

Combine Tables with JOIN

Database Development 2022
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What do you mean JOIN

- ▶ Most of the time a query does not rely on **ONLY** one table
- ▶ Information must be pulled from multiple sources to answer the question
- ▶ The keyword or clause for this is a JOIN
- ▶ The syntax of the JOIN clause is important to follow for correct results

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Flashback to Normalization (3NF)

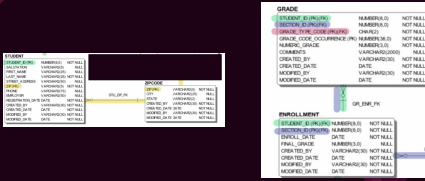
- ▶ Remember making the reference to another table as a FOREIGN KEY
- ▶ That path (potentially complex) is how we link tables to JOIN them
- ▶ The FOREIGN KEY (FK) of the first table needs to match the PRIMARY KEY (PK) of the second table
- ▶ If the PRIMARY KEY is a composite PK, that means **ALL** shared fields need to match!!!

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Path Identification

Individual PK – FK

Composite PK – FK



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Equijoin

- Specifically any JOIN based on equality
- The default type of JOIN we use
- PK = FK

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Aliases

- When doing advanced queries like JOIN it becomes helpful to aliases to clearly identify which tables and their associated fields are in use.
- Aliases are used as a prefix with a dot to specify which table contains the subsequent field
- To make an alias no keyword is used, just a space then the name of the alias after the table name
- An alias should be at least three letters long and describe the table name it is replacing

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ANSI JOIN Syntax

- FROM
 - Table you start with (with alias)
- JOIN
 - Table connected via relationship (with alias)
- ON
 - The PK – FK equality check AKA relationship
 - Composite PK – FK relationships joined with AND(s)
- Additional connections via subsequent JOIN – ON clauses

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When does it happen?

- All table selections (FROM/JOIN) are the **FIRST** step in the execution sequence
- The ON clauses then restrict rows to those that have a match along the PRIMARY KEY to FOREIGN KEY path
- Then the WHERE, GROUP BY, HAVING, SELECT clauses as normal

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SQL Execution Order

```
SELECT
  AVG(stu.student_id) AS silly,
  stu.zip,
  COUNT(*) AS students
FROM
  student stu
JOIN
  zipcode zip
ON
  zip.zip = stu.zip
WHERE
  zip.city LIKE 'h%'
GROUP BY
  stu.zip
ORDER BY
  students ASC
;
```

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Self Referential JOIN

- ▶ A table with a FOREIGN KEY to its own PRIMARY KEY
- ▶ Same rules apply
- ▶ Be sure to use a fabulous alias to avoid the ambiguous column error!

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Simple JOIN Example

```
SELECT
  stu.first_name,
  zip.city
FROM
  student stu
JOIN
  zipcode zip
ON
  stu.zip = zip.zip
;
```

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Composite PK Example

```
SELECT
  gra.section_id
FROM
  enrollment enr
JOIN
  grade gra
ON
  enr.student_id = gra.student_id
  AND
  gra.section_id = enr.section_id
JOIN
  grade_type_weight gtw
ON
  gra.grade_type_code = gtw.grade_type_code
  AND
  gra.section_id = gtw.section_id
;
```

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What NOT to do

▶ Do NOT use comma separated values in the FROM clause

▶ Path not clear

▶ Relations easy to miss

▶ Connect Primary Key – Foreign Key in the WHERE clause

▶ Harder to read

▶ Harder to reuse logic

▶ USING Clause

▶ Names not guaranteed

▶ NATURAL JOIN

▶ Names not guaranteed

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