Lesson 21

18.02.2024

```
public class ex1 {
    int num = 100;
    public void calc(int num)   { num = num * 10;   }
    public void printNum()      { System.out.println(num); }

    public static void main(String[] args)
    {
        ex1 obj = new ex1();
        obj.calc(2);
        obj.printNum();
    }
}
```

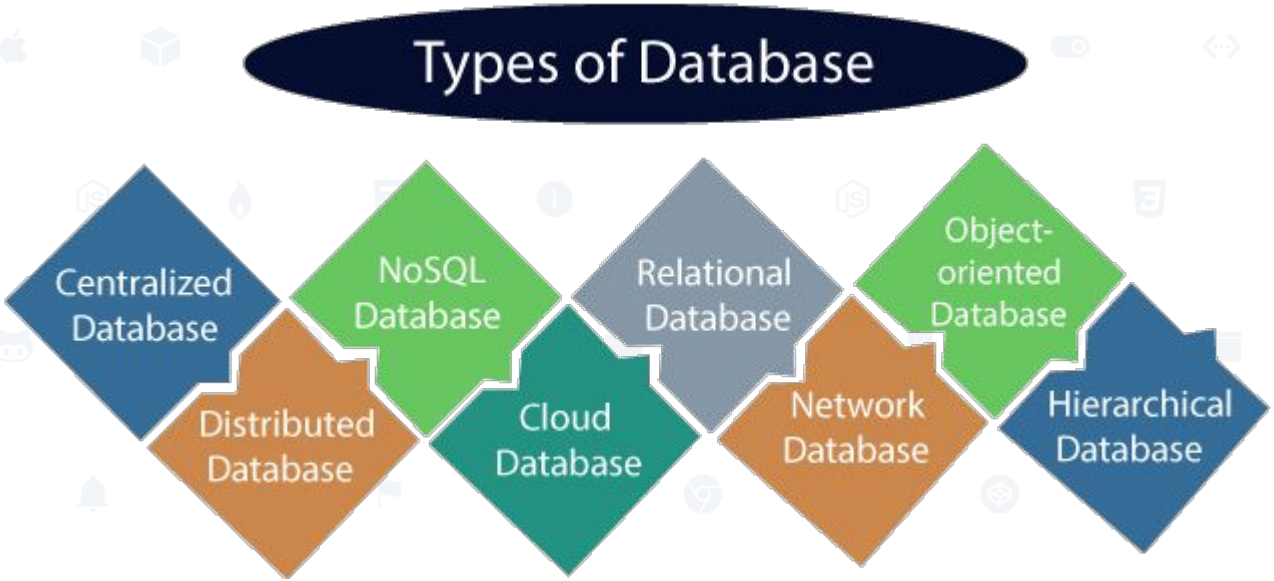
```
class First {
    public First() { System.out.println("a"); }
}

class Second extends First {
    public Second() { System.out.println("b"); }
}

class Third extends Second {
    public Third() { System.out.println("c"); }
}

public class ex2 {
    public static void main(String[] args) {
        Third c = new Third();
    }
}
```

