ASSIGNMENT NO: 1

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AIM : Design sample database, draw ER diagram and Study of MySQL Database Management System.

INDEX TERMS: Database Management System, ER Data Model, MySQL

THEORY

ER Data Model :

ER Data Model is based on real world objects and their relationship. In a database, we would be grouping only related data together and storing them under one group name called Entity. An attribute is a list of all related information of an entity, which has valid value. Keys are the attributes of the entity, which uniquely identifies the record of the entity. A relationship defines how two or more entities are inter-related.

Since ER diagram is the pictorial representation of real world objects, it involves various symbols and notation to draw the diagrams. Let us see one by one below.

Entity: Rectangles are used to represent the entity in the diagram. Name of the Entity is written inside the rectangle.

STUDENT	EMPLOYEE	ACCOUNT

A strong entity is represented by simple rectangle as shown above. A weak entity is represented by two rectangles as shown below.

| CLASS_SECTION	DEPENDANT

Attribute: An oval shape is used to represent the attributes. Name of the attribute is written inside the oval shape and is connected to its entity by a line. Multivalued attributes are represented by double oval shape; where as derived attributes are represented by oval shape with dashed lines. A composite attribute is also represented by oval shape, but these attribute will be connected to its parent attribute forming a tree structure.

Cardinality of Relationship: Different developers use different notation to represent the cardinality of the relationship. Not only for cardinality, but for other objects in ER diagram will have slightly different

notations. But main difference is noticed in the cardinality. For not to get confused with many, let us see two types of notations for each.

One-to-one relation: - A one-to-one relationship is represented by adding '1' near the entities on the line joining the relation. In another type of notation one dash is added to the

relationship line at both ends.

Entity —1— R —1— Entity   OR   Entity —|— R —|— Entity
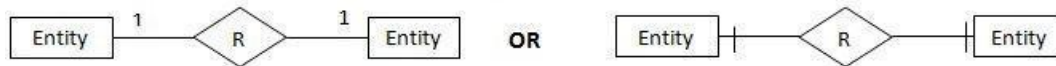
One-to-Many relation: A one-to-many relationship is represented by adding '1' near the entity at left hand side of relation and 'N' is written near the entity at right side. Other type of notation will have dash at LHS of relation and three arrow kind of lines at the RHS of relation as shown below.

Entity —1— R —N— Entity   OR   Entity —|— R —< Entity

Many-to-Many relation: A one-to-many relationship is represented by adding 'M' near the entity at left hand side of relation and 'N' is written near the entity at right side. Other type of notation will have three arrow kinds of lines at both sides of relation as shown below.

Entity —M— R —N— Entity   OR   Entity >— R —< Entity
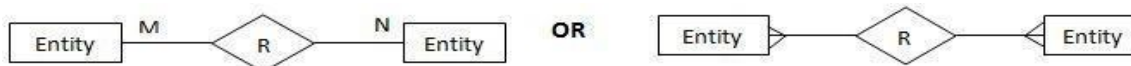
Participation Constraints: Total participation constraints are shown by double lines and partial participations are shown as single line.

Entity =1= R —N— Entity

ER Diagram for College Activity:

What is Database?

A database is a separate application that stores a collection of data.Each database has one or more distinct APIs for creating, accessing, managing, searching and replicating the data it holds. So nowadays, we use relational database management systems (RDBMS) to store and manage huge volumes of data. This is called relational database because all the data is stored into different tables and Relations are established using primary keys or other keys known as foreign keys

The conversion of ER diagram into Table structure at this would be as below:
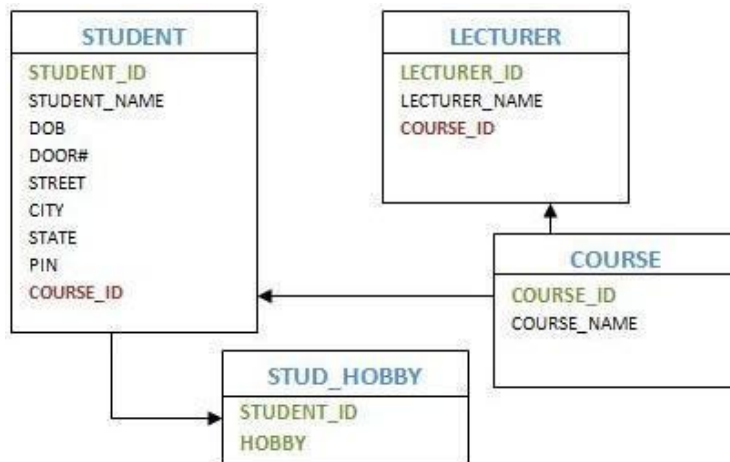
MySQL:

MySQL, the most popular Open Source SQL database management system, is developed, distributed, and supported by Oracle Corporation.

