# Software Engineering

Lecture 3

Structured Analysis

Structured Analysis is a development method that allows the analyst to understand the system and its activities in a logical way. It is a **systematic approach**, which uses graphical tools that analyze and refine the objectives of an existing system and develop a new system specification which can be easily understandable by user.

Structured Analysis
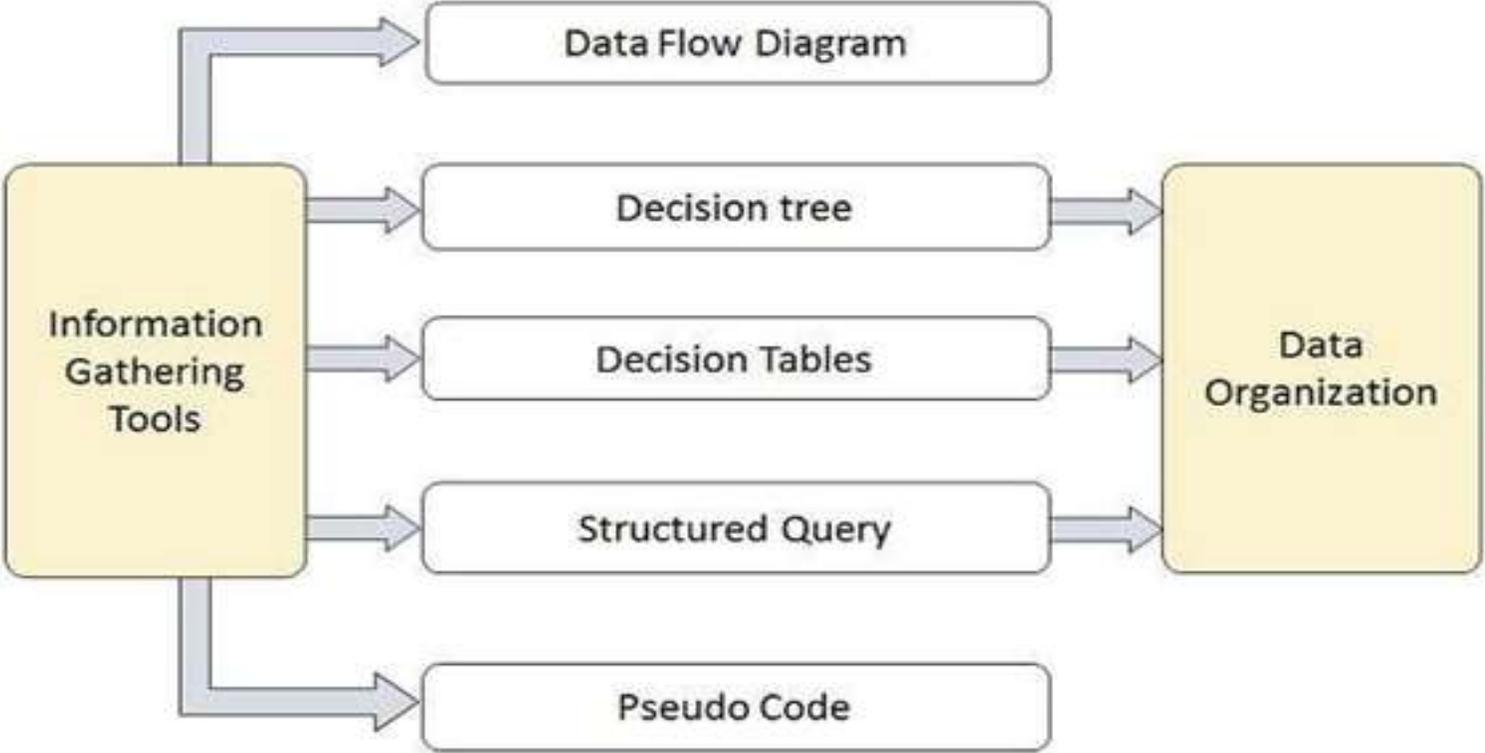
ER Diagram(Entity Relationship Model)

The **ER (Entity-Relationship) Model** is a high-level conceptual data model used to define the logical structure of a database system. It visually represents real-world entities, their attributes, and the relationships between them, making it easier for designers to communicate system requirements with users. The ER model helps in **designing the database before actual implementation** and ensures clarity and consistency in the data structure. It is commonly mapped into a relational schema, where entities become tables, attributes become columns, and relationships define how the tables are linked, forming the foundation of a well-structured database system.

ER Diagram Model

Entities

Attributes

Relationships

Entities

Entities are objects or things in the real world that have a distinct existence. These can be physical (like a student or book) or conceptual (like a course or department). Each entity is represented by a rectangle in an ER diagram.

Student	Teacher	Course

Attributes

It is a graphical representation which specifies the presentation of application.

