Tables

Students

student_id	name	major
1	Alice Smith	Biology
2	Bob Johnson	Computer Science
3	Clara White	Math

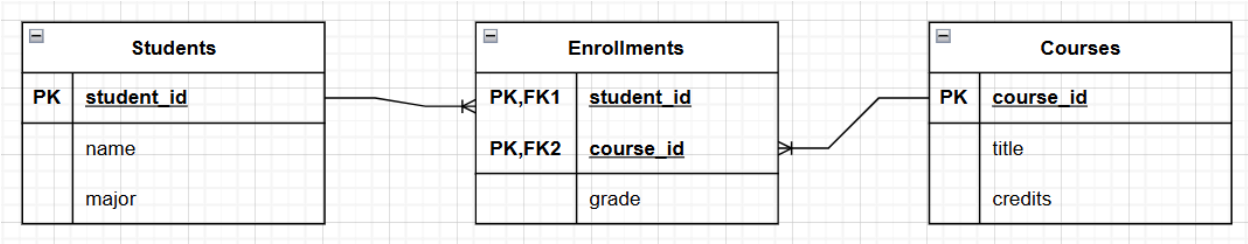
Courses

course_id	title	credits
101	Intro to Biology	4
102	Data Structures	3
103	Calculus I	4

Enrollments

student_id	**course_id**	grade
1	101	89
2	102	92
3	103	85
2	103	76

Entity-relationship diagram



Basic terminology	
Table	A collection of related data held in a structured format with rows and columns.
Field	A column in a table, representing a data attribute.
Record	A row in a table, representing one entry.
Entity	A real-world object represented in a database (e.g., Student, Course).
Attribute	A property of an entity (e.g., name, major).
One-to-many	One record in Table A relates to many in Table B (e.g., one course has many enrollments).
Many-to-many	Records in Table A relate to many in Table B and vice versa (e.g., many students take many courses).
Entity-relationship diagram	A visual representation of entities and their relationships.
Primary key	A field uniquely identifying a record.
Composite key	A primary key made up of two or more fields that together uniquely identify a record.
Foreign key	A field in one table that links to the primary key in another table.

Primary commands		

`CREATE TABLE`	Defines a new table in the database along with its columns, data types, and constraints (like primary keys or foreign keys).	`CREATE TABLE Students (`
		`  student_id INT PRIMARY KEY,`
		`  name VARCHAR(100),`
		`  major VARCHAR(50)`
		`);`

`DROP TABLE`	Permanently deletes a table and all its data and structure from the database.	`DROP TABLE Students;`
`INSERT INTO ... VALUES`	Adds new rows of data into a table.	`INSERT INTO Students (student_id, name, major)` `VALUES (4, 'Daniel Grey', 'Physics');`
`DELETE FROM ...`	Removes rows from a table that	`DELETE FROM Students WHERE student_id = 4;`

WHERE	meet a specified condition.	
UPDATE ... SET ... WHERE	Modifies existing data in a table for rows that meet a given condition.	**UPDATE Students SET major = 'Mathematics' WHERE student_id = 3;**
SELECT ... FROM	Retrieves data from one or more tables. Can be used with filters, sorting, aggregation, and joins.	**SELECT * FROM Students;**

Query modifiers		
TOP	Limits the result to a specified number of rows	**SELECT TOP 2 * FROM Students;**
DISTINCT	Eliminates duplicate values in the result set for the selected column(s).	**SELECT DISTINCT major FROM Students;**
ORDER BY	Sorts the result set by one or more columns, either ascending (**ASC**) or descending (**DESC**).	**SELECT * FROM Enrollments ORDER BY grade DESC;**
UNION	Combines the result sets of two **SELECT** statements and removes duplicates. Both queries must have the same number of columns.	**SELECT name FROM Students UNION SELECT title FROM Courses;**
WHERE	Filters rows based on a specified condition.	**SELECT * FROM Enrollments WHERE grade > 85;**
AND	Combines multiple conditions; all must be true.	**SELECT * FROM Enrollments WHERE grade > 80 AND course_id = 103;**
OR	Combines multiple conditions; at least one must be true.	**SELECT * FROM Enrollments WHERE grade > 80 OR course_id = 103;**
IN	Tests whether a value matches any value in a list.	**SELECT * FROM Courses WHERE course_id IN (101, 103);**

LIKE	Matches a pattern in a string. • * matches zero or more characters • ? matches a single character • # matches a single digit • [ax] matches one character that is either a or x • [a-k] matches one character in the range a-k	**SELECT * FROM Students WHERE name LIKE 'A*';**
MIN	Finds the smallest value in a column.	**SELECT MIN(grade) FROM Enrollments;**
MAX	Finds the largest value in a column.	**SELECT MAX(grade) FROM Enrollments;**
SUM	Calculates the total sum of a numeric column.	**SELECT SUM(credits) FROM Courses;**
AVG	Calculates the average of a numeric column.	**SELECT AVG(grade) FROM Enrollments;**
STDEV	Returns the standard deviation of a numeric column	**SELECT STDEV(grade) FROM Enrollments;**
COUNT	Counts the number of rows (or non-null values in a column).	**SELECT COUNT(*) FROM Students;**
GROUP BY	Groups rows that have the same values into summary rows (often used with aggregate functions like **AVG**, **SUM**, **COUNT**).	**SELECT student_id, AVG(grade) FROM Enrollments GROUP BY student_id;**
HAVING	Filters groups created by **GROUP BY**, similar to **WHERE** but for aggregates.	**SELECT student_id, AVG(grade) AS avg_grade FROM Enrollments GROUP BY student_id HAVING AVG(grade) > 80;**
INNER JOIN	Returns only rows with matching values in both tables.	**SELECT Students.name, Courses.title, Enrollments.grade FROM Enrollments**

		INNER JOIN Students ON Enrollments.student_id = Students.student_id **INNER JOIN Courses ON Enrollments.course_id = Courses.course_id;**
LEFT JOIN	Returns all rows from the left table, and matched rows from the right. If no match, NULLs appear.	**SELECT Students.name, Enrollments.grade** **FROM Students** **LEFT JOIN Enrollments ON Students.student_id = Enrollments.student_id;**
RIGHT JOIN	Returns all rows from the right table, and matched rows from the left.	**SELECT Courses.title, Enrollments.grade** **FROM Courses** **RIGHT JOIN Enrollments ON Courses.course_id = Enrollments.course_id;**
FULL JOIN	Returns all rows when there's a match in either table.	**SELECT Students.name, Courses.title** **FROM Students** **FULL JOIN Enrollments ON Students.student_id = Enrollments.student_id** **FULL JOIN Courses ON Enrollments.course_id = Courses.course_id;**