SQL Operators: `LIKE`, `NOT`, `IN`, `BETWEEN`, `IS NULL` and Their Real-Life Applications Across Industries

These SQL operators are essential for filtering data in relational databases, helping organizations derive meaningful insights from their datasets. Below is an explanation of each operator and its practical applications in various industries.

1. `LIKE` Operator

The `LIKE` operator is used for pattern matching in strings. It allows for flexible queries that can match partial strings.

Use Cases:

- E-Commerce: Search for products by name or description.

- Healthcare: Find patient records with specific symptoms.

- Education: Query student names or courses based on partial matches.

Example:

E-Commerce: Find all products containing "shoe" in their names.

```
SELECT product_name
FROM Products
WHERE product_name LIKE '%shoe%';
```

- Explanation: This query retrieves all products with "shoe" anywhere in their names, helping customers find relevant items.

2. `NOT` Operator

The `NOT` operator negates a condition, filtering out results that meet specified criteria.

Use Cases:

- Banking: Exclude transactions from certain categories.

- Retail: Filter out items that are out of stock.

- Telecom: Analyze customer plans excluding premium packages.

Example:

Retail: Get all products that are not in the "clearance" category.

```
SELECT product_name
FROM Products
WHERE category NOT LIKE 'Clearance%';
```

- Explanation: This query helps retailers focus on regular items, avoiding clearance products during promotions.

3. `IN` Operator

The `IN` operator allows users to specify multiple values in a WHERE clause, making it easier to filter data based on a list of acceptable values.

Use Cases:

- Telecom: Analyze call records for specific customer segments.

- Healthcare: Retrieve patient records based on multiple diagnoses.

- Finance: Filter transactions by multiple categories.

Example:

Finance: Find all transactions that are either "withdrawal" or "transfer".

```
SELECT transaction_id
FROM Transactions
WHERE transaction_type IN ('Withdrawal', 'Transfer');
```

- Explanation: This query retrieves transactions of interest, helping financial analysts focus on specific types of activities.

4. `BETWEEN` Operator

The `BETWEEN` operator is used to filter data within a specific range. It is inclusive of the boundary values.

Use Cases:

- Real Estate: Find properties within a certain price range.

- Education: Retrieve students with scores within a specified range.

- Logistics: Analyze shipments delivered within a time frame.

Example:

Real Estate: Get properties priced between $200,000 and $500,000.

```
SELECT property_id
FROM Properties
WHERE price BETWEEN 200000 AND 500000;
```

- Explanation: This query helps real estate agents identify suitable properties for clients based on budget constraints.

5. `IS NULL` Operator

The `IS NULL` operator is used to check for null values in a dataset, indicating missing or undefined data.

Use Cases:

- Healthcare: Identify patients with missing medical records.

- E-Commerce: Find customers without recorded email addresses.

- Banking: Detect accounts without recent transactions.

Example:

Healthcare: Retrieve patients with missing phone numbers.

```
SELECT patient_id
FROM Patients
WHERE phone_number IS NULL;
```

- Explanation: This query helps healthcare administrators identify patients who may need to provide their contact information for follow-up.

Conclusion

The SQL operators `LIKE`, `NOT`, `IN`, `BETWEEN`, and `IS NULL` are powerful tools for data analysis across various industries. By enabling targeted queries and data filtering, these operators help organizations gain valuable insights and make informed decisions based on their datasets.