MySQL is a database management system. A database is a structured collection of data. It may be anything from a simple shopping list to a picture gallery or the vast amounts of information in a corporate network. To add, access, and process data stored in a computer database, you need a database management system such as MySQL Server. Since computers are very good at handling large amounts of data, database management systems play a central role in computing, as standalone utilities, or as parts of other applications.

MySQL databases are relational. A relational database stores data in separate tables rather than putting all the data in one big storeroom. The database structures are organized into physical files optimized for speed. The logical model, with objects such as databases, tables, views, rows, and columns, offers a flexible programming environment

A. Draw an ER diagram for the following application from the hospital:
- A doctor has one or more patients to treat
- Each doctor has an unique Doctor ID
- Each patient has a name, phone number, address and date of birth
- Patient entity is a weak entity
- Age is a derived attribute

Draw an ER diagram for the following application from the Hospital:
- A Doctor has one or more patients to treat
- Each doctor has an unique Doctor ID
- Each patient has a name, phone number, address and date of birth
- Patient entity is a weak entity
- Age is a derived attribute
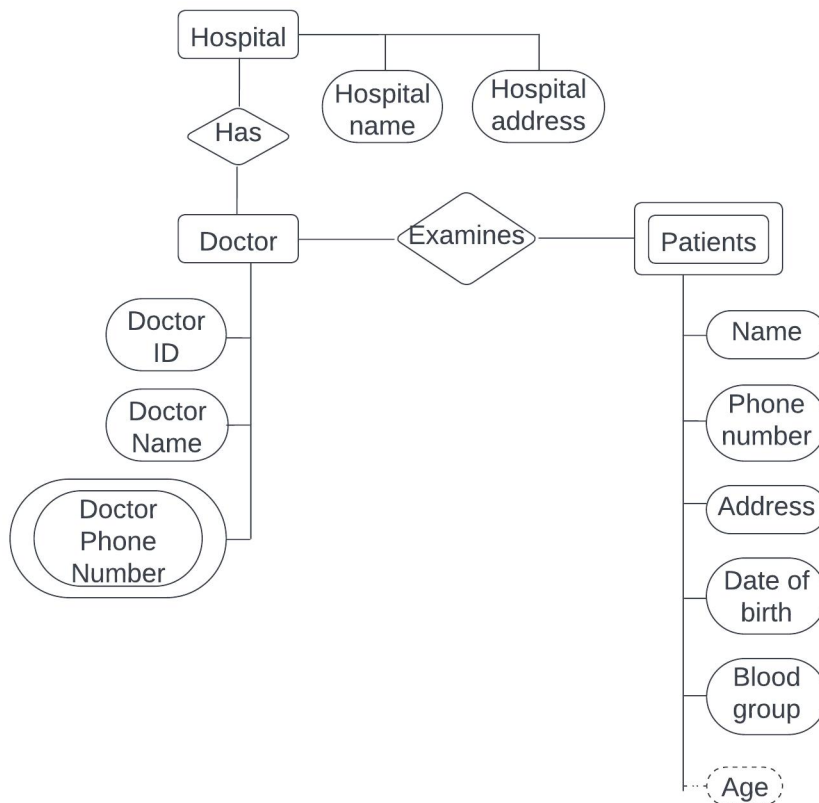
MySQL software is Open Source. Open Source means that it is possible for anyone to use and modify the software. Anybody can download the MySQL software from the Internet and use it without paying anything. If you wish, you may study the source code and change it to suit your needs. The MySQL software uses the GPL.

The MySQL Database Server is very fast, reliable, scalable, and easy to use. If that is what you are looking for, you should give it a try. MySQL Server can run comfortably on a desktop or laptop, alongside your other applications, web servers, and so on. If you dedicate an entire machine to MySQL, you can adjust the settings to take advantage of all the memory, CPU power, and I/O capacity available. MySQL can also scale up to clusters of machines, networked together.

MySQL Installation Steps on Ubuntu:

$ sudo apt get update

$ sudo apt get install mysql server

$ sudo mysql_secure_installation

$ sudo mysql_install_db

MySQL Commands:

Create a database on the sql server.

mysql> create database [databasename];

List all databases on the sql server.

mysql> show databases;

Switch to a database.

mysql> use [db name];

To see all the tables in the db.

mysql> show tables;

To see database's field formats.

mysql> describe [table name];

To delete a db.

mysql> drop database [database name];

To delete a table.

mysql> drop table [table name];

Show all data in a table.

mysql> SELECT * FROM [table name];

Returns the columns and column information pertaining to the designated table.

