



UNRAVELING THE MYSTERY

Databases and Tables

- Databases store data and contain various objects (tables, views, schemas, etc.)
- One type of database object is a Table, which is a collection of related information arranged in rows and columns
 - Columns (Fields or Attributes) contain one type of information (e.g., text, currency, date/time)
 - Rows (records) contain information for one record in the table

| StudentID | FirstName | LastName |
|-----------|-----------|----------|
| S1011101 | John | Smith |
| S1011102 | David | Williams |
| S1011103 | Chloe | Anderson |
| S1011104 | Emily | Adams |
| S1011105 | James | Roberts |

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Table Relationships

- One-to-One (1 – 1)
 - Example: Every student has one unique student ID number – usually tied to his/her SSN
- One-to-Many (1 – n)
 - Example: Every student can have one or more enrollment records (or none, if they never register)
- Many to Many* (n – n)
 - Example: Students can register for multiple classes, and classes can have multiple students

*To combine the Students table and the Courses table, you need a Junction Table – this junction table has a one-to-many relationship with the Students table and a one-to-many with the Courses table

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What is SQL?

- Structured Query Language (SQL) is the language that a client application uses to communicate with an SQL database
- SQL commands can create and manage databases and tables; and can retrieve, add, delete, or modify data within those tables
- SQL is widely used across major database services (Microsoft SQL Server, Oracle, Access, etc.) as a standard language (with some differences in how it's used)
- There are three major SQL Command Groups:
 - Data Manipulation Language (DML)
 - Data Definition Language (DDL)
 - Data Control Language (DCL)

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Data Manipulation Language (DML)

- This is the most common command group for every-day users
- Allows the user to view, change, and manipulate data within a **table**
- Includes the Commands:
 - SELECT
 - UPDATE
 - INSERT
 - DELETE


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Data Definition Language (DDL)

- Creates and defines databases and the objects within it
- Includes commands to create and delete tables
- Includes the Commands:
 - CREATE TABLE
 - DROP TABLE
 - CREATE VIEW
 - DROP VIEW


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Data Control Language (DCL)

- Controls access to the data in a database
- Primarily used by database administrators
- Includes the Commands:
 - REVOKE
 - GRANT

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Querying a Database

- A query is an SQL statement that requests information housed within the tables of a database
- SQL follows a specific Syntax, including the Command Clauses (**required** and **optional**), and **Placeholders** for the data (field names)
- Must be listed in a specific order
- Example:


```
SELECT colname1[, colname2, colname3...]
FROM tablename
WHERE condition
GROUP BY colname1[, colname2...]
HAVING condition
ORDER BY colname1[, colname2...]
```

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The SELECT Command

- To view data, you use a SELECT statement
- The order in which you list the columns determines the order they are displayed in the query output
- Use commas to separate column names (if using more than one)
- Example:


```
SELECT StudentID, FirstName, LastName, Email, GradeLevel
FROM tblStudents
WHERE GradeLevel ='Senior';
```


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Building your Statement

- While the Syntax requires you to write the statement in a specific order, you want to construct it differently
- The order is always: SELECT (fields) FROM (table) WHERE (condition, if needed, etc.)
- But it helps to change up the order when writing:
 - 3 – SELECT
 - 1 – FROM
 - 2 – WHERE
- Knowing where you're getting your data (FROM) and what conditions you need (WHERE) is the most important step; THEN you can designate what fields you want included (SELECT)

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Types of Queries


- There are main types of Queries: Simple and Joins
- Simple Queries pull data all from one Table within the database
- Joins pull data from multiple Tables within the database by using relationships between the tables
 - Without a defined Join, you get a Cartesian Product from all tables included in the Query – THIS IS BAD! You don't want this!

```

SELECT FirstName, LastName, StudentID
FROM tblStudents;

SELECT S.FirstName, S.LastName, S.StudentID, B.TotalAid, B.TotalCharges, B.RemainingBal
FROM tblBilling B INNER JOIN tblStudents S ON tblBilling.StudentID = tblStudents.StudentID
WHERE B.RemainingBal > 0;
    
```

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Types of Joins

- Inner Join
 - Select records that have matching values in both tables
- Left Outer Join
 - Select records from the first table (left-most) table with matching right table records
- Right Outer Join
 - Select records from the second (right-most) table with matching left table records
- Full (Outer) Join
 - Selects all records that match either left or right table records

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Types of Joins

The diagram illustrates four types of SQL joins using two overlapping circles representing 'left table' and 'right table':

- INNER JOIN:** Only the overlapping area of the two circles is shaded orange.
- FULL JOIN:** The entire area of both circles is shaded orange.
- LEFT JOIN:** The left circle and the overlapping area are shaded orange, while the right circle is white.
- RIGHT JOIN:** The right circle and the overlapping area are shaded orange, while the left circle is white.

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A SQL Statement walks into a bar

Sees two tables and asks...

"Can I join you?"

