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Experiment No.	1

AIM:	1. Formulate a case study and create an E-R Diagram. 2. Mapping of E-R model to Relational Model.
Program 1	
PROBLEM STATEMENT:	**Create an E-R Model of a Hotel Database Management System.**
THEORY:	An Entity–relationship model (ER model) describes the structure of a database with the help of a diagram, which is known as an Entity Relationship Diagram (ER Diagram). An ER model is a design or blueprint of a database that can later be implemented as a database. The main components of the ER model are entity set and relationship set. **What is an Entity Relationship Diagram (ER Diagram)?** An ER diagram shows the relationship among entity sets. An entity set is a group of similar entities, and these entities can have attributes. In terms of DBMS, an entity is a table or attribute of a table in the database, so by showing the relationship among tables and their attributes, ER diagram shows the complete logical structure of a database. Why use ER Diagrams? Here, are prime reasons for using the ER Diagram: 1. It helps you to define terms related to entity relationship modelling. 2. To provide a preview of how all your tables should connect, and what fields are going to be on each table. 3. It helps to describe entities, attributes, and relationships. 4. ER diagrams are translatable into relational tables, allowing you to build databases quickly. 5. ER diagrams can be used by database designers as a blueprint for implementing data in specific software applications. **ER Diagram Symbols & Notations:** Entity Relationship Diagram Symbols & Notations mainly contains three

basic symbols which are rectangle, oval, and diamond to represent relationships between elements, entities, and attributes. There are some sub-elements that are based on the main elements in ER Diagram. ER Diagram is a visual representation of data that describes how data is related to each other using different ERD Symbols and Notations.

Following are the main components and their symbols in ER Diagrams:

- **Rectangles:** This Entity Relationship Diagram symbol represents entity types.
- **Ellipses:** This symbol represents attributes.
- **Diamonds:** This symbol represents relationship types.
- **Lines:** It links attributes to entity types and entity types with other relationship types.
- **Primary key:** Attributes are underlined.
- **Double Ellipses:** Represent multi-valued attributes.

Components of the ER Diagram:

- Entities
- Attributes
- Relationships

WHAT IS AN ENTITY?

A real-world thing either living or non-living that is easily recognizable and nonrecognizable. It is anything in the enterprise that is to be represented in our database. It may be a physical thing or simply a fact about the enterprise or an event that happens in the real world.

An entity can be a place, person, object, event, or concept, that stores data in the database. The characteristics of entities must have an attribute and a unique key. Every entity is made up of some ‘attributes’ which represent that entity.

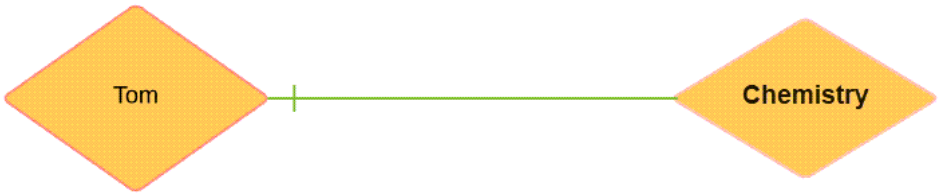
An entity is of two types: Strong and Weak Entities.

Examples of entities:

- **Person:** Employee, Student, Patient
- **Place:** Store, Building
- **Object:** Machine, Product, and Car
- **Event:** Sale, Registration, Renewal
- **Concept:** Account, Course

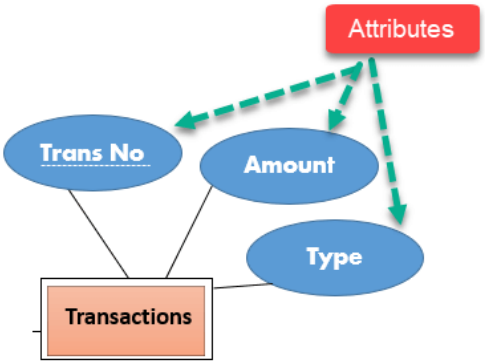
Relationship

A relationship is nothing but an association among two or more entities.
E.g., Tom works in the Chemistry department.
It too has two types: Strong and Weak Relations.



Attributes

It is a single-valued property of either an entity type or a relationship type.
For example, a lecture might have attributes: time, date, duration, place, etc.
An attribute in ER Diagram examples is represented by an ellipse.