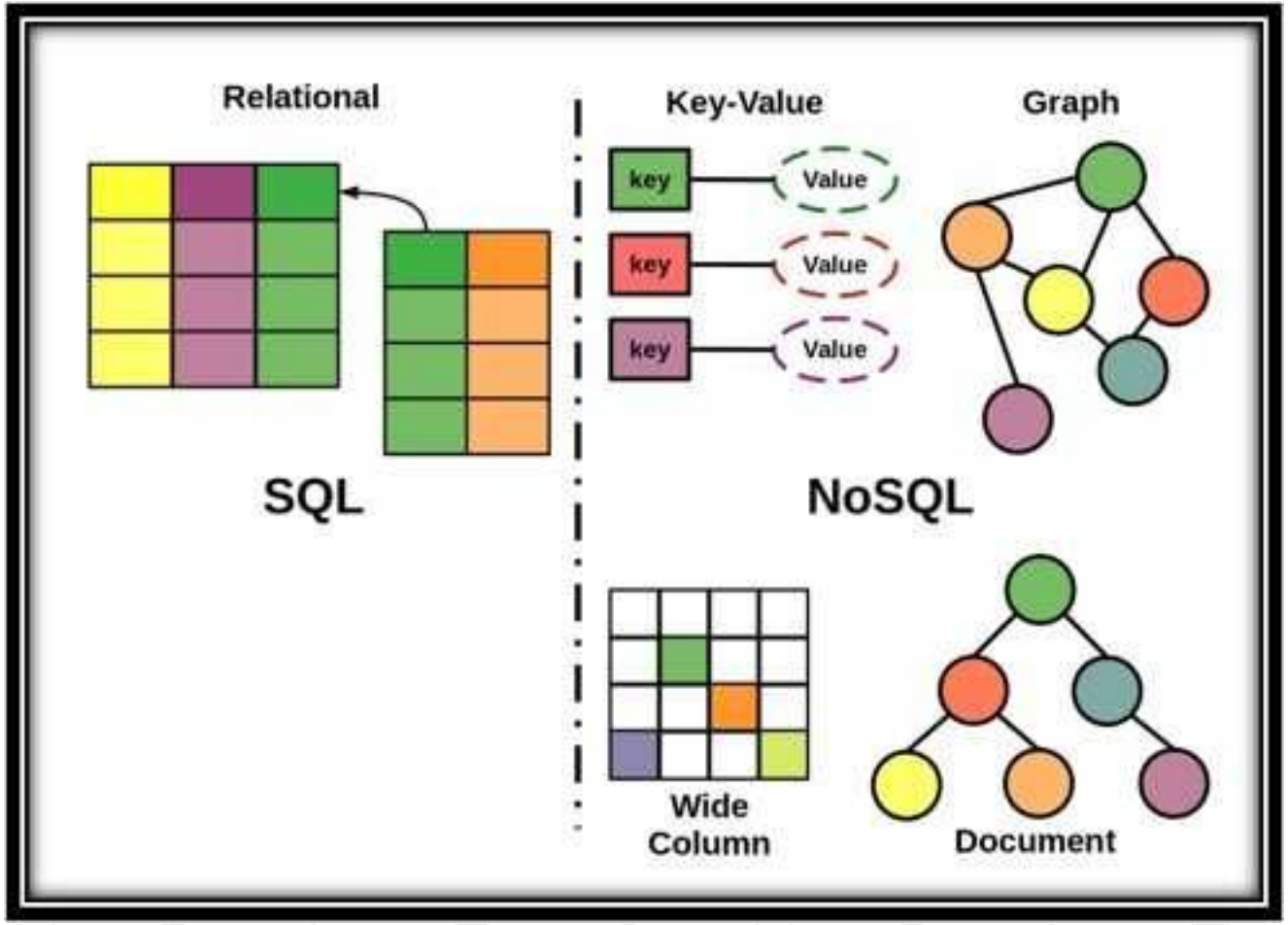
```
public class ex3 {
    public static void main(String[] args) {
        var list = List.of(new String[]{"A", "BB", "CCC"},
                new String[]{"DD", "E"});
        list.forEach(x ->
                System.out.print(x.length));
    }
}
```

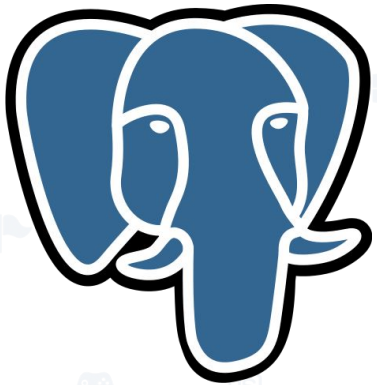
```
public class ex4 {
    public static void main(String[] args) {
        char[][] arr = {
                {'A', 'B', 'C'},
                {'D', 'E', 'F'},
                {'G', 'H', 'I'}
        };
        for (int i = 0; i < arr.length; i++) {
            for (int j = 0; j < arr[i].length; j++) {
                System.out.print(arr[i][1]);
            }
            System.out.println();
        }
    }
}
```

```
class Car {
    void speed(Byte val) {System.out.println("DARK");}

    void speed(byte... vals) {System.out.println("LIGHT");}
}

public class ex5 {

    public static void main(String[] args) {
        byte b = 10;
        new Car().speed(b);
    }
}
```

База даних - сукупність даних, що зберігаються відповідно до схеми даних, маніпулювання якими виконують відповідно до правил засобів моделювання даних.




