**Reporting in SQL Server**

**Chapter 1**

Case study

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**Query 1: COUNT(\*)**

SELECT

bronze,

COUNT(\*) AS rows

FROM summer\_games

GROUP BY bronze;

* **What it does**:
  + COUNT(\*) counts **all rows** in the group, regardless of whether the bronze column contains NULL values or not.
  + NULL values in bronze will still be included in the count of rows.

**Query 2: COUNT(bronze)**

SELECT

bronze,

COUNT(bronze) AS rows

FROM summer\_games

GROUP BY bronze;

* **What it does**:
  + COUNT(bronze) counts **only the non-NULL values** in the bronze column within each group.
  + Rows where bronze is NULL will not be included in the count.

**Key Difference**

* COUNT(\*): Counts **all rows** in the group.
* COUNT(bronze): Counts **only rows where bronze is not NULL**.

**Example Table**

| **bronze** | **other\_column** |
| --- | --- |
| 1 | X |
| 2 | Y |
| NULL | Z |
| 1 | W |

**Query 1: COUNT(\*)**

Output:

| **bronze** | **rows** |
| --- | --- |
| 1 | 2 |
| 2 | 1 |
| NULL | 1 |

**Query 2: COUNT(bronze)**

Output:

| **bronze** | **rows** |
| --- | --- |
| 1 | 2 |
| 2 | 1 |

* The NULL group does not appear because COUNT(bronze) ignores NULL values.

**Use Case**

* Use COUNT(\*) when you need the total number of rows, including those where the bronze column is NULL.
* Use COUNT(bronze) when you need to count only the rows where bronze has a value.

**Chapter 2**

Creating Reports

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**Chapter 3**

Cleaning and Validation

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* DATE\_DIFF for Date
* UPPER for String

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* For Date: 1. DATE\_TRUNC 2.DATE\_PART 3. CAST()

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1. **Filter Null Cells for Counting**: Use COUNT():

SELECT COUNT(column\_name) AS non\_null\_count

FROM table\_name

WHERE column\_name IS NOT NULL;

1. **Filter Null Cells for Summing Numeric Values**: Use SUM():

SELECT SUM(column\_name) AS total\_sum

FROM table\_name

WHERE column\_name IS NOT NULL;

1. **General NULL Handling**: To filter rows explicitly based on NULL values, use IS NOT NULL:

SELECT \*

FROM table\_name

WHERE column\_name IS NOT NULL;

**Example with Data**

| **column\_name** |
| --- |
| 10 |
| NULL |
| 20 |

**Using COUNT(column\_name):**

* Output: 2 (counts rows with values 10 and 20).

**Using SUM(column\_name):**

* Output: 30 (adds values 10 and 20, ignores NULL).

**Summary**

* Use COUNT() to **count non-NULL rows**.
* Use SUM() to **sum non-NULL numeric values**.

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To ensure the expression handles NULL values correctly, wrap each column in COALESCE() to replace NULL with 0. This way:

* COALESCE(gold, 0)+COALESCE(silver, 0)+COALESCE(bronze, 0)\text{COALESCE(gold, 0)} + \text{COALESCE(silver, 0)} + \text{COALESCE(bronze, 0)}COALESCE(gold, 0)+COALESCE(silver, 0)+COALESCE(bronze, 0) will correctly compute the sum of available values, even if some are NULL.

**Correct Query**

SELECT

c.country,

-- Add the three medal fields using COALESCE to handle NULLs

SUM(COALESCE(gold, 0) + COALESCE(silver, 0) + COALESCE(bronze, 0)) AS medals

FROM summer\_games AS s

JOIN countries AS c

ON c.id = s.country\_id

GROUP BY c.country

ORDER BY medals DESC;

**Example**

**Input Data:**

| **country\_id** | **country** | **gold** | **silver** | **bronze** |
| --- | --- | --- | --- | --- |
| 1 | USA | 10 | 5 | NULL |
| 2 | Canada | NULL | 3 | 1 |
| 3 | Germany | NULL | NULL | NULL |

**Without COALESCE:**

* gold + silver + bronze:
  + USA: 10+5+NULL=NULL10 + 5 + \text{NULL} = \text{NULL}10+5+NULL=NULL
  + Canada: NULL+3+1=NULL\text{NULL} + 3 + 1 = \text{NULL}NULL+3+1=NULL
  + Germany: NULL+NULL+NULL=NULL\text{NULL} + \text{NULL} + \text{NULL} = \text{NULL}NULL+NULL+NULL=NULL

Result:

| **country** | **medals** |
| --- | --- |
| USA | NULL |
| Canada | NULL |
| Germany | NULL |

**With COALESCE:**

* COALESCE(gold, 0) + COALESCE(silver, 0) + COALESCE(bronze, 0):
  + USA: 10+5+0=1510 + 5 + 0 = 1510+5+0=15
  + Canada: 0+3+1=40 + 3 + 1 = 40+3+1=4
  + Germany: 0+0+0=00 + 0 + 0 = 00+0+0=0

Result:

| **country** | **medals** |
| --- | --- |
| USA | 15 |
| Canada | 4 |
| Germany | 0 |

**Key Takeaway**

Arithmetic operations with NULL values result in NULL. To avoid this, use COALESCE() to replace NULL with a default value (e.g., 0) before performing calculations. The SUM() function itself doesn't cause the issue—it’s the gold + silver + bronze expression that evaluates to NULL due to NULL values.

**Chapter 4**

Complex Calculation

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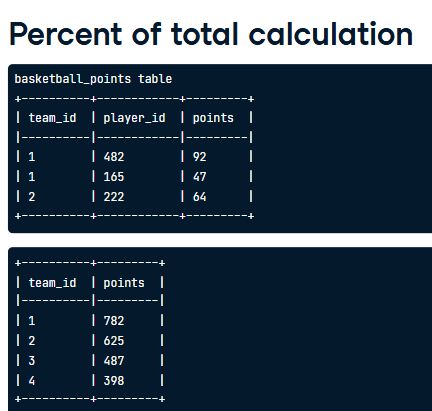
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