



# Relational Database Concepts

*Graphical Representation of Referential Integrity*

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# Objectives

- Identify one to many relationships in associated primary and foreign keys in a relational database diagram.

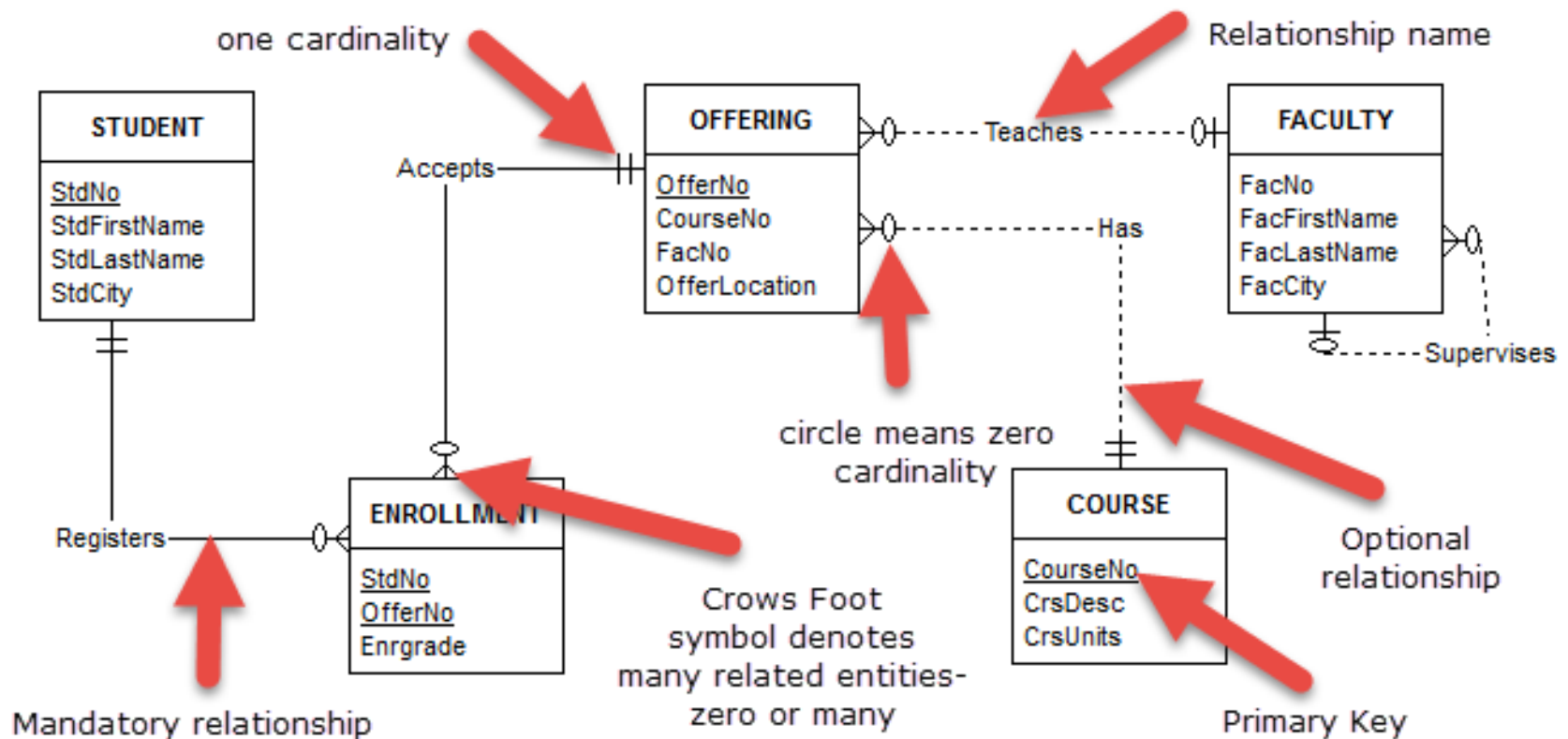


# Importance of Graphical Representation of Referential Integrity Rules

- The graphical representation makes referential integrity easier to define and understand than the text representation in the CREATE TABLE statement.
- ERDs are important in understanding relationships and integrity rules.
- A graphical representation supports non procedural data access.

# University ERD

- Let's review the ERD for the University database below.





# Graphical Representation of Referential Integrity

- Each line represents a referential integrity constraint or relationship.
- In a relationship, the primary key table is known as the parent or "1" table (for example, Student) and the foreign key table (for example, Enrollment) is known as the child or "M" (many) table.
- The relationship from Student to Enrollment is called "1-M" (one to many) because a student can be related to many enrollments but an enrollment can be related to only one student.
- The relationship from the Offering table to the Enrollment table means that an offering can be related to many enrollments but an enrollment can be related to only one offering.
- M-N (many to many) relationships are not directly represented in the Relational Model



# Graphical Representation of Referential Integrity

- An M-N relationship means that rows from each table can be related to many rows of the other table.
- For example, a student enrolls in many course offerings and a course offering contains many students.
- In the Relational Model, a pair of 1-M relationships and a linking or associative table represents an M-N relationship.
- Linking table Enrollment and its relationships with Offering and Student represent an M-N relationship between the Student and Offering tables.
- Self-referencing relationships are represented indirectly in the ERD.
- The self-referencing relationship involving Faculty is represented as a relationship between the Faculty and Faculty table.

# Graphical Representation of Referential Integrity

- The primary key of each table is underlined. For example, StdNo is the primary key of the Student table.
- Foreign keys relationships are denoted using the crow foot symbol. For example, the offering table has two foreign keys, CourseNo referencing a course table and FacNo referencing a faculty table.
- The lines represent relationships with referential integrity constraints.
- Each relationship has a parent table appearing next to the arrow in the line and a child table appearing next to the foot symbol.
- For example, the line between course and offering means that a relationship exists from course to offering with course as the parent table and offering as the child table.
- This relationship means that a course can be related to many offerings. Therefore, you can say that there is a one to many relationship.



# Graphical Representation of Referential Integrity

- A solid line means that the foreign key cannot have missing values. For example, the values in courseNo column of the offering table cannot have missing or null values, because the relationship line is solid in the diagram.
- A dashed line in the diagram means that the foreign key can accept missing or null values. For example, the FacNo foreign key in the offering table can accept null values in the faculty for an offering but may not be assigned until after the offering is initially entered into the database.



# Graphical Representation of Referential Integrity

- Most tables are combined using a relationship with a primary key from a parent table matching to a foreign key in a child table.
- To understand a relational database, you need to identify primary keys and foreign keys.
- Primary keys should have unique values for each row.
- No part of a primary key can have a missing or null value.
- Foreign keys must have a value matching a primary key value in a parent table.
- A database diagram provides a convenient representation, highlighting primary keys, foreign keys in relationships from parent tables to related child tables.



# Questions

- What is the consequence of two taxpayers or customers with the same government identifier or customer identifier?
- What integrity rule is violated?
- What is the consequence of a shipment associated with the wrong order? What integrity rule is violated?