

LAB Session-1

Introduction to SQL:-

SQL, or Structured Query Language is a powerful and standardized programming language used for managing and manipulating relational databases.

It serves as a bridge between humans and database allowing users to interact with data by defining querying, updating and managing relational database systems. SQL is essential for tasks such as data retrieval, modification, creation and deletion within databases.

Characteristic Of SQL:-

SQL possesses several key characteristics that make it a fundamental tool for managing and manipulating relational databases.

1. Declarative language:- SQL is a declarative language, meaning you specify what you want to retrieve or manipulating from the database without specifying how to do it.
2. Standardization:- SQL is an ANSI standard language with different database management system providing their implementation.
3. Relational Data Model:- SQL is designed for relational databases, which represent data in tables with rows and columns.
4. Structured Querying:- SQL allow you to write structured queries using command like SELECT, INSERT, UPDATE and DELETE.

5. Data Integrity:- SQL supports data integrity through constraints like PRIMARY_KEY, UNIQUE, FOREIGN KEY, CHECK constraints.
6. Data Manipulation and Analysis:- SQL provides powerful tools for data manipulation, aggregation and analysis through function like COUNT, SUM, AVG, and GROUP BY.
7. Data SECURITY:- SQL provides user and role management to control access to data and operations. This helps protect sensitive information within the database.

Advantages of SQL:-

1. Data Retrieval:- SQL enables precise data retrieval filtering and sorting, making it easy to extract the desired information from large database.
2. Data Manipulation:- It allows for efficient data manipulation and modification, facilitating data maintenance.
3. Scalability :- SQL databases can handle large volumes of data and are scalable as data needs grow.
4. Multi-User Support:- SQL databases support concurrent access by multiple users, maintaining data consistency.
5. Data Independence:- SQL abstracts data from its physical storage, providing data independence.

Data types in SQL:-

1. Numeric types:-

'INT' - Integer.

'Decimal' or 'Numeric' - fixed-point number with specified precision and scale.

'FLOAT' - Floating-point number.

2. Character strings:-

CHAR(n) : fixed-length character strings.

VARCHAR(n) : Variable-length character string maxlength

TEXT : Variable length character string with no maxlen

3. Date and time types:-

Date :- Date without a time component.

TIME :- Time without a date.

4. Boolean type:-

BOOLEAN :- Represents True or False values.

5. Binary Data types:-

BINARY(n) fixed-length binary data.

VARBINARY variable-length binary data.

BLOB Binary large object for storing large binary data.

Some other types are 'ENUM', 'JSON', 'ARRAY'.

Types of SQL:-

1. DDL (Data Definition Language):-

DDL changes the structure of the table like creating a table or deleting or altering. These are some commands that comes under DDL; CREATE, ALTER, DROP, TRUNCATE.

2. DML (Data Manipulation language):-

DML commands are used to modify the database. It is responsible for all form of changes in the database. These are some commands that comes under DML; INSERT, UPDATE, DELETE.

3. DCL (Data Control language):-

DCL commands are used to grant and take back authority for any database user. These are some commands; GRANT, REVOKE.

4. TCL (Transaction control language):-

TCL commands can be only use with DML commands like INSERT, DELETE, and update only. These are some commands that comes under TCL; COMMIT, ROLLBACK, SAVEPOINT.

5. DQL (Data Query language):-

DQL is used to fetch the data from the database. It used only command: SELECT.

Introduction to ER Model:-

The entity relational model is a model for identifying entities to be represented in the database & representation of how those entities are related. The ER data model specifies enterprises scheme that represents the overall logical structure of a database graphically.