Relational
Key-Value
Graph
key
Value
key
Value
key
Value
SQL
NoSQL
Wide
Column
Document




MariaDB


Microsoft®
SQL Server®


SQLite


H2


MySQL™


ORACLE®
DATABASE

https://db-engines.com/en/ranking

Rank Feb 2024	Rank Jan 2024	Rank Feb 2023	DBMS	Database Model	Score Feb 2024	Score Jan 2024	Score Feb 2023
1.	1.	1.	Oracle	Relational, Multi-model	1241.45	-6.05	-6.08
2.	2.	2.	MySQL	Relational, Multi-model	1106.67	-16.79	-88.78
3.	3.	3.	Microsoft SQL Server	Relational, Multi-model	853.57	-23.03	-75.52
4.	4.	4.	PostgreSQL	Relational, Multi-model	629.41	-19.55	+12.90
5.	5.	5.	MongoDB	Document, Multi-model	420.36	+2.88	-32.41
6.	6.	6.	Redis	Key-value, Multi-model	160.71	+1.33	-13.12
7.	7.	↑ 8.	Elasticsearch	Search engine, Multi-model	135.74	-0.33	-2.86
8.	8.	↓ 7.	IBM Db2	Relational, Multi-model	132.23	-0.18	-10.74
9.	9.	↑ 12.	Snowflake	Relational	127.45	+1.53	+11.80
10.	↑ 11.	↓ 9.	SQLite	Relational	117.28	+2.08	-15.38
11.	↓ 10.	↓ 10.	Microsoft Access	Relational	113.17	-4.50	-17.86
12.	12.	↓ 11.	Cassandra	Wide column, Multi-model	109.27	-1.77	-6.95
13.	13.	13.	MariaDB	Relational, Multi-model	97.23	-2.00	+0.42
14.	14.	14.	Splunk	Search engine	91.65	-1.07	+4.57
15.	↑ 16.	15.	Amazon DynamoDB	Multi-model	82.90	+1.96	+3.21
16.	↓ 15.	16.	Microsoft Azure SQL Database	Relational, Multi-model	79.56	-1.51	+0.81
17.	17.	↑ 19.	Databricks	Multi-model	76.91	-3.62	+16.58
18.	18.	↓ 17.	Hive	Relational	65.81	-1.15	-6.31
19.	19.	↑ 22.	Google BigQuery	Relational	63.63	+0.15	+11.17
20.	20.	↓ 18.	Teradata	Relational, Multi-model	51.24	-1.94	-11.79