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Examples of SQL Statements

```

--SQL ROLE TO IDENTIFY STUDENTS WHO ARE MEETING ALL REQUIREMENTS (FISHER)
SELECT DISTINCT ROBOTAT_FIRM
FROM ROBOTAT
INNER JOIN ROBOTON ON ROBOTAT_FIRM = ROBOTAT_FIRM AND ROBOTON_ROWID = F_GET_CONKEYT_ROBOTON_ROWID(ROBOTAT_FIRM, 'AIDY') /*ROBOTON FUNCTION TO PULL MOST CURRENT RECORD*/
LEFT JOIN HIRGLORA ON ROBOTAT_FIRM = HIRGLORA_FIRM
WHERE HIRGLORA_LEVEL_CODE = ROBOTON_LEVEL_CODE
/*%# TEST %*/
/*%# HIRGLORA_SCORE_RANGE(1) * 0.43 % => (HWL.HIRGLORA_SCORE_RANGE(1))
FROM ROBOTAT TEST %*/
AND (
  ROBOTON_LEVEL_CODE = 'L04' AND (HWL.HIRGLORA_SCORE_ATTENDED(0, 00001) <= 90,00000
  OR (ROBOTON_LEVEL_CODE = 'T04' AND (HWL.HIRGLORA_SCORE_ATTENDED(10, 00001) <= 100,00000)
/*%# TEST %*/
AND
  ROBOTON_LEVEL_CODE = 'L04'
  AND (HWL.HIRGLORA_SCA_1(0) >= 3,00)
  OR (ROBOTON_LEVEL_CODE = 'T04'
  AND (HWL.HIRGLORA_SCORE_ATTENDED(20, 9999) BETWEEN 0,000 AND 20, 9999)
  AND (HWL.HIRGLORA_SCA_4(0) >= 1,75))
  OR (ROBOTON_LEVEL_CODE = 'L04'
  AND (HWL.HIRGLORA_SCORE_ATTENDED(10, 9999) BETWEEN 30,000 AND 10, 9999)
  AND (HWL.HIRGLORA_SCA_4(0) >= 1,50))
  OR (ROBOTON_LEVEL_CODE = 'T04'
  AND (HWL.HIRGLORA_SCORE_ATTENDED BETWEEN 60,00000 AND 80, 9999)
  AND (HWL.HIRGLORA_SCA_1(0) >= 1,50))
  OR (ROBOTON_LEVEL_CODE = 'T04'
  AND (HWL.HIRGLORA_SCORE_ATTENDED >= 90,00000)
  AND (HWL.HIRGLORA_SCA_1(0) >= 2,00))
)
AND (HWL.HIRGLORA_SCORE_ATTENDED = 'AIDY'
AND ROBOTAT_FIRM = 'ISSIM'

```

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FAMs with GUI Tools to Build Queries PowerFAIDs Example


Selection Set Details:

Selection Set Name: BGT GR Fees for Nursing Token: 8935

Group: New Existing (B.COSTS)

| Dictionary Item | Operator | Target | Expression | Add Clause | Delete Clause |
|-----------------|----------|--------|------------|---------------------------------|---------------|
| Program* | Is | Equal | Constant | Graduate | AND |
| Publication* | Is | Equal | Constant | Graduate | AND |
| Degree* | Is | Equal | Constant | Doctor Nurse Practitioner | OR |
| Degree* | Is | Equal | Constant | PhD Doctor Nursing Practitioner | OR |
| Degree* | Is | Equal | Constant | Master Sc Nursing | OR |
| Degree* | Is | Equal | Constant | PhD Master Science Nursing | AND |

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FAMs with GUI Tools to Build Queries Colleague Example

Element Checking Criteria

Rule ID: 107_0018 Checked On: 11/16/23 Created By: wphoton

Description: Review License Renewal for Nurse

Office Code: 01000000000000000000

Priority Filter: All Approved: 0 Submitter Name: 00000000000000000000

Run Status Message:

Checking Criteria

| Connector | Left Hand Expression | Relation | Right Hand Expression |
|-----------|-----------------------|----------|-----------------------|
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | EQ |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | GT |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | LT |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | NE |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | EQ |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | GT |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | LT |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | NE |

Element Checking Criteria

Rule ID: 107_0018 Checked On: 11/16/23 Created By: wphoton

Description: Review License Renewal for Nurse

Office Code: 01000000000000000000


Priority Filter: All Approved: 0 Submitter Name: 00000000000000000000

Run Status Message:

Checking Criteria

| Connector | Left Hand Expression | Relation | Right Hand Expression |
|-----------|-----------------------|----------|-----------------------|
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | EQ |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | GT |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | LT |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | NE |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | EQ |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | GT |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | LT |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | NE |

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FAMs with GUI Tools to Build Queries Colleague Example

Element Checking Criteria

Rule ID: 107_0018 Checked On: 11/16/23 Created By: wphoton

Description: Review License Renewal for Nurse

Office Code: 01000000000000000000

Priority Filter: All Approved: 0 Submitter Name: 00000000000000000000

Run Status Message:

Checking Criteria


| Connector | Left Hand Expression | Relation | Right Hand Expression |
|-----------|-----------------------|----------|-----------------------|
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | EQ |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | GT |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | LT |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | NE |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | EQ |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | GT |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | LT |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | NE |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | EQ |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | GT |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | LT |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | NE |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | EQ |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | GT |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | LT |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | NE |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | EQ |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | GT |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | LT |
| AND | CC-CL-SRVS-ACAD-LEVEL | IS | NE |

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Free SQL For Beginners

- SOLO Learn has an online website and apps available on iOS and Android Devices:
 - <https://www.sololearn.com/Course/SQL/>
- <https://www.dofactory.com/sql/tutorial>
- SQL Playground Practice:
 - <https://www.sql-practice.com/>



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Questions & Answers

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