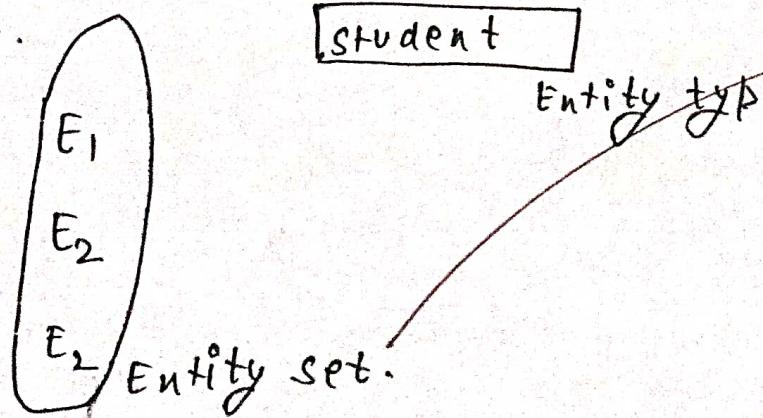
The Entity Relationship diagram explains the relationship among the entities present in the database.

Entity:- An entity may be an object with a physical existence, a particular person, car or employee.

Entity set:- An entity is an object of entity type & a set of all entities is called entity set.

For Example:-

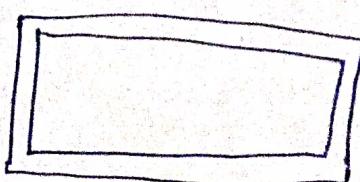
E_1 is an entity having entity type student and the set of all students is called entity set.



Line:- It represents attributes to entities and entity set with other relationships.

Double ellipse:- It represents multivalued attributes.

Double rectangle:- It represents a weak entity.

Figure	Symbol	Represents
Rectangle		Entities in ER Model.
Ellipse		Attributes in ER model.
Diamond		Relationship among entities.
Line		Attributes to entities & entity set with other relationship types.
Double ellipse		Multivalued attributes.
Double rectangle		Weak entity.

19/9/23

LAB SESSION :- 02

Object:- To create an ER diagram for following

- 1.) Library Management System
- 2.) Hospital Management System
- 3.) Account Management System

Steps for creating ER diagram —

- i) Identify the entity sets.
- ii) Identify the relationship among the entity set.
- iii) Identify the attribute of each entity set.
- iv) To draw the simple attribute ER-diagram.
- v) To findout cardinality constraint or mapping b/w entity set.
- vi) Review the diagram.