Types of Attributes	Description
Simple attribute	Simple attributes can't be divided any further. For example, a student's contact number. It is also called an atomic value.
Composite attribute	It is possible to break down composite attribute. For example, a student's full name may be further divided into first name, second name, and last name.
Derived attribute	This type of attribute does not include in the physical database. However, their values are derived from other attributes present in the database. For example, age should not be stored directly. Instead, it should be derived from the DOB of that employee.
Multivalued attribute	Multivalued attributes can have more than one values. For example, a student can have more than one mobile number, email address, etc.

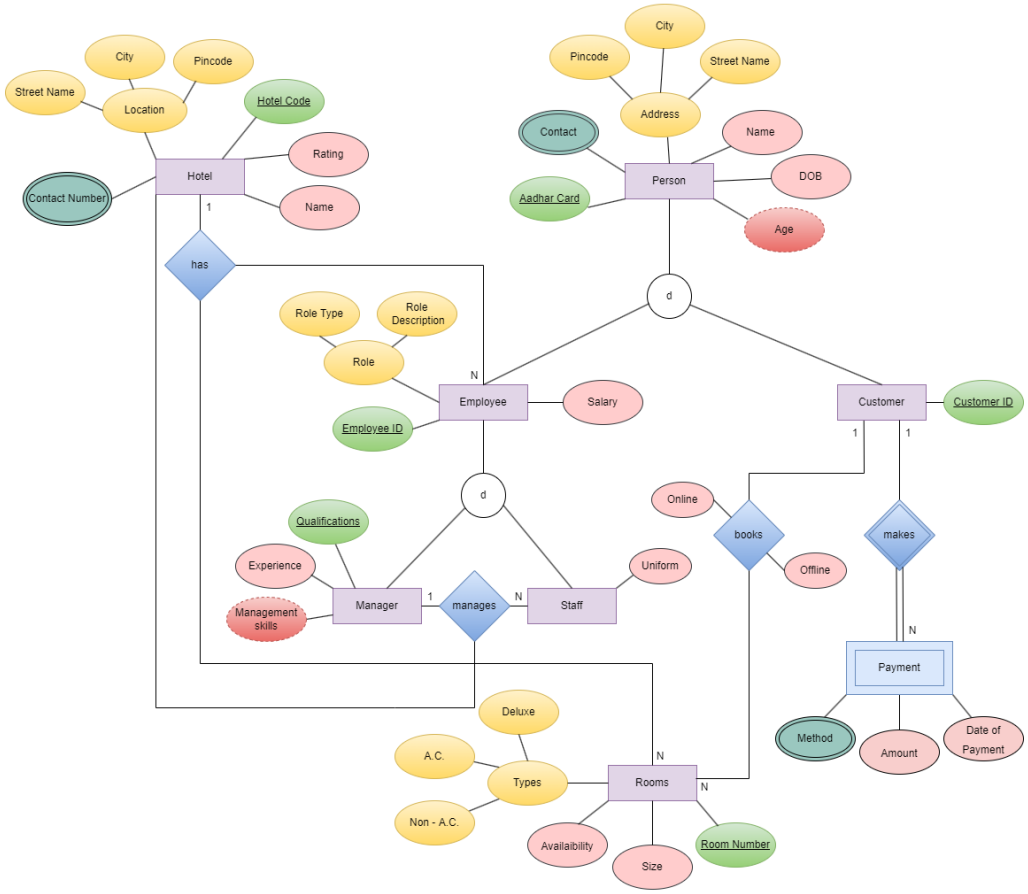
Cardinality

Defines the numerical attributes of the relationship between two entities or entity sets.

Different types of cardinal relationships are:

- One-to-One Relationships
- One-to-Many Relationships
- May to One Relationships
- Many-to-Many Relationships

ER MODEL OF A HOTEL DATABASE MANAGEMENT SYSTEM



CONCLUSION:

In this experiment, we learned all about ER models, and the elements which make up the ER Models – Entities, Attributes, Relationships, Cardinality, etc. We learned about the symbols used to represent these, i.e., in the form of rectangles, ellipses, diamonds, and slight variations in these shapes as per the different types. We tried to include all the different types of each element and bifurcated the types by different colours. We also showed disjointedness wherever possible and cardinalities for all the relationships.