Jaypee University of Engineering and Technology, Guna
Database Systems Lab
B.Tech. III Semester CSE

Project - 5
Database Modeling – ER Modeling – ER Diagrams

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1) Go through all lectures content related to ER modeling.

2) Open project 2

3) Make notes for all key terms mentioned in the Project 2 document.

4) Go through symbols used in ER modeling

5) Carefully read requirement analysis given in the project 2 document

6) Identify Entity types

7) Identify attributes of each ET and its type also weak entity if any

8) Find those attributes which exhibits relations ship between entity types (Consider self-relationship also - Recursive relationship)

9) Identify participation and cardinality constraints

10) Identify attribute(s) of relationships if any

11) Draw neat and clean ER Diagram with pen and paper

12)Mention participation and cardinality constraints

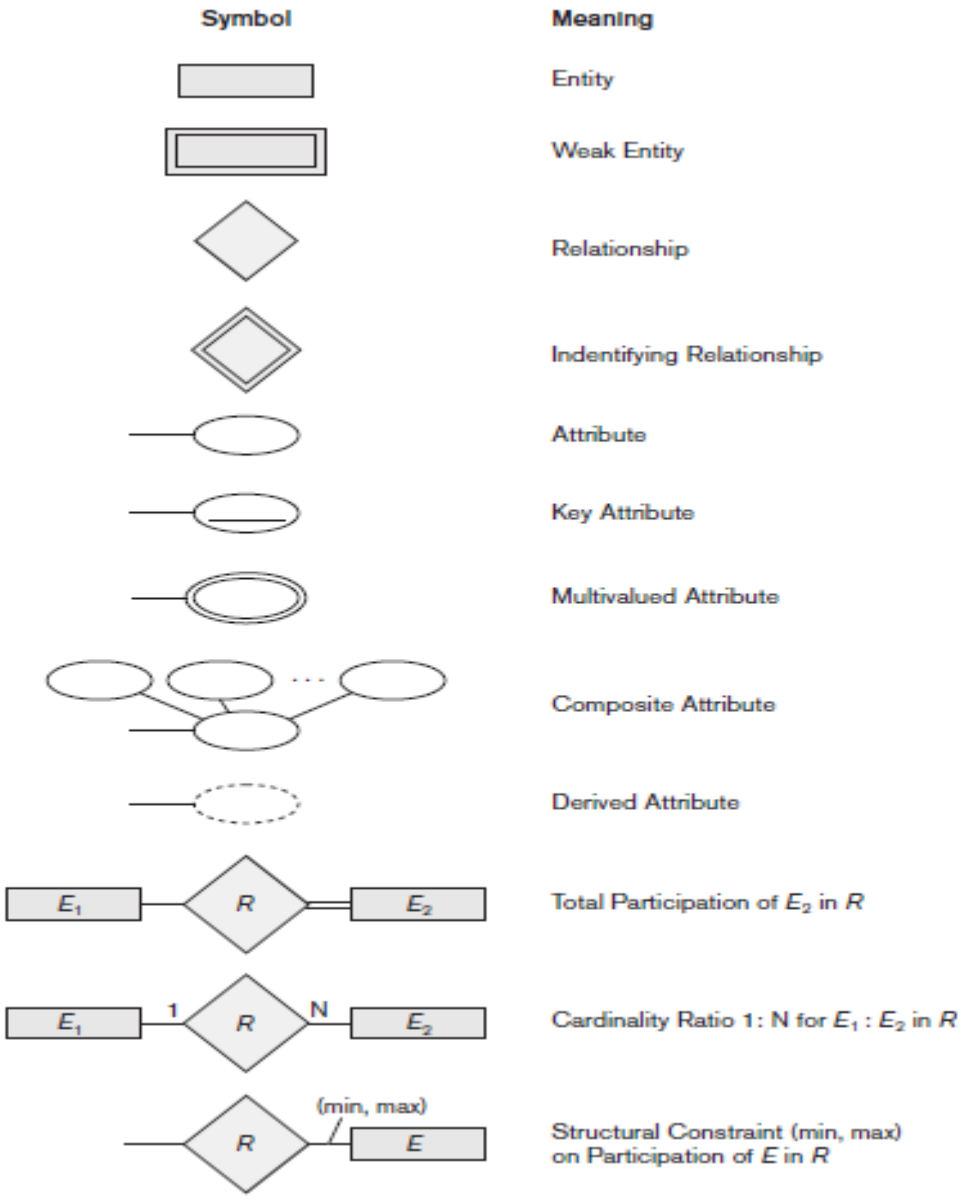
Entity–relationship (**ER**) **model**, is a popular high-level conceptual data model. The diagrammatic notation associated with the ER model is known as **ER diagrams**.

Keywords:

• Entity Types	• Entity	• Entity Sets	• Attributes
• Simple Attributes	• Composite Attributes	• Component Attributes	• Single Valued Attributes
• Multi Valued Attributes	• Stored Attributes	• Derived Attributes	• Key Attributes
• Complex Attributes	• NULL	• Value Set (Domain)	• Relationship Types
• Relationship Sets	• Relationship Instances	• Roles	• Role Names
• Relationship Degree	• Recursive Relationships or Self-referencing relationships	• Structural Constraints	• Cardinality Ratios
• Participation Constraints	• Total participation	• Existence Dependencies	• Partial participation

• Attributes of Relationship Types • Identifying relationship	• Weak Entity Types • Partial key	• Strong entity types	• Identifying or owner entity type

Figure 1: ER Diagram Symbols and Meaning



Data Requirement

Consider the following set of requirements for a University database. Design an ER diagram for this application:

- The university keeps track of each student's name, Er. number, Aadhar number, Current address and Phone number, Permanent address, Birth-date, Gender, Class (eg. First Year, Second Year, Third Year and Fourth Year), major department, minor

department (if any), degree program (B.Tech., M.Tech, ... Ph.D.). Some user applications need to refer to the city, state, and zip code of the student's permanent address and to the student's last name. Both Er. Number and Aadhar number are unique for each student.

- All students will have at least a major department. Each department is described by a name, department code, office number, office phone, and college. Both the name and code have unique values for each department.
- Each course has a course name, description, and course number, number of credits, level and offering department. The course number is unique for each course.
- Each section has an instructor, semester, year, course, and section number. The section number distinguishes sections of the same course that are taught during the same semester; its value is an integer (1, 2, 3, ... up to the number of sections taught during each semester).
- A grade report must be generated for each student that lists the section, letter grade, and numeric grade (0,1,2,3, or 4) for each student and calculates his or her average GPA.

Design an ER scheme for this application, and draw an ER diagram for that schema. Specify key attributes of each entity type and structural constraints on each relationship type. Note any unspecified requirements, and make appropriate assumptions to make the specification complete.

Other modelling tools:

Object modelling methodologies such as the **Unified Modelling Language** (**UML**) are becoming increasingly popular in both **database and software design**. These methodologies go **beyond database design** to specify detailed design of **software modules** and their interactions using various types of diagrams.

Rational Rose, Visual Paradigm, Dia, Microsoft Visio, and ERWin