1.) Library Management System —

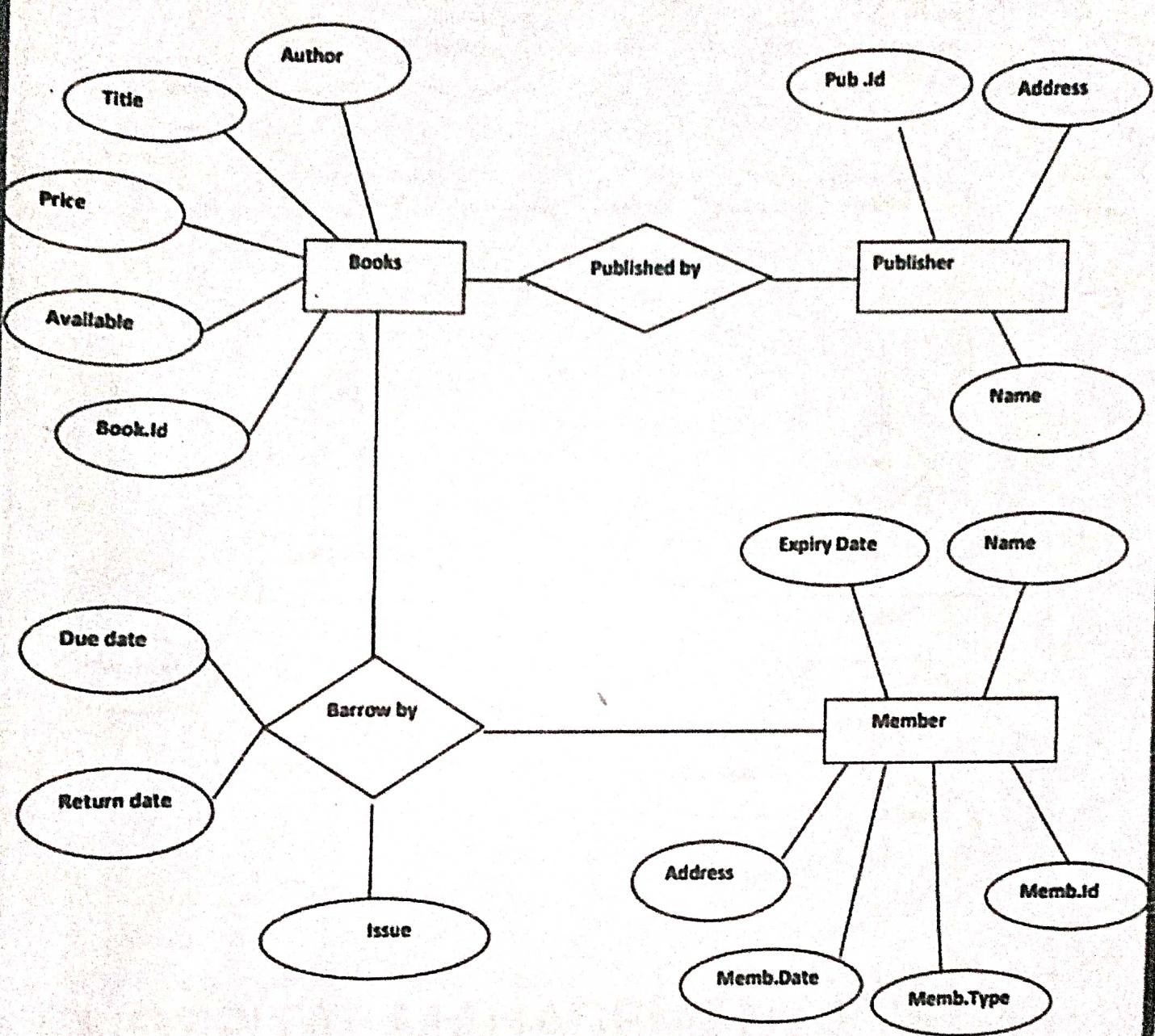
S.No	Entity set	Attributes
1.)	Books	Author, title, price, Available, Book-id
2.)	Publisher	Pub-id, Address, Name
3.)	Borrow by	Due date, Return date, Issue
4.)	Member	Expiry, Name, Address, Memb-ID, Memb-Typr, Memb-Dat

