBMS as their data store. The leading RDBMS vendors are Oracle, IBM and Microsoft.

The first commercial RDBMS was the Multics Relational Data Store, first sold in 1978. INGRES, Oracle, Sybase, Inc., Microsoft Access, and Microsoft SQL Server are well-known database products and companies. Others include PostgreSQL, SQL/DS, and RDB. A relational database management system (RDBMS) is a program that lets you create, update, and administer a relational database. Most commercial RDBMS's use the Structured Query Language (SQL) to access the database, although SQL was invented after the development of the relational model and is not necessary for its use.

The leading RDBMS products are Oracle, IBM's DB2 and Microsoft's SQL Server. Despite repeated challenges by competing technologies, as well as the claim by some experts that no current RDBMS has fully implemented relational principles, the majority of new corporate databases are still being created and managed with an RDBMS.

### SQL Statements

1. Data Retrieval(DR)
2. Data Manipulation Language(DML)
3. Data Definition Language(DDL)
4. Data Control Language(DCL)
5. Transaction Control Language(TCL)

TYPE	STATEMENT	DESCRIPTION
DR	SELECT	Retrieves the data from the database
DML	1.INSERT 2.UPDATE 3.DELETE 4.MERGE	Enter new rows, changes existing rows, removes unwanted rows from tables in the database respectively.
DDL	1.CREATE 2.ALTER 3.DROP 4.RENAME 5.TRUNCATE	Sets up, changes and removes data structures from tables.
TCL	1.COMMIT 2.ROLLBACK 3.SAVEPOINT	Manages the changes made by DML statements. Changes to the data can be grouped together into logical transactions.
DCL	1.GRANT 2.REVOKE	Gives or removes access rights to both the oracle database and the structures within it.

### DATA TYPES

1. **Character Data types:**
  - Char – fixed length character string that can varies between 1-2000 bytes
  - Varchar / Varchar2 – variable length character string, size ranges from 1-4000 bytes.it saves the disk space(only length of the entered value will be assigned as the size of column)
  - Long - variable length character string, maximum size is 2 GB
2. **Number Data types :** Can store +ve,-ve,zero,fixed point, floating point with 38 precision.
  - Number – {p=38,s=0}
  - Number(p) - fixed point
  - Number(p,s) -floating point (p=1 to 38,s= -84 to 127)
3. **Date Time Data type:** used to store date and time in the table.

- DB uses its own format of storing in fixed length of 7 bytes for century, date, month, year, hour, minutes, and seconds.
- Default data type is "dd-mon-yy"
- New Date time data types have been introduced. They are  
TIMESTAMP-Date with fractional seconds  
INTERVAL YEAR TO MONTH-stored as an interval of years and months

INTERVAL DAY TO SECOND-stored as an interval of days to hour's minutes and seconds

4. **Raw Data type:** used to store byte oriented data like binary data and byte string.

5. **Other :**

- CLOB – stores character object with single byte character.
- BLOB – stores large binary objects such as graphics, video, sounds.
- BFILE – stores file pointers to the LOB's.

18/7/25

## EXERCISE-1

### Creating and Managing Tables

#### OBJECTIVE

After the completion of this exercise, students should be able to do the following:

- Create tables
- Describing the data types that can be used when specifying column definition
- Alter table definitions
- Drop, rename, and truncate tables

#### NAMING RULES

Table names and column names:

- Must begin with a letter
- Must be 1-30 characters long
- Must contain only A-Z, a-z, 0-9, \_, \$, and #
- Must not duplicate the name of another object owned by the same user
- Must not be an oracle server reserve words
- 2 different tables should not have same name.
- Should specify a unique column name.
- Should specify proper data type along with width
- Can include "not null" condition when needed. By default it is 'null'.

#### The CREATE TABLE Statement

**Table:** Basic unit of storage; composed of rows and columns

**Syntax: 1** Create table table\_name (column\_name1 data\_type (size)  
column\_name2 data\_type (size)....);

**Syntax: 2** Create table table\_name (column\_name1 data\_type (size) constraints,  
column\_name2 data\_type constraints ...);

#### Example:

```
Create table employees ( employee_id number(6), first_name varchar2(20), ..job_id varchar2(10),  
CONSTRAINT emp_emp_id_pk PRIMARY KEY (employee_id));
```

#### Tables Used in this course

#### Creating a table by using a Sub query

#### **SYNTAX**

```
// CREATE TABLE table_name(column_name type(size)...);
```

```
Create table table_name as select column_name1, column_name2,.....column_namen from  
table_name where predicate;
```

#### **AS Subquery**

Subquery is the select statement that defines the set of rows to be inserted into the new table.

