**SQL JOINs – What is a JOIN?**

**A JOIN in SQL is used to COMBINE COLUMS from two or more tables BASED on a RELATED COLUMN, usually a key – like a foreign key.**

**Types of JOINS**

1. **INNER JOIN:**
   * **Returns rows where there is a match in both tables.**
2. **LEFT JOIN (or LEFT OUTER JOIN):**
   * **Returns all rows from the left table, and matching rows from the right table. If there is no match, returns NULL values for the right table.**
3. **RIGHT JOIN (or RIGHT OUTER JOIN):**
   * **Opposite of LEFT JOIN. Returns all rows from the right table, and matching rows from the left table.**
4. **FULL OUTER JOIN:**
   * **Returns rows where there is a match in either table. If there's no match, it will return NULL for the non-matching table.**

**E.g. of an INNER JOIN**

**Let’s say we have two simple tables:**

**1. students table:**

| **student\_id** | **student\_name** |
| --- | --- |
| **1** | **Alice** |
| **2** | **Bob** |
| **3** | **Charlie** |

**2. courses table:**

| **course\_id** | **student\_id** | **course\_name** |
| --- | --- | --- |
| **101** | **1** | **Math** |
| **102** | **2** | **History** |
| **103** | **1** | **Science** |
| **104** | **3** | **Literature** |

**SQL Query Using JOIN:**

**SELECT students.student\_name, courses.course\_name FROM students JOIN courses ON students.student\_id = courses.student\_id;**

**Result After JOIN:**

| **student\_name** | **course\_name** |
| --- | --- |
| **Alice** | **Math** |
| **Alice** | **Science** |
| **Bob** | **History** |
| **Charlie** | **Literature** |

**Explanation:**

* **The students table's student\_name column is joined with the courses table's course\_name column based on the student\_id column.**
* **The INNER JOIN will only return rows where there is a match between the student\_id in both tables.**
  + **Alice appears twice because she is enrolled in two courses (Math and Science).**
  + **Bob and Charlie each appear once, as they are enrolled in one course each.**

**Key Differences Between JOIN and UNION:**

| **Feature** | **JOIN** | **UNION** |
| --- | --- | --- |
| **Combines...** | **Columns side by side** | **Rows on top of each other** |
| **Based on...** | **A related column (usually keys)** | **Structure (same number & type of columns)** |
| **Returns...** | **Wider rows (more columns)** | **Taller result set (more rows)** |
| **Use Case E.g.** | **Combine employee data with department data** | **Combine customer and supplier lists** |