Sql database structure

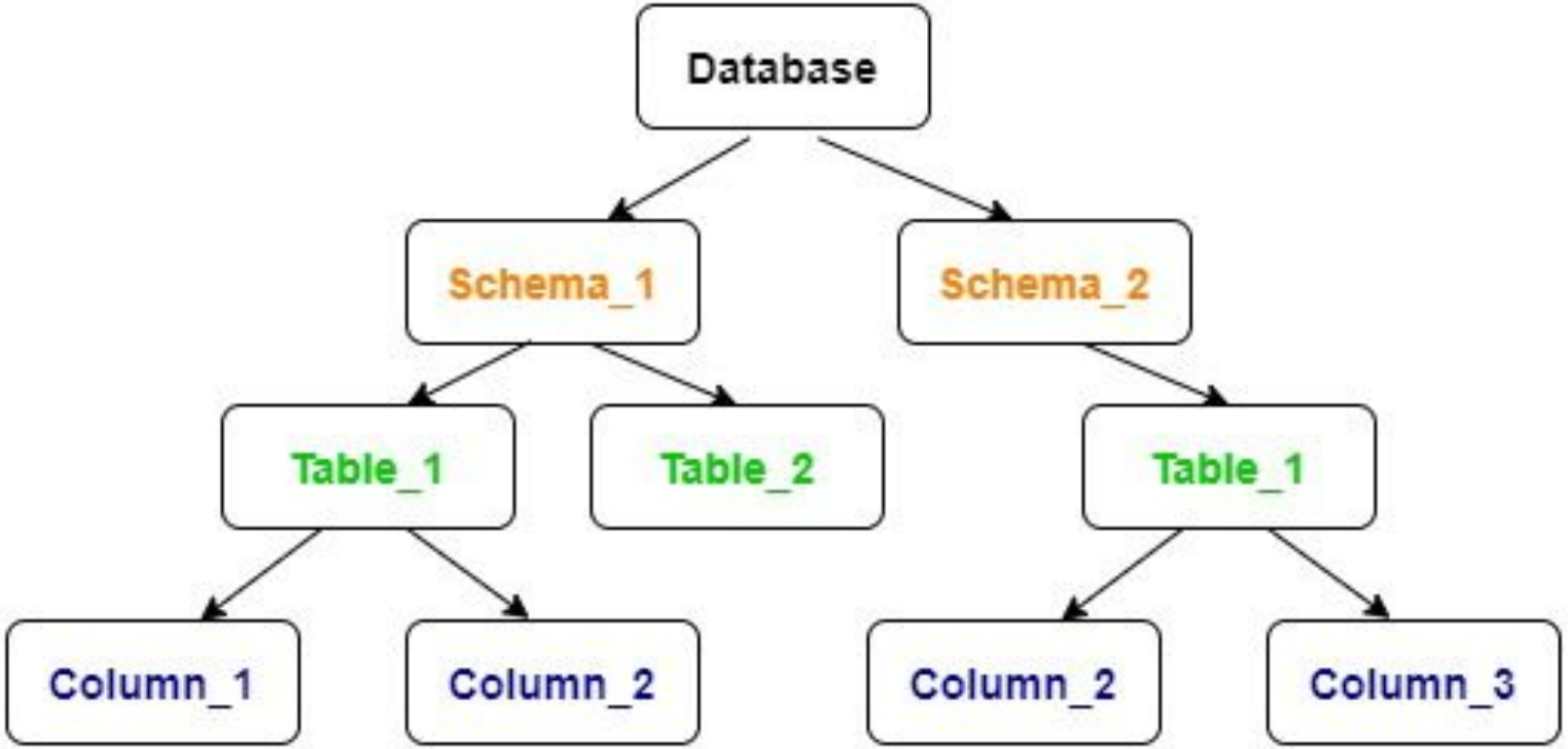
