#1

Hi, everyone here. Nice to meet you.

I am Lee Jung Yoon of ITM major who will present the independent project under the theme of IN operator and EXISTS operator.

#2

As you can see on the screen, I will explain why I chose this topic, the concept of IN operator and EXISTS operator, and the difference.

After that, let us look at an example of how the difference between IN operator and EXISTS operator applies.

#3

First, let me tell you why I chose this topic.

Is there anyone who has completed our second assignment?

Those who have solved the task will know, but there was the following problem.

Transform the following query into another query so as to use EXISTS or NOT EXISTS operators.

The problem requires changing the query with IN operator into the SQL code with exists operator.

#4

I have a question while solving this problem.

Same Result, Different Code.

What is the Difference between EXISTS and IN in SQL?

Eventually, both codes are for the same result, so why do they use IN and EXISTS separately?

When should I use IN, and when should I use EXISTS?

Those were my questions, and they became the topic of this presentation.

#5

What is an IN operator?

The IN operator finds the rows that meet the conditions in the given table.

How do I use the code?

Use the values in parentheses of the IN operator.

#6

Or you can put a subquery in parentheses.

#7

IN operator can be replaced with multiple OR operators.

The IN operator runs only once. Scan every record in the IN block.

IN operator returns the list of values that meet the condition.

Compare outer query’s results & inner query’s results, one by one.

#8

What is an EXISTS operation?

The EXISTS operator checks for the presence of values that meet the conditions of the sub-query.

EXISTS creates EXISTS without any attribute keywords in the WHERE statement of the main query and uses it by typing sub-query in parentheses. However, you cannot put values in parentheses like IN operator.

#9

The EXISTS operator compares the first result of the outer query with the execution result of the inner query.

It then checks whether the two result values are the same.

In this way, verify that each result value in the outer query also exists in the return value in the inner query. Therefore, the inner query is executed as many as the number of result values in the outer query.

If the result of the outer query is the same as the result of the inner query, EXISTS operator returns True. In the opposite case, return False. In other words, EXISTS operator returns a boolean-type value, unlike IN operator.

Finally, the EXISTS operator stops the search and moves on to the next step as soon as it finds a value in the inner query which is equal to the result value of each outer query. This allows query execution to be faster than with IN operator. Again, EXISTS operator would stop the comparison when the first matching occurs.

#10

To sum up, what is the difference between the two operators?

There are mainly two different parts.

The method of determining the values that match the conditions, and the types of values that the two operators return.

First, in terms of the method of verifying the values meet the conditions, the IN operator compares all the values of the main query and the subquery one by one.

The more values you need to compare, the more run-time of queries.

In contrast, the EXISTS operator stops searching the first time the result value of the main query matches the result value of the subquery.

It is relatively efficient compared to the IN operator because it stops the search when it finds a value that fits the condition.

#11

EXISTS operator returns true or false, Boolean type value, depending on whether there are values that satisfy the conditions of the subquery.

#12

So far, we have taken a brief look at the IN and EXISTS operators.

So what is the conclusion? When should we use the IN operator and the EXISTS operator?

If most of the filtering criteria are in the subquery, then you can use IN operator.

IN for big outer query and small inner query.

As mentioned earlier, it is appropriate to use when the result value of the IN operator can be expected to be small, because as the result value of the subquery in the IN operator increases, the time required for the query operation increases.

If most of the filtering criteria are in the main query, then you can use EXISTS operator.

EXISTS for small outer query and big inner query.

If each operation has the same result as the main query and subqueries, it immediately moves on to the next operation, so you can output values relatively quickly, even if the result values of the subqueries and main queries are large.

#13

I arbitrarily wrote the tables about the electric scooters and their user.

The kickboard relation has attributes consisting of kickboard id, mileage, battery, status, and current\_user.

The user\_info relation has columns consisting of user\_id, average\_distance, average\_time, average\_speed, and license.

#14

These two codes are the same except for the operator in the WHERE clause.

Similarly, their results are the same.

#15

If we execute these codes, SQL will output the following results.

#16

I executed each query 20 times.

I drew the following graph by recording the time taken in each execution.

As can be seen from the line graph, it can be seen that the runtime of queries using EXISTS operators is slightly less than that of queries using IN operators.

#17

As a result, EXISTS had a slight advantage even in average runtime.

I think there was such a slight difference in the dataset used this time because the number of rows was not large and the conditions were simple.

As mentioned in the concept part, I think that the runtime difference between IN and EXISTS will become more severe as the conditions of the subquery become more complex and the size of the data becomes bigger.

#18

I prepared this presentation by referring to these books and sites.

#19

This is the end of the presentation of the individual project of database management. Thank you for listening.