It divides the processes so that it gives a clear picture of system flow.

It is an approach that works from high-level overviews to lower-level details.

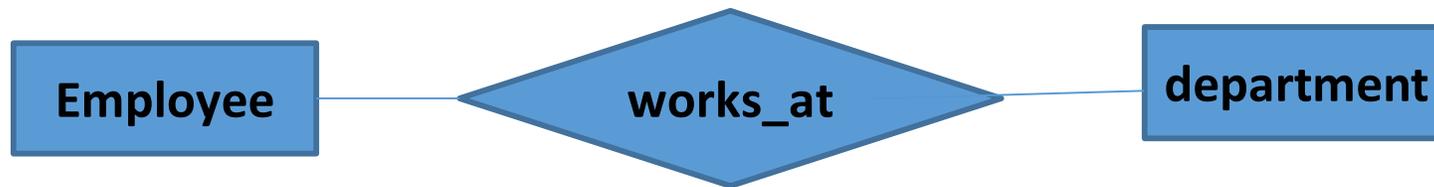Entities have attributes that give Identity.

Roll no, names, address

Relationships

A relationship is an association among entities. It is represented by Diamond – Shaped box.
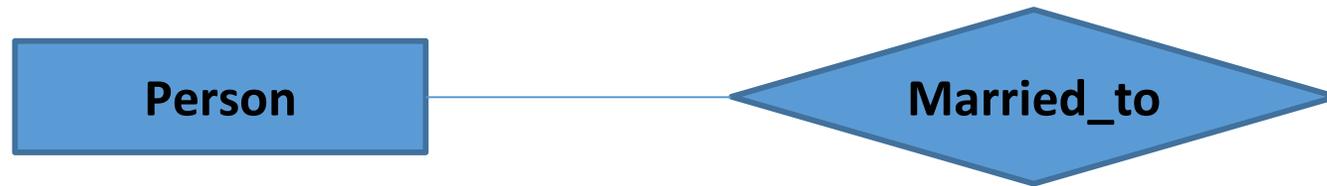
For Example :

I.   An employee **works_at** a department

II.   A student **enrolls** in a course

Degree of Relationships

Unary Relationship: A relationship between instances of the same entity.
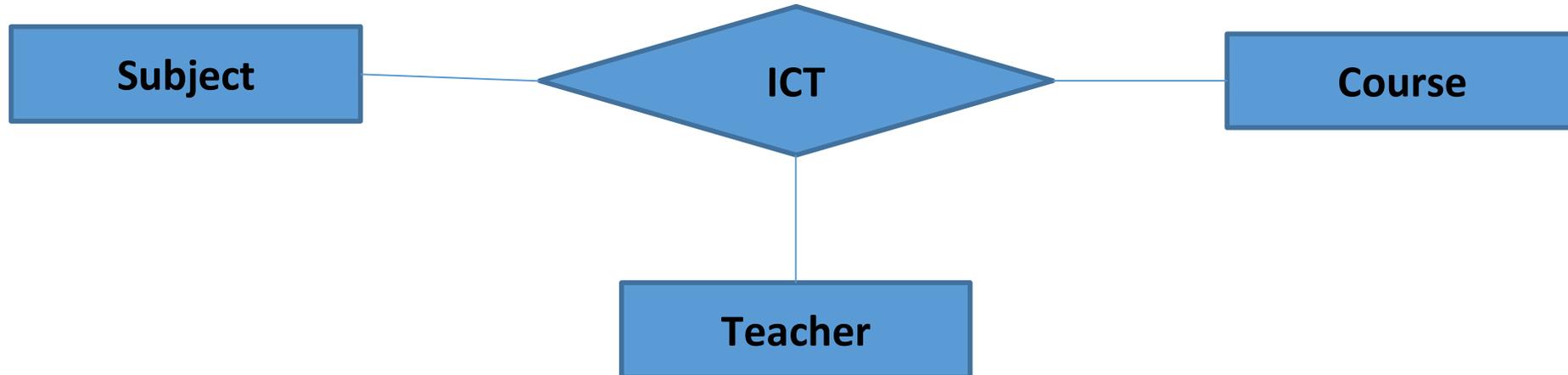*Example*: An employee manages another employee.

Degree of Relationships

Binary Relationship: A relationship between two different entities.
Example: A student enrolls in a course.

Degree of Relationships

Ternary Relationship: A relationship between two different entities.
Example: A student enrolls in a course.

Degree of Relationships

Problem:

At a university, professors work on research projects.Each project can involve **multiple professors**, and each professor can be **involved in multiple projects.**Additionally, when a professor is involved in a project, they may also be mentoring one or more students as part of that specific project.A professor may also mentor other professors (like junior faculty) regardless of project involvement.

- Identify any unary relationship(s) in the scenario.

- Identify any ternary relationship(s).