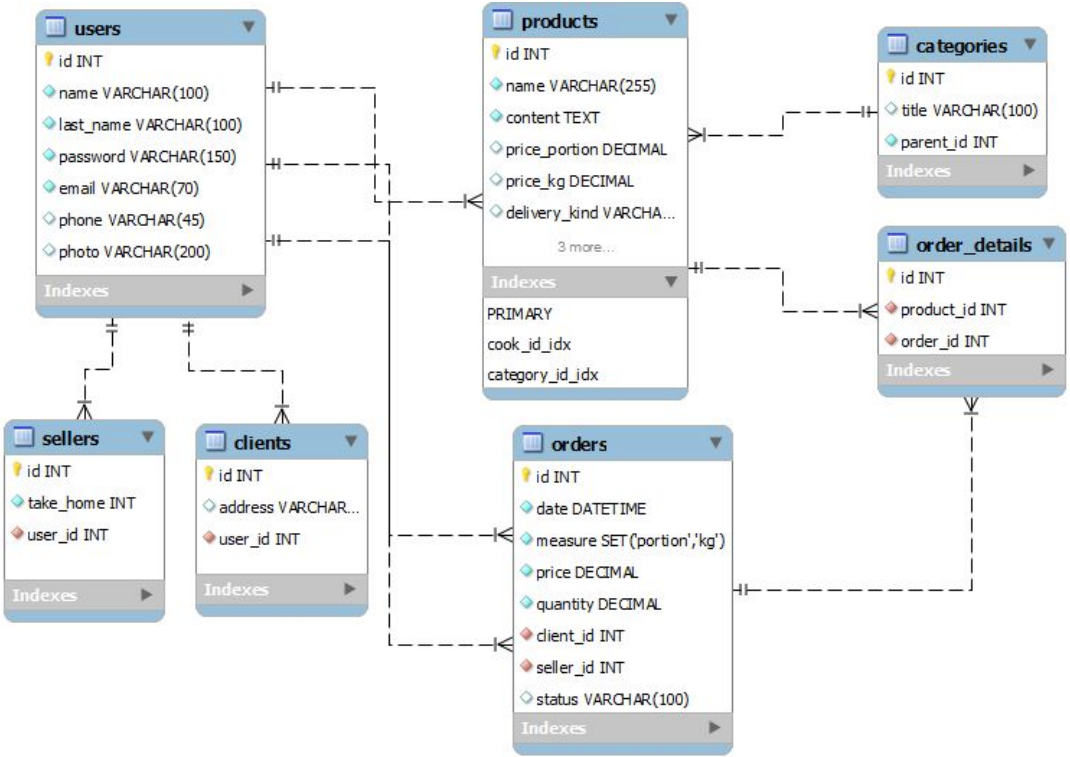
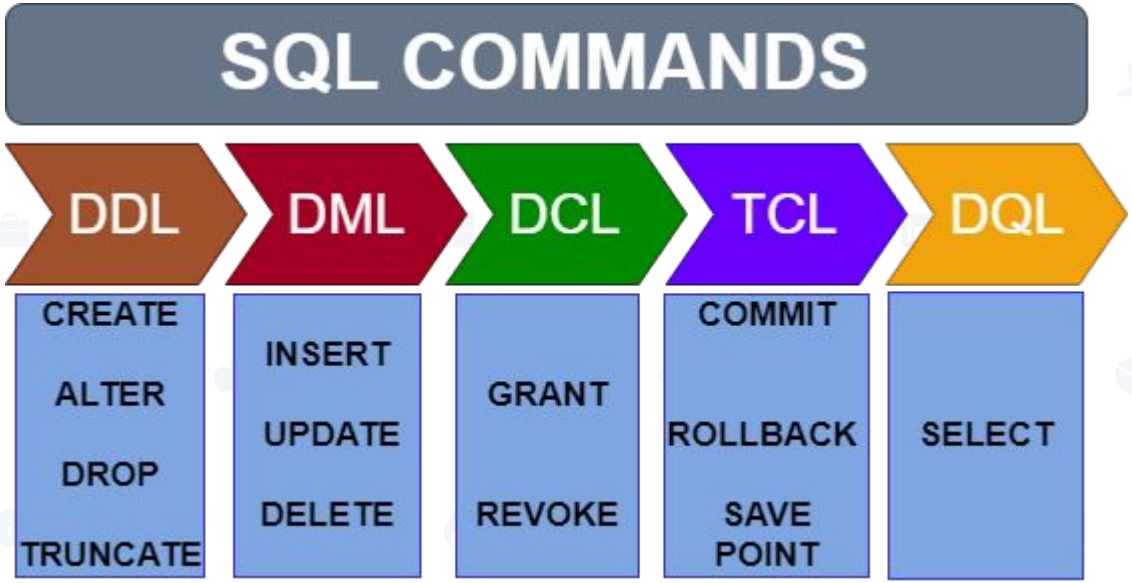