2.) Hospital Management System —

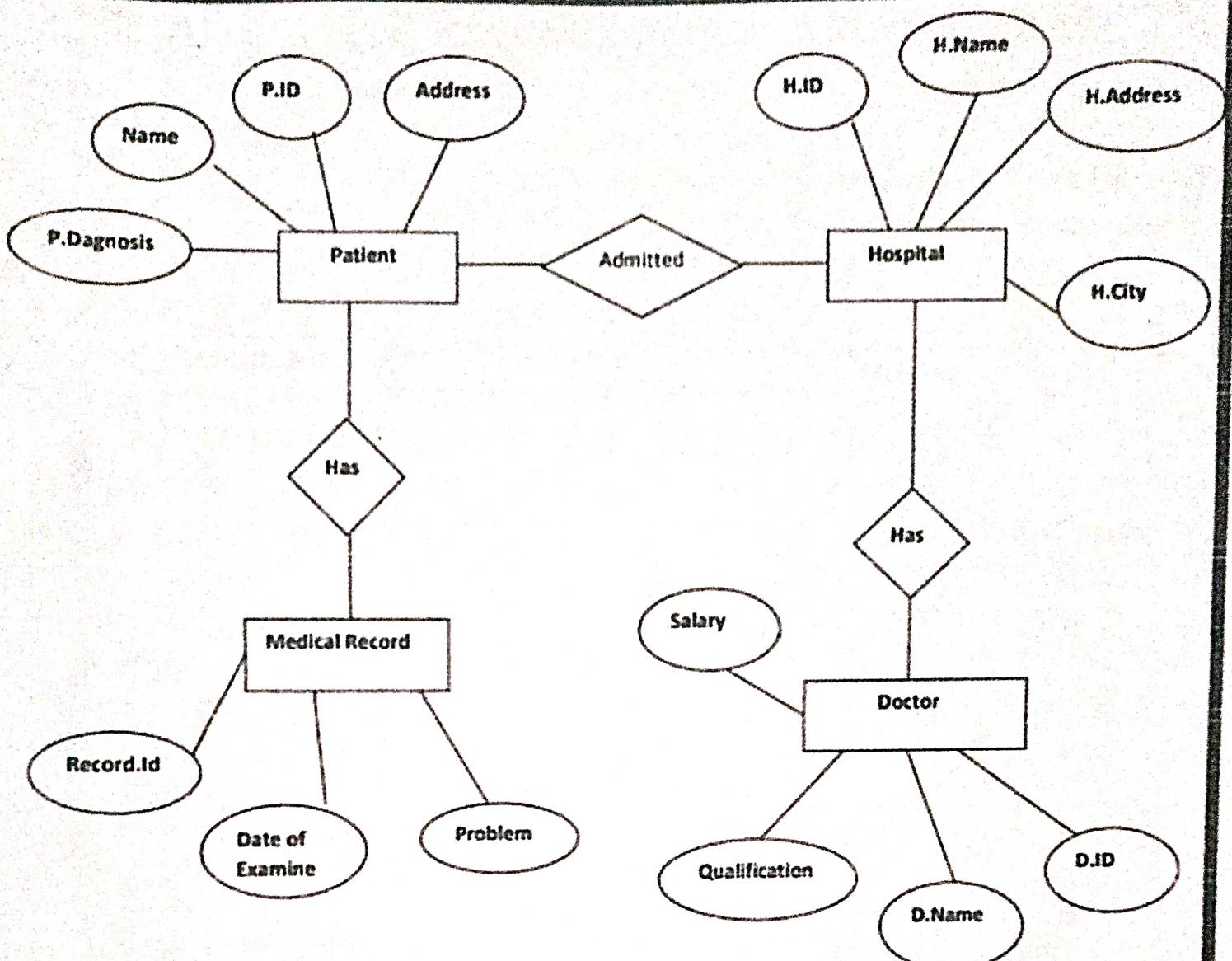
S.No	Entity Set	Attributes
1.)	Patient	Address , P.ID , Name
2.)	Medical Record	Record , Date of examine , Problem
3.)	Doctor	Salary , Qualification , D.Name , D-ID
4.)	Hospital	H.ID , H.Name , H.Address , H.City

3.) Account Management System —

S.No	Entity Set	Attributes
1.)	Acc. Manager	Address , Name , Acc.ID
2.)	Account	Password , Phone , ID , Name , Email Address
3.)	Worker	Work time , Supervisor , Analyzer
4.)	Account Activity	Last login , Inserted video , Account.

