Building Block of Database & ER Diagram

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Building block of database

Buliding Blocks

- Columns/filed
- rows/tuples/record
- Tables

Adavantages of database

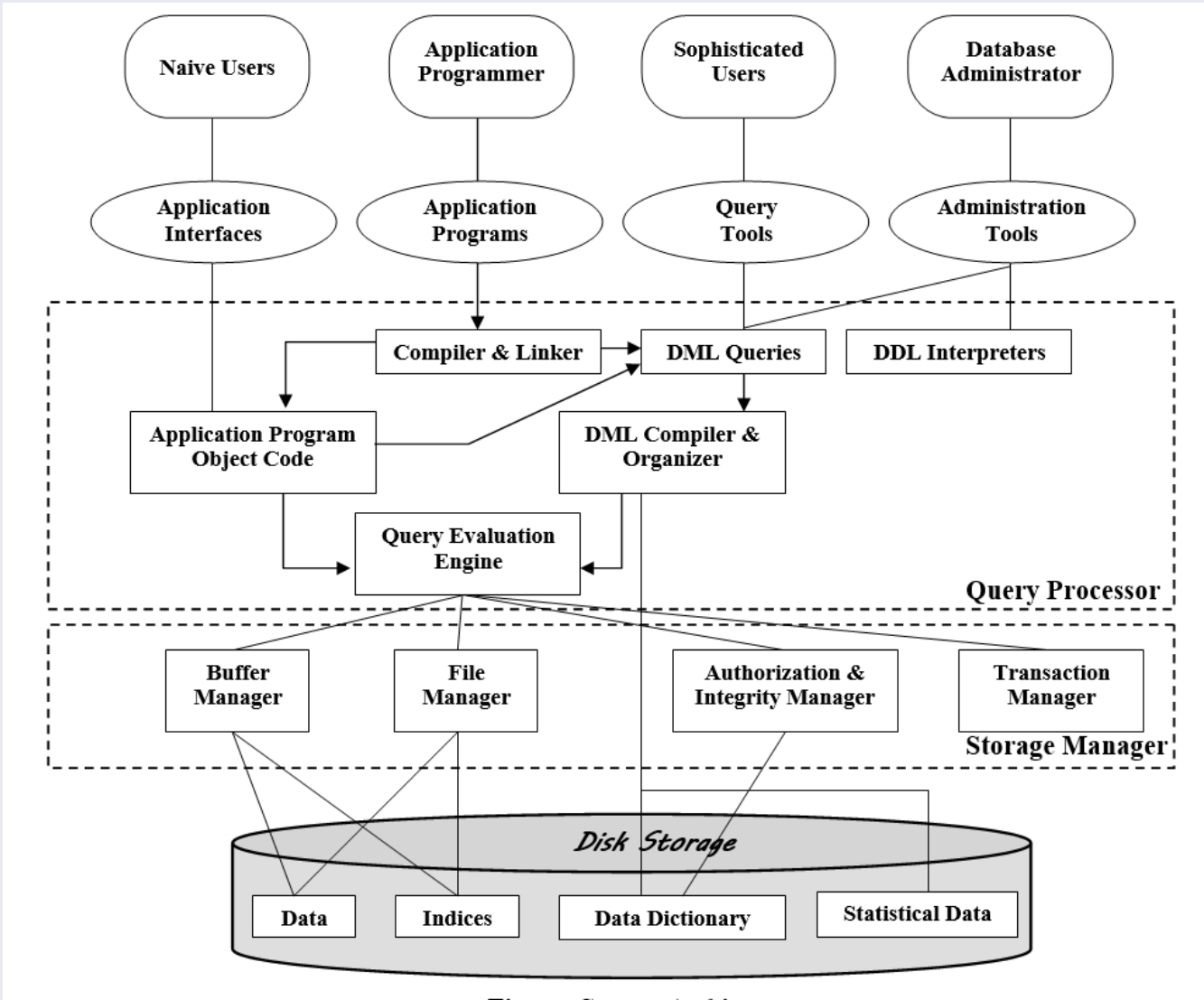
- Data independence
- Efficient data access
- Data integrity & security
- Data administrator
- Concurrent access & crash recovery
- Reduce application development time