Схема бази даних





1. DDL – Data Definition Language
2. DQL – Data Query Language
3. DML – Data Manipulation Language
4. DCL – Data Control Language
5. TCL – Transaction Control Language

- **CREATE**: This command is used to create the database or its objects (like table, index, function, views, store procedure, and triggers).
- **DROP**: This command is used to delete objects from the database.
- **ALTER:** This is used to alter the structure of the database.
- **TRUNCATE:** This is used to remove all records from a table, including all spaces allocated for the records are removed.
- **COMMENT**: This is used to add comments to the data dictionary.
- **RENAME:** This is used to rename an object existing in the database.

- **SELECT:** It is used to retrieve data from the database.

- **INSERT**: It is used to insert data into a table.
- **UPDATE:** It is used to update existing data within a table.
- **DELETE**: It is used to delete records from a database table.
- **LOCK:** Table control concurrency.
- **CALL:** Call a PL/SQL or JAVA subprogram.
- **EXPLAIN PLAN:** It describes the access path to data.

```
CREATE TABLE [schema.]table
        (column datatype [DEFAULT expr][, ...]);
```

Data Type	Description
VARCHAR2(*size*)	Variable-length character data
CHAR(*size*)	Fixed-length character data
NUMBER(*p*,*s*)	Variable-length numeric data
DATE	Date and time values
LONG	Variable-length character data (up to 2 GB)
CLOB	Character data (up to 4 GB)
RAW and LONG RAW	Raw binary data
BLOB	Binary data (up to 4 GB)
BFILE	Binary data stored in an external file (up to 4 GB)
ROWID	A base-64 number system representing the unique address of a row in its table

```sql
ALTER TABLE table_name
ADD column_name datatype;
```

```sql
INSERT INTO table_name (column1, column2, column3, ...)
VALUES (value1, value2, value3, ...);
```

```sql
UPDATE table_name
SET column1 = value1, column2 = value2, ...
WHERE condition;
```

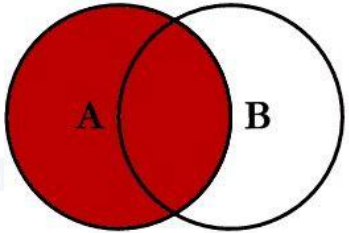
```sql
SELECT column1, column2, ...
FROM table_name;
```

```sql
SELECT COUNT(column_name)
FROM table_name
WHERE condition;
```

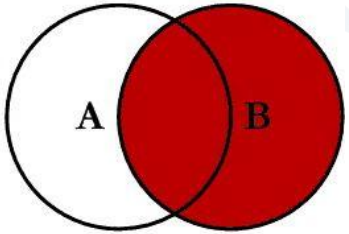
```sql
SELECT AVG(column_name)
FROM table_name
WHERE condition;
```

```sql
SELECT SUM(column_name)
FROM table_name
WHERE condition;
```

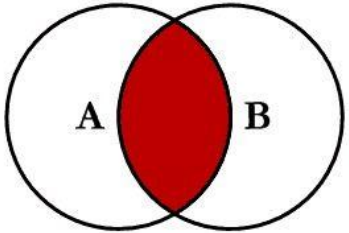
SQL JOINS



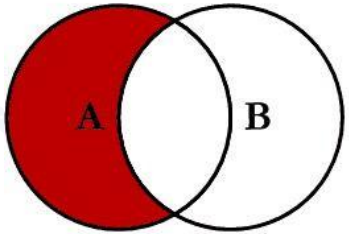

```
SELECT <select_list>
FROM TableA A
LEFT JOIN TableB B
ON A.Key = B.Key
```



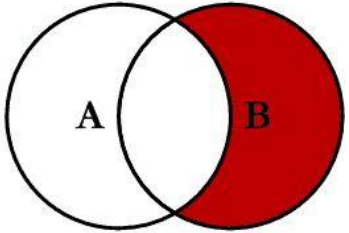

```
SELECT <select_list>
FROM TableA A
RIGHT JOIN TableB B
ON A.Key = B.Key
```



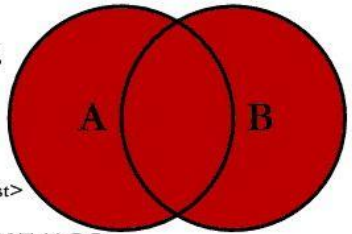

```
SELECT <select_list>
FROM TableA A
INNER JOIN TableB B
ON A.Key = B.Key
```



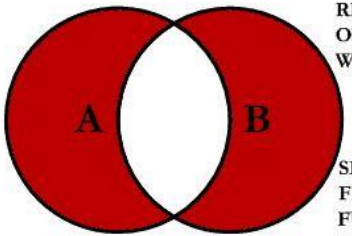

```
SELECT <select_list>
FROM TableA A
LEFT JOIN TableB B
ON A.Key = B.Key
WHERE B.Key IS NULL
```