### Example

Create table dept80 as select employee\_id, last\_name, salary\*12 Annsal, hire\_date from employees where dept\_id=80;

### The ALTER TABLE Statement

The ALTER statement is used to

- Add a new column
- Modify an existing column
- Define a default value to the new column
- Drop a column
- To include or drop integrity constraint.

### SYNTAX

*ALTER TABLE table\_name ADD /MODIFY(Column\_name type(size));*

*ALTER TABLE table\_name DROP COLUMN (Column\_name);*

*ALTER TABLE ADD CONSTRAINT Constraint\_name PRIMARY KEY (Column\_Name);*

### Example:

Alter table dept80 add (jod\_id varchar2(9));  
Alter table dept80 modify (last\_name varchar2(30));  
Alter table dept80 drop column job\_id;

**NOTE:** Once the column is dropped it cannot be recovered.

### DROPPING A TABLE

- All data and structure in the table is deleted.
- Any pending transactions are committed.
- All indexes are dropped.
- Cannot roll back the drop table statement.

### Syntax:

**Drop table tablename;**

### Example:

Drop table dept80;

### RENAMEING A TABLE

To rename a table or view.

### Syntax

**RENAME old\_name to new\_name**

Example:

Rename dept to detail\_dept;

**TRUNCATING A TABLE**

Removes all rows from the table.

Releases the storage space used by that table.

Syntax

TRUNCATE TABLE *table\_name*;

Example:

TRUNCATE TABLE copy\_emp;

**Find the Solution for the following:**

Create the following tables with the given structure.

**EMPLOYEES TABLE**

NAME	NULL?	TYPE
Employee_id	Not null	Number(6)
First_Name		Varchar(20)
Last_Name	Not null	Varchar(25)
Email	Not null	Varchar(25)
Phone_Number		Varchar(20)
Hire_date	Not null	Date
Job_id	Not null	Varchar(10)
Salary		Number(8,2)
Commission_pct		Number(2,2)
Manager_id		Number(6)
Department_id		Number(4)

**DEPARTMENT TABLE**

NAME	NULL?	TYPE
Dept_id	Not null	Number(6)
Dept_name	Not null	Varchar(20)
Manager_id		Number(6)
Location_id		Number(4)

**JOB\_GRADE TABLE**

NAME	NULL?	TYPE
Grade_level		Varchar(2)
Lowest_sal		Number

Highest_sal	Number
-------------	--------

### LOCATION TABLE

NAME	NULL?	TYPE
Location_id	Not null	Number(4)
St_addr		Varchar(40)
Postal_code		Varchar(12)
City	Not null	Varchar(30)
State_province		Varchar(25)
Country_id		Char(2)

1. Create the DEPT table based on the DEPARTMENT following the table instance chart below. Confirm that the table is created.

Column name	ID	NAME
Key Type		
Nulls/Unique		
FK table		
FK column		
Data Type	Number	Varchar2
Length	7	25

```
mysql> Create table DEPTC
        ID integer,
        name Varchar(25));
```

2. Create the EMP table based on the following instance chart. Confirm that the table is created.

Column name	ID	LAST_NAME	FIRST_NAME	DEPT_ID
Key Type				
Nulls/Unique				
FK table				
FK column				
Data Type	Number	Varchar2	Varchar2	Number
Length	7	25	25	7

```
Create table EMPC
    ID int,
    first-name Varchar(25),
    last-name Varchar(25),
    dept-ID int;
```

3. Modify the EMP table to allow for longer employee last names. Confirm the modification.(Hint: Increase the size to 50)

```
ALTER TABLE EMP MODIFY last-name Varchar(50);
```

4. Create the EMPLOYEES2 table based on the structure of EMPLOYEES table. Include Only the Employee\_id, First\_name, Last\_name, Salary and Dept\_id columns. Name the columns Id, First\_name, Last\_name, salary and Dept\_id respectively.

```
Create TABLE EMPLOYEES
employee_ID int,
first_name Varchar(23),
last_name Varchar(25),
Salary int,
dept_ID int;
```

5. Drop the EMP table.

```
Drop TABLE EMP;
```

6. Rename the EMPLOYEES2 table as EMP.

```
ALTER TABLE EMPLOYEES RENAME TO EMP;
```

7. Add a comment on DEPT and EMP tables. Confirm the modification by describing the table.

```
ALTER TABLE DEPT COMMENT = 'Department details';
ALTER TABLE EMP COMMENT = 'Employee details';
```

8. Drop the First\_name column from the EMP table and confirm it.

```
ALTER TABLE EMP drop first_name;
```

Evaluation Procedure	Marks awarded
Query(5)	5
Execution (5)	5
Viva(5)	5
Total (15)	15
Faculty Signature	DPL