**Relation (table)**

Definition: A relation, commonly known as a table in a database, is a collection of data organized in rows and columns. Each table represents a specific entity or concept in the database.

Structure:

A diagram of a diagram

Description automatically generated- Columns (Attributes): Each column in a table represents a specific attribute of the entity, such as name, age, or ID. Columns have defined data types, such as integer, string, or date.

- Rows (Records or Tuples): Each row in a table represents a single record or instance of the entity.

**Tuple (Row) ：every *row* need to be unique, every cell don’t need to unique**

Definition: A tuple is a single entry in a table, representing a set of related data items. It corresponds to a row in the table.

Components:

- A tuple contains values for each attribute defined by the table’s columns. For example, a tuple in a student table might include a student’s ID, name, age, and GPA.

- Each value in the tuple must correspond to the data type specified for its column.

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Foreign key: attribute in one table that uniquely identifies a row in another table, acting like a "pointer“from a child table back to parent　table

**Handling Foreign Key Constraints**

**1. Delete Corresponding Records**: If the referencing record has no meaning on its own, delete it.

**2. Nullify Foreign Key**: Keep the data but "unlink" it by setting the foreign key to NULL.

**3. Disallow Changes**: Prevent changes to the referenced table if they would violate referential integrity, requiring some action to be taken first.

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Example: "An employee must work in one department, but a department does not necessarily have any employees."

A diagram of a work flow

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Description automatically generatedA diagram of a number of objects

Description automatically generated with medium confidence

Weak Entity:

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Description automatically generated- Double rectangle for the entity set  
- Double diamond for the supporting relationship

**SQL Table Creation Syntax**

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**Example Table Creation:**

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A table of chemical formulas

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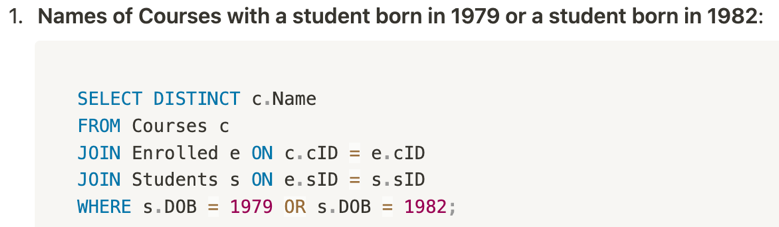
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A table with numbers and letters

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