Database Relationships Guide

Introduction

In relational database design, understanding relationships between tables is crucial. There are three primary types of relationships: One-to-One, One-to-Many, and Many-to-Many. This guide explains each type with examples and tabular illustrations.

One-to-One (1:1)

Definition: A single row in Table A is linked to a single row in Table B. Example: STUDENT and STUDENT_PROFILE. • Each student has exactly one profile. • Each profile belongs to exactly one student.

Sample Tables:

student_id	name
1	Alice
2	Bob

profile_id	student_id	address	phone
101	1	Dhaka, BD	012345678
102	2	Chittagong, BD	098765432

One-to-Many (1:M)

Definition: A single row in Table A is linked to many rows in Table B. Example: DEPARTMENT and STUDENT. • One department can have many students. • Each student belongs to exactly one department.

Sample Tables:

department_id	name
1	CSE
2	EEE

student_id	name	department_id
101	Alice	1
102	Bob	1
103	Carol	2

Many-to-Many (M:N)

Definition: Rows in Table A can be linked to many rows in Table B, and vice versa. Example: STUDENT and COURSE. • A student can enroll in many courses. • A course can have many students. This requires a junction table: ENROLLMENT.

Sample Tables:

student_id	name
1	Alice
2	Bob

course_id	title
101	Math
102	Physics
103	English

student_id	course_id
1	101
1	102
2	101
2	103
3	102

Key Rules to Remember

1. One-to-One → Use a UNIQUE FK, or make the FK also the PK in child.
2. One-to-Many → The child contains the parent's PK as FK.
3. Many-to-Many → Always create a junction table.

Golden Tip: The FK always lives in the table that represents the 'many' side.