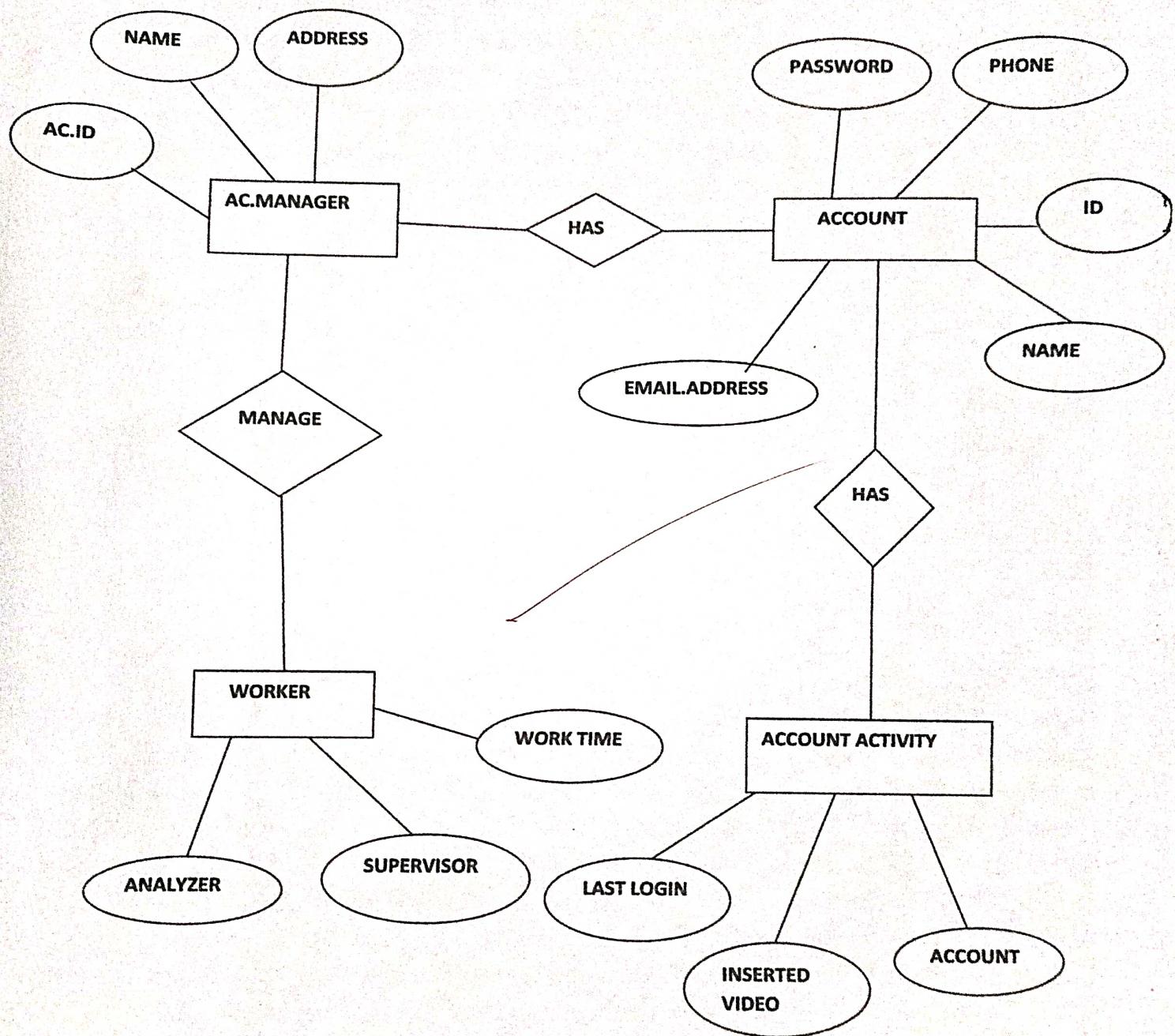


LIBRARY MANAGEMENT SYSTEM



HOSPITAL MANAGEMENT SYSTEM

ER diagram of account management system



26/01/23

MySQL 8.0 Command Line Client

```
mysql> Create table Employee (E_ID int, Name varchar (20), Age int, Contact_No int, Address varchar (15), Designation varchar (10));
Query OK, 0 rows affected (0.02 sec)
```

```
mysql> desc Employee;
```

Field	Type	Null	Key	Default	Extra
E_ID	int	YES		NULL	
Name	varchar(20)	YES		NULL	
Age	int	YES		NULL	
Contact_No	int	YES		NULL	
Address	varchar(15)	YES		NULL	
Designation	varchar(10)	YES		NULL	

```
6 rows in set (0.01 sec)
```

```
mysql> Create table Book (B_ID int, B_Author varchar (20), B_Price int, B_Publication varchar (15));
Query OK, 0 rows affected (0.03 sec)
```

```
mysql> desc Book;
```

