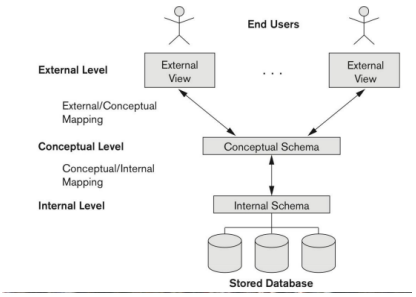
Ideas->Requirements->Entity Model->Relational Model->Database



Informal Terms		Formal Terms
Table		Relation
Column Header		Attribute
All possible Column Values		Domain
Row		Tuple
Table Definition		Schema of a Relation
Populated Table		State of the Relation

Tuple = row A relation is a set of such tuples(rows)
Values in a tule are considered unable to be divided.

A relational database state is sometimes called a relational database **snapshot** or **instance**.

Discussed Relational Model Constraints and Relational Database Schemas
• Domain constraints, Key constraints, Entity integrity, Referential integrity

ER-to-Relational Mapping Algorithm
- Step 1: Mapping of Regular Entity Types
- Step 2: Mapping of Weak Entity Types
- Step 3: Mapping of Binary 1:1 Relation Types
- Step 4: Mapping of Binary 1:N Relationship Types.
- Step 5: Mapping of Binary M:N Relationship Types.
- Step 6: Mapping of Multivalued attributes.
- Step 7: Mapping of N-ary Relationship Types.

Mapping EER Model Constructs to Relations
- Step 8: Options for Mapping Specialization or Generalization.
- Step 9: Mapping of Union Types (Categories)

• **1st normal form**
• All attributes are a single value per entry
• **2nd normal form**
• All attributes depend on the whole key, that is, removing any part of the key makes the functional dependency fail. The smallest, simplest superkey.
• **3rd normal form**
• All attributes depend on nothing but the key,
there is no transitive functional dependency
• **BCNF normal form**
• No attribute has a recursion.
• **4th normal form**
• For every non-key attribute in a multivariate relation has a superkey.
• That is, every tuple in the table will be unique and one-to-one
• **5th normal form**
• The tables can no longer be split any further and still be useful.
• Very rarely in practice.

- Relational Algebra
  - Unary Relational Operations
    - SELECT (symbol: σ (sigma))
    - PROJECT (symbol: π (pi))
    - RENAME (symbol: ρ (rho))
  - Relational Algebra Operations From Set Theory
    - UNION (∪)
    - INTERSECTION (∩)
    - DIFFERENCE (–)
    - CARTESIAN PRODUCT (X)

ER Diagram Dictionary

- Relation: Reading
- Entities: Book, Person
- Participation: Partial
- Cardinality: Many-To-Many

- Entity: Automobile
- Attributes:
  - Make-Varchar (50), the company that made the automobile
  - Model-Varchar(50), the style of the automobile
  - License- Compound attribute, a metal plate with an issuing state and number
    - State-Varchar (25),The state the automobile is registered in
    - Number-Varchar(12), The number on the license
  - Colors-A set of the different colors of the car, colors are Varchar(16)
  - Current Market Value-float, derived, current value of the car.
- Primary Key: License

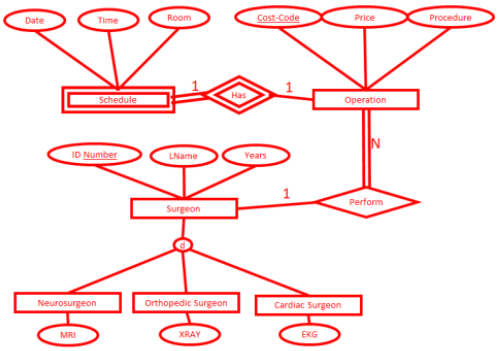
Schema

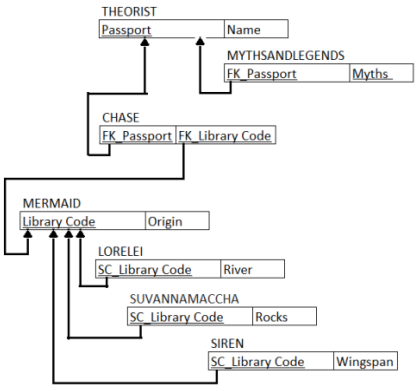
- Schema: <Schema Name>
- Attributes:<Attribute Name 1>,<Attribute Datatype 1>,[Description 1]
- Attributes:<Attribute Name 2>,<Attribute Datatype 2>,[Description 2]
- Attributes:<Attribute Name N>,<Attribute Datatype N>,[Description N]
- Primary Key: (<Attribute Name>[Attribute Name])
- Foreign Key: <Attribute Name FK1> refers to <OtherSchema1>(<OtherSchemaAttribute1>)
- Foreign Key: <Attribute Name FK2> refers to <OtherSchema2>(<OtherSchemaAttribute2>)
- Foreign Key: <Attribute Name FKN> refers to <OtherSchemaN>(<OtherSchemaAttributeN>)

Entity: Surgeon
Description: The individual performing the surgery, who has a number of years of experience.
Attribute: ID Number, INT
Attribute: LName, VARCHAR(80)
Attribute: Years, INT
Primary Key: ID Number

RELATIONSHIP DICTIONARY

Relationship: Has
Description: An operation has a schedule for a single time.
Entities: Operation, Schedule
Participation: Operation, Partial to Schedule, Total
Cardinality: Operation,1 to Schedule, 1





CHASE
Primary Key: FK_Passport,FK_Library_Code
FK_Passport references Theroist.Passport
FK_Library_Code references Mermaid.Library_Code

LORELEI
Primary Key: SC_Library_Code
Foreign Key: SC_Library_Code references Mermaid.Library Code

MERMAID
Primary Key: Library_Code