A.   Case Study: Draw an ER diagram for the following application from the manufacturing industry:
- Each supplier has a unique name.
- More than one supplier can be located in the same city.
- Each part has a unique part number.
- Each part has a colour.
- A supplier can supply more than one part.
- A part can be supplied by more than one supplier.

Payments: stores payments made by customers based on their accounts.
Employees: stores all employee information as well as the organization structure such as who reports to whom.
**Offices**: stores sales office data.

B.   Draw an ER diagram for the following application from the ABC Company:
- Employees work for many projects and each project has many employees
- Each employee has an unique Emp_No
- Each employee has a name and name consists of first name, middle name and last name
- Each project has an unique number and name

C. Draw an ER diagram for the following application from the ABC Company:
▮ Employees work for many projects and each project has many employees
▮ Each employee has an unique Emp_No
▮ Each employee has a name and name consists of first name, middle name and last name
▮ Each project has an unique number and name
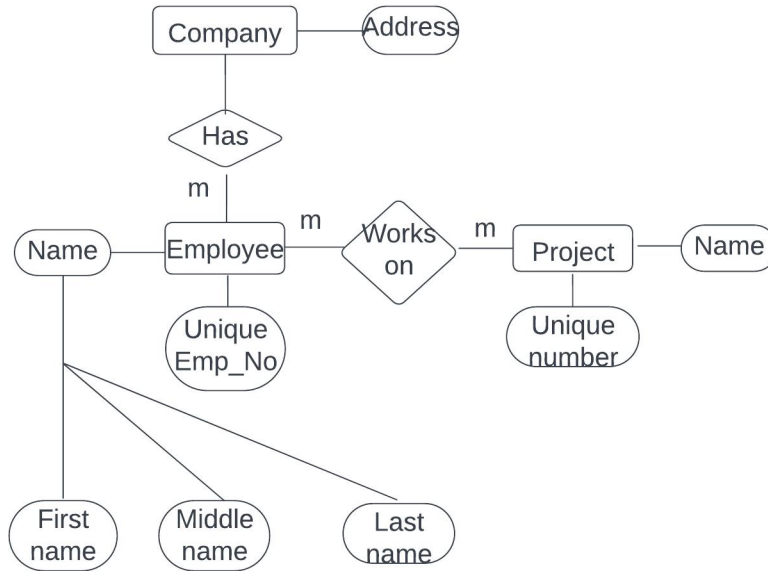
FAQs:

1) What are the advantages of DBMS over a traditional file system?

Ans: A Database Management System (DBMS) offers several advantages over a traditional file system when it comes to managing and organizing data. Here are some of the key advantages:

1. Data Integrity: DBMS enforces data integrity constraints to ensure accurate and consistent data, while file systems lack built-in mechanisms for this purpose.

2. Data Security: DBMS provides access control, allowing
administrators to define who can access and modify data,
whereas file systems often lack robust security features.

3. Data Abstraction: DBMS abstracts the physical data storage,
simplifying data management and allowing developers to
focus on data manipulation.

4. Concurrent Access: DBMS handles concurrent access by
multiple users or applications, preventing data corruption,
which is a challenge in file systems.

5. Query Language: DBMS offers SQL or similar query
languages for efficient data retrieval and manipulation, while
file systems lack query capabilities.

2) Explan in the terms table and record in a database.
Ans: Table:
    1. A table is a fundamental database object.
    2. It's a two-dimensional structure that resembles a spreadsheet or matrix.
    3. Tables consist of rows and columns.
    4. Columns define the attributes or properties of the data.
    5. Each column has a name and a data type.
    6. Tables organize data into a structured format, making it easier to store and retrieve
information.

    Record:
    1. A record is a single row of data within a table.
    2. It represents a specific entity or instance in the database.
    3. Records are made up of values, one for each column in the table.
    4. Each record contains information related to a unique entry or entity.
    5. Records are also referred to as rows in the database table.
    6. In a relational database, records are often associated with primary keys to ensure their
uniqueness.

3) Find out databases used for following applications.
A. Twitter :Manhattan.
B. Facebook :Several database technologies, including MySQL and RocksDB.
C. Amazon / Flipkart : Amazon RDS (Relational Database Service) and NoSQL databases like
Amazon DynamoDB for various purposes.
D. AADHAR Card: Not disclosed publically.

Conclusion:
Purpose of this assignment is fulfilled by understanding ER Data Model,
Relational Databases and MySQL Database Management Systems.