Disadvantage of Database

- High initial investment in h/w, s/w & training
- Cost of defining & processing data
- Overhead for security, concurrency, control, recovery

DBMS Architecture

Detailed Architecture



Types of Database Users

Users

- **Native user** : Who need not be aware of the presence of database system (end users)
- **Application Programmer** :One who responsible for developing application program or user interface
- **Sophisticated User** :One who interact with the database system without writing the program (only SQL query)
- **Database Administrator** :It is a person or group of incharge for implementing database system within an organization. The database administration has all the privileges

Database

Database

- Application data need to be stored in set of files (physically) and conceptualize as set of tables(logically)
- Set of such tables is known as database, where you keep all application data

ER-Diagram

ER

- ER-Diagram is a diagrammatic representation of logical strucutre of database
- ER diagram describes relationship between tables
- Peter Chen developed ERDs in 1976
- Since then Charles Bachman and James Martin have added some slight refinements to the basic ERD principles

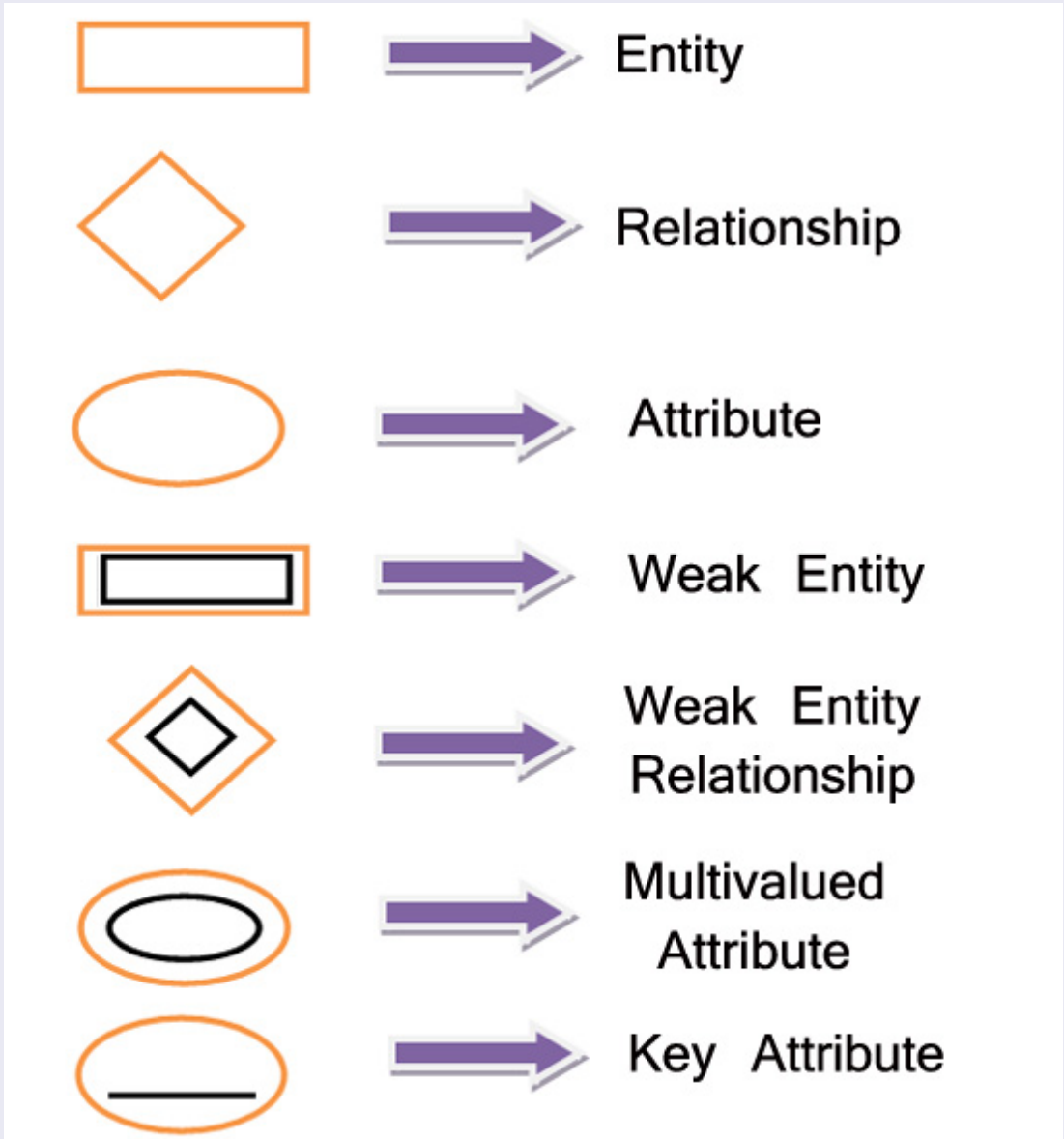
Entities and Attributes

- The basic object that the ER model represent is an entity, which is a thing in real world with an independent existence
- Each entity has attributes. They are the properties whose values are the data that stored in the database
- Database is a collection of entity, attribute, and relationship

Types of Attributes

- Atomic vs Composite
- Single valued vs Multivalued
- Stored vs derived
- NULL valued
- Key Attributes