Field	Type	Null	Key	Default	Extra
B_ID	int	YES		NULL	
B_Author	varchar(20)	YES		NULL	
B_Price	int	YES		NULL	
B_Publication	varchar(15)	YES		NULL	

```
4 rows in set (0.00 sec)
```

```
mysql> Create table Publishers (P_ID int, P_Name varchar(20), P_Address varchar (10));
Query OK, 0 rows affected (0.03 sec)
```

```
mysql> desc Publishers;
```

Field	Type	Null	Key	Default	Extra
P_ID	int	YES		NULL	
P_Name	varchar(20)	YES		NULL	
P_Address	varchar(10)	YES		NULL	

```
rows in set (0.00 sec)
```

```
mysql>
```

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```
sql> Create Table Reports(S_no int, L_id int, R_name varchar(10), Date_Inc, ReturnDate int);
Copy OK, 0 rows affected (0.02 sec)
```

SQL> desc Reports;

Name	Type	Null	Key	Default	Extra
S_no	int	NO			
L_id	int	NO			
R_name	varchar(10)	YES			
Date_Inc	int	YES			
ReturnDate	int	YES			

Rows in set (0.00 sec)

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LAB SESSION-3

Objective:- to create Database and use it to create tables for Library Management System.

Syntax:-

- To create Database

```
create Database <Database Name>
```

- To create Table

```
create Table table_name (Column1 datatype(size),  
Column2 datatype(size) --- Columnn datatype(size));
```

Tables for Library Management system

1. Student (S-ID, Age, Branch, Session, Contact-No, Address)
2. Employee (E-ID, Name, Age, Contact-No, Address, Designation)
3. Book (B-ID, B-Author, B-Price, B-Publication)
4. publishers (P-ID, P-Name, P-Address)
5. Reports (S-ID, B-No, B-Issue-Date, B-Return-Date)

- Create Database "Library Management System"

```
create Database Library-Management-System;
```

Query :-

Query for creating Tables for above Database.

(1) Create Table student (S-ID int, Name varchar(20),
Age int, Branch varchar(10), Session int, contact-No
int (20), Address varchar(25));

- (iii) Create Table Book (B-ID, B-Author varchar(20),
B-Price int, B-Publication varchar(20));
- (^{***}iv) Create Table Employee (E-ID int, Name varchar
(20), Age int, Contact-No int, Address varchar(25),
Designation varchar(15));
- (v) Create Table Publishers (P-ID int, P-Name varchar
(20), P-Address varchar(15));
- (vi) Create Table Reports (S-ID int, B-No int,
B-Issue-Date int, B-Return-Date));

Output:-

Employee: **Employee 100 (Email: vachan@99)**
Only one row affected (0 of 100)
Records 0 contained a warning.

1 row(s) used. Employee:

Field	Type	Value	Key	Nullable	Default
id	int	100	PK	NO	
name	varchar(25)	Vachan	NS	NO	
age	int	25	NS	NO	
gender	enum('M','F')	M	NS	NO	
email	varchar(50)	vachan@99	UNIQUE	NO	
password	varchar(255)	123456	NS	NO	

1 row(s) used. Employee:
Employee 100 (Email: vachan@99)
Records 1 contained a warning.
Warning: Row 1 contains a value for the column 'password' which is defined as 'not null'.
Row 1: (100, Vachan, 25, M, vachan@99, 123456)

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LAB SESSION - 4

Objective:- To use DDL commands (Alter & Drop) in MySQL for the Database Library Mgmt. system.

Syntax:-

- Use Alter command in MySQL:

```
Alter Table table_Name MODIFY COLUMN  
column_name datatype(size);
```

- Use drop command in MySQL:

```
Drop Table table_Name;
```

Query:-

- To add a new column in Employee Table

```
Alter Table Employee ADD (Email Varchar(20));
```

- To add "Year of Publication" column in Publisher Table

```
Alter Table Publisher ADD (Year-of_Publication Int);
```

- To delete the "Session" column from Student Table.