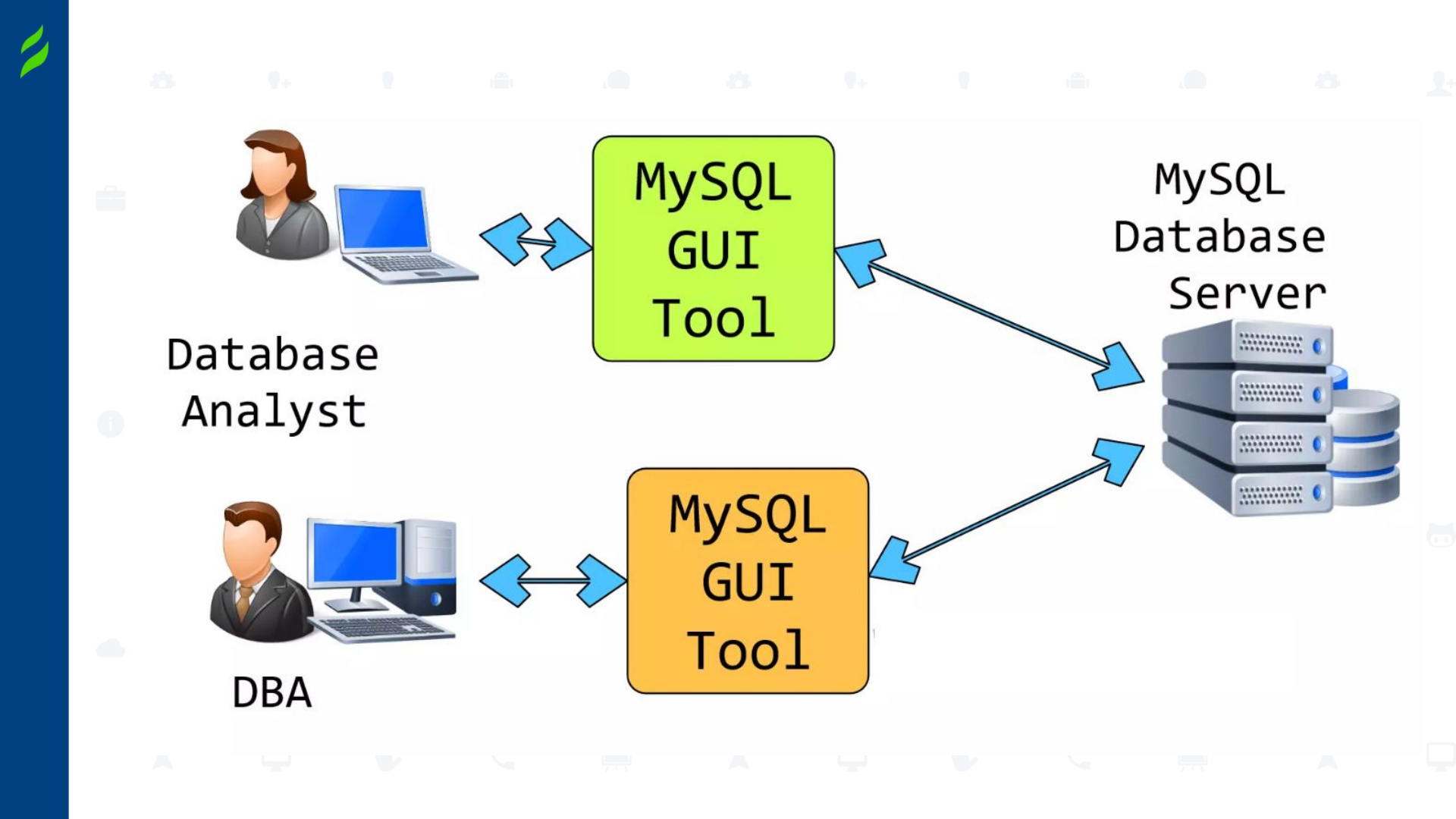

```
SELECT <select_list>
FROM TableA A
RIGHT JOIN TableB B
ON A.Key = B.Key
WHERE A.Key IS NULL
```




```
SELECT <select_list>
FROM TableA A
FULL OUTER JOIN TableB B
ON A.Key = B.Key
```




```
SELECT <select_list>
FROM TableA A
FULL OUTER JOIN TableB B
ON A.Key = B.Key
WHERE A.Key IS NULL
OR B.Key IS NULL
```


MySQL
GUI
Tool
MySQL
Database
Server
Database
Analyst
MySQL
GUI
Tool
DBA