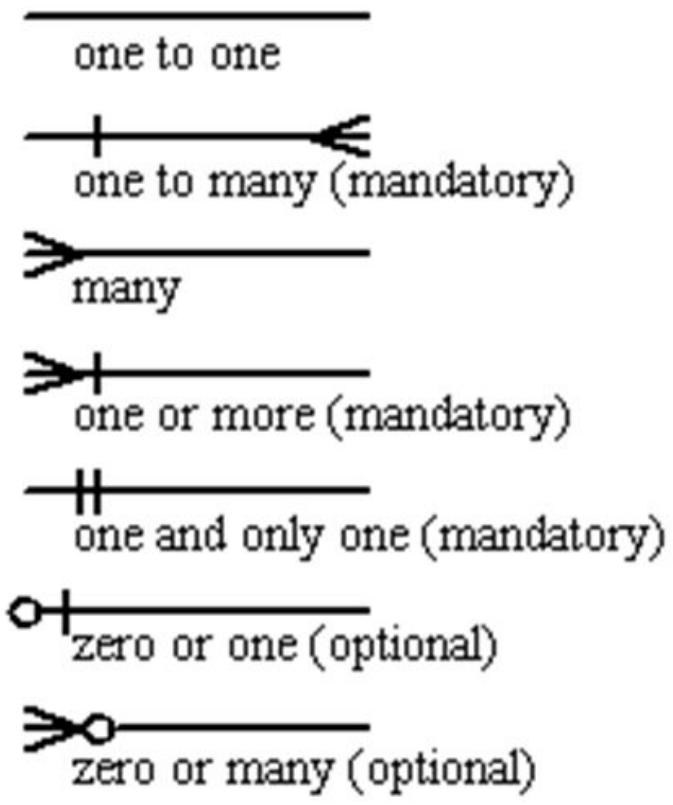
Symbols used in ER-Diagram



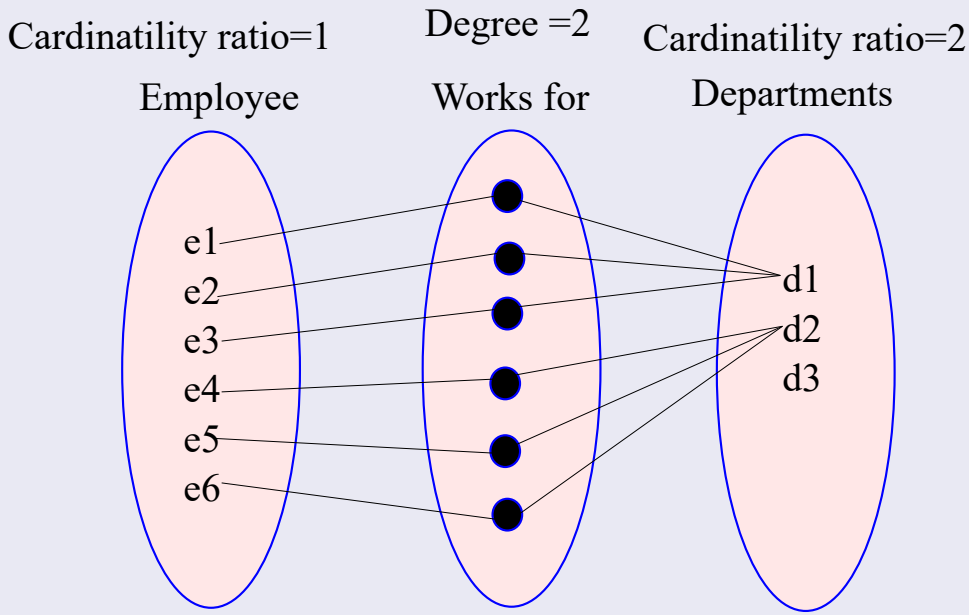
Cardanality

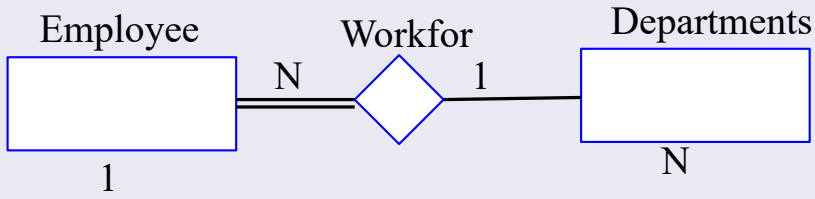
Cardinality Notations

Information Engineering style

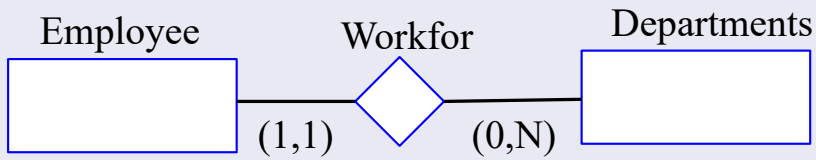


Relationship Entity





Cardinality ratio single line double line representation of ER diagram



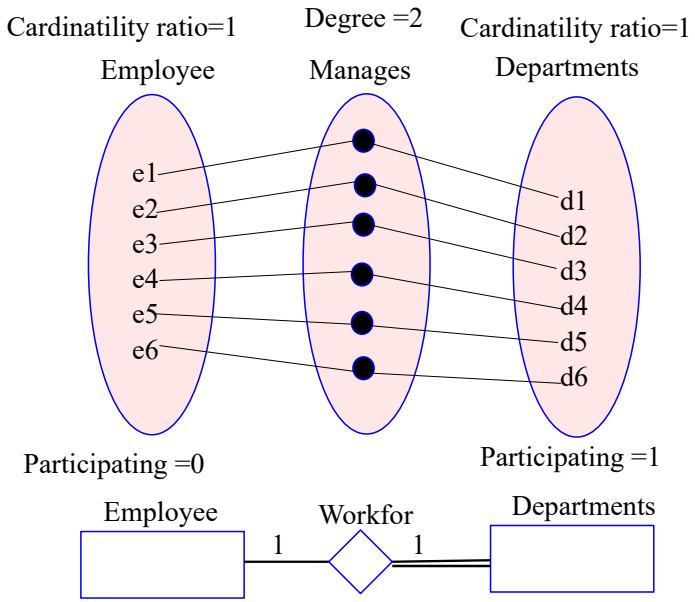
Min-Max Representation

Relationship One to Many

- **Requirement Analysis:** Every employee works for exactly one department and a department can have many employee and new department need not have any employee
- **Degree** In any relationship how many entities are participating.
- **Cardinality ratio** What is the maximum number of relationship an entity is participating.
- **participation or existence** What is the minimum number of relationship an entity is participation
- Both Cardinality ration and participation combine called structural constraint

Relationship One to One

- **Requirement Analysis:** Every department should have a manager and only one employee manages a department, and employee can manage only one department



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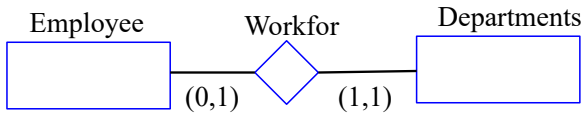

Min-Max Representation

Relationship Many to Many

- **Requirement Analysis:** P1: (e1,e2,e3), P2: (e2,e4,e8), P3:(e5,e7), P4:(e1,e5,e6)