```
Alter Table Student Drop Column Session;
```

- To delete the Reports Table.

```
Drop Table Reports.
```

Output:-

MySQL 8.0 Command Line Client

ERROR 1264 (22003) : Out of range value for column 'Contact_No' at row 1

mysql> desc Student;

Field	Type	Null	Key	Default	Extra
S_ID	int	YES		NULL	
Name	varchar(20)	YES		NULL	
Age	int	YES		NULL	
Branch	varchar(15)	YES		NULL	
Session	int	YES		NULL	
Contact_No	int	YES		NULL	
Address	varchar(20)	YES		NULL	

7 rows in set (0.00 sec)

mysql> Insert Into Student (S_ID, Name, Age, Branch, Session, Contact_No, Address) Values (123, "XYZ", 21, "CSE", 2024, 944154, "IIM_GDRA");

Query OK, 1 row affected (0.01 sec)

mysql> select * from Student ;

S_ID	Name	Age	Branch	Session	Contact_No	Address
123	XYZ	21	CSE	2024	944154	IIM_GDRA

1 row in set (0.00 sec)

mysql>

MySQL 8.0 Command Line Client

mysql> desc Student;

Field	Type	Null	Key	Default	Extra
S_ID	int	YES		NULL	
Name	varchar(20)	YES		NULL	
Age	int	YES		NULL	
Branch	varchar(15)	YES		NULL	
Session	int	YES		NULL	
Contact_No	int	YES		NULL	
Address	varchar(20)	YES		NULL	

7 rows in set (0.00 sec)

mysql> Insert into Student (S_ID, Name, Age, Branch, Session, Contact_No, Address) Values (123, "XYZ", 21, "CSE", 2024, 984154, "ITM_GIDA");

mysql> select * from Student;

S_ID	Name	Age	Branch	Session	Contact_No	Address
123	XYZ	21	CSE	2024	984154	ITM_GIDA

1 row in set (0.00 sec)

mysql>

Type here to search

LAB SESSION- 5

Objective:- To use Insert & Select command
in MySQL.

Syntax:-

- To insert values into a table

Insert INTO table-name (column 1, column 2 ---
--- column n) VALUES (value1, value2 ... Valuen);

- To select records in a table

Select * from table-name;

Query:-

- Insert the values (101, Akash, 22, CSE, 97545, GKP)
into student Table.

Insert INTO student VALUES (101, "Akash", 22, "CSE",
97545, "GKP");

- Insert values (27512, Robert T. Kiyosaki, 350,
RoliBooks) into Book Table.

Insert INTO BookVALUES (27512, "Robert T. Kiyosaki",
350, "RoliBooks");

- Select all records of previous table
one by one

Select * from student;

Select * from Employer;

Select * from Book;

Select * from Publishers;

Output:-

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LAB SESSION - 6

Objective:- To write SQL query for DML commands
Insert, Delete & update

Syntax:-

- To insert records into a Table.

INSERT INTO table-name VALUES(value1, value2...);

- To delete records of a Table.

Delete from table-name WHERE <condition>;

- To update records of a Table.

Update table-name SET column-name = "new value"
WHERE <condition>;

Query:-

- Insert values (251, Amber, 32, 74576, Bangalore, senior manager) into Employee Table.

INSERT INTO Employee Values(251, "Amber", 32, 74576,
"Banglore", "senior Manager");

- Delete the record where Name is Akash
& Branch is CSE from student table.

Delete from student WHERE (name = "Akash" and
Branch = "CSE");

- Update the record from Employee Table.

Update Employee SET contact_no = 654123
WHERE contact_no = 745762;

Output:-