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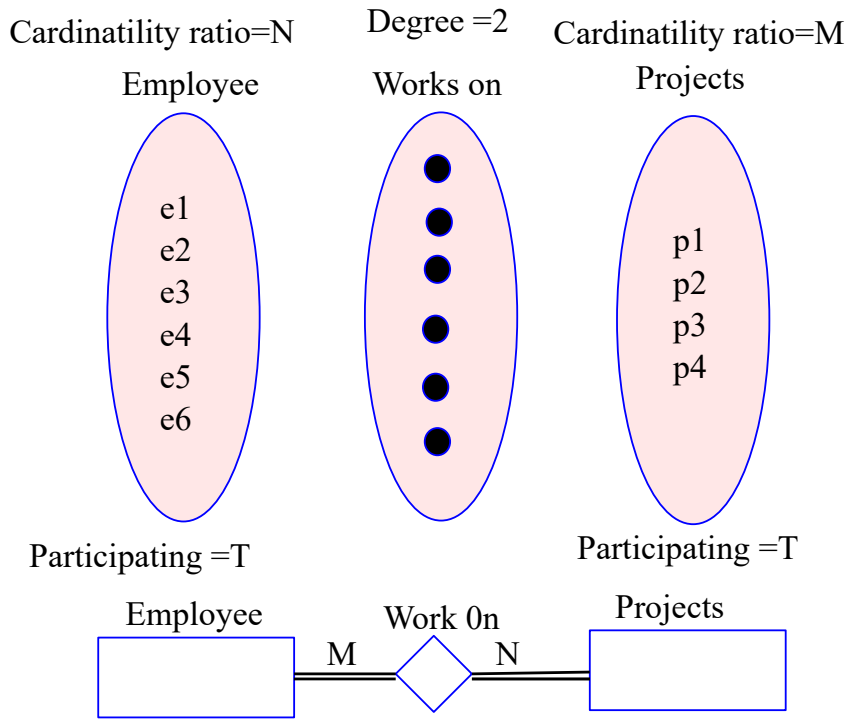

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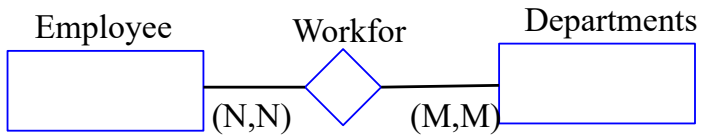
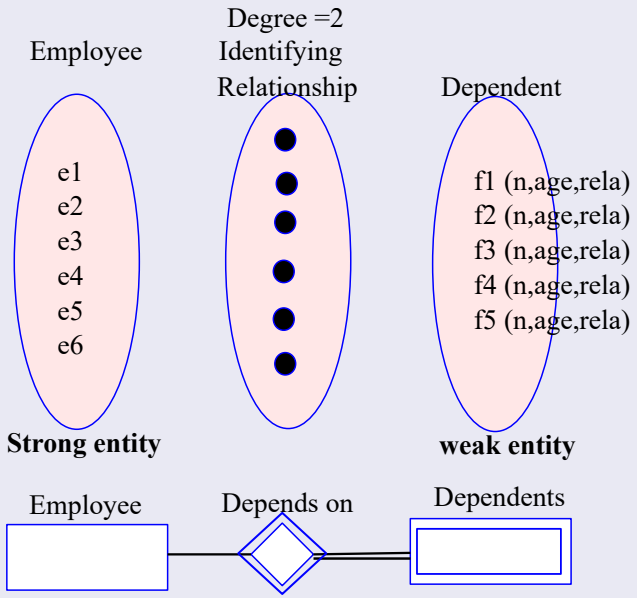


Min-Max Representation

Weak entity

- **Weak entity**: the entity has no key attributes to uniquely identify the record
- The participation of weak entity in relationship is total
- To identity each record in weal entity, we add the strong entity key attributes with weak entity attributes such as (emp id, name,age,relationship)



Create ER Diagram for Coaching Institute

Basic Steps to follow

- First identify the entities for database
- Identify the attributes to a entity
- Set the relationship with meaning full name
- Find the cardinality,participation,degree.
- Identify the weak entity
- Represent the proper pictorial representation to entity, attributes, relation, key attribute, weak entity, identifying relationship, and etc.
- Once all the requirement gathered start designing the ER diagram for Coaching Institute