UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

School of Computer Science and Applied Mathematics
UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

COMS2002A: DATABASE FUNDAMENTALS

SEMESTER 1, 2024

LAB 3 – 27th February, 2024

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DATA MANIPULATION COMMANDS – SELECT, INSERT, UPDATE, DELETE

Note that you can refer to the file **Introduction to SQL - 3.pdf** file on Ulwazi for more details on the SQL queries.

PRELIMINARIES

1. Connect to the LAMP server
2. Connect to MySQL
3. Choose the database to be used using the `USE` command.

Details on these steps are in the Lab1.pdf file.

PART 1 – PRACTICE

A. Deleting Tables

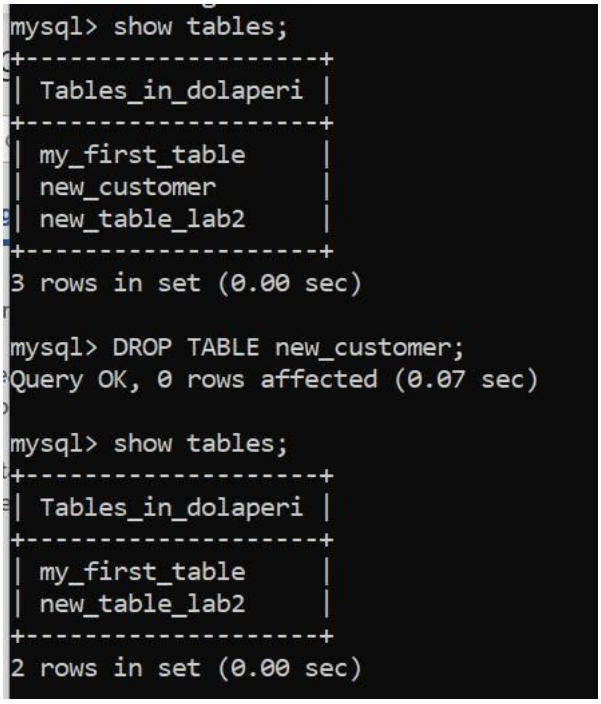
1. You can always delete/remove a table. We do that using the DROP command, which deletes all the data in the table as well as the table structure. Let's drop the *new_customer* table created in a previous lab.
   First, execute the following command:

```
SHOW DATABASES;
```

If you carried out Lab2 you should have a table called 'new_customer'. Delete that table by executing the following command

```
DROP TABLE new_customer;
```

Execute `SHOW TABLES;` again to confirm that the table no longer exists.



```
mysql> show tables;
+--------------------+
| Tables_in_dolaperi |
+--------------------+
| my_first_table     |
| new_customer       |
| new_table_lab2     |
+--------------------+
3 rows in set (0.00 sec)

mysql> DROP TABLE new_customer;
Query OK, 0 rows affected (0.07 sec)

mysql> show tables;
+--------------------+
| Tables_in_dolaperi |
+--------------------+
| my_first_table     |
| new_table_lab2     |
+--------------------+
2 rows in set (0.00 sec)
```

B. Create a New Table

2. Next, let's create a table to work with. Create a new table called ***students***. The table properties are shown:

ATTRIBUTE (FIELD NAME)	DATA TYPE
student_num	CHAR(3)
student_lname	VARCHAR(25)
student_fname	VARCHAR(25)
enrollment_date	DATE
age	INTEGER

3. Describe the table by executing the command

```
DESC students;
```

Your output should be as shown in the screenshot:

```
mysql> DESC students;
+-----------------+-------------+------+-----+---------+-------+
| Field           | Type        | Null | Key | Default | Extra |
+-----------------+-------------+------+-----+---------+-------+
| student_num     | char(3)     | YES  |     | NULL    |       |
| student_lname   | varchar(25) | YES  |     | NULL    |       |
| student_fname   | varchar(25) | YES  |     | NULL    |       |
| enrollment_date | date        | YES  |     | NULL    |       |
| age             | int         | YES  |     | NULL    |       |
+-----------------+-------------+------+-----+---------+-------+
5 rows in set (0.00 sec)
```

C. Inserting (Adding) and Selecting (Viewing) Data

4. Next, let's view the data in our table. To do this we execute the command:
   `SELECT * FROM students;`

   Your output should an Empty set. This is because we are yet to insert any data into our table.

5. Next, let's insert some data using the INSERT keyword. Execute the following command:
   `INSERT INTO students VALUES ("001", "Ndlovu", "Mike", '2022-04-09', 89);`
   The command inserts each data value into each of the columns in the table, in the order that the columns where specified when creating the table.

6. Next let's run the SELECT command again. Notice the data was added to the table.
   `SELECT * FROM students;`

```
mysql> select * from students;
+-------------+---------------+---------------+-----------------+------+
| student_num | student_lname | student_fname | enrollment_date | age  |
+-------------+---------------+---------------+-----------------+------+
| 001         | Ndlovu        | Mike          | 2022-04-09      |   89 |
+-------------+---------------+---------------+-----------------+------+
1 row in set (0.00 sec)
```

7. We can also insert multiple rows at a time:
   `INSERT INTO students VALUES ("002", "Muhammed", "Ali", '2022-07-09', 18), ("003", "Samuel", "Atif", '2022-04-03', 12), ("004", "Liam", "Jean", '2022-02-11', 13);`

8. Run the SELECT command again to see all the data in the table.

```
mysql> select * from students;
+-------------+---------------+---------------+-----------------+------+
| student_num | student_lname | student_fname | enrollment_date | age  |
+-------------+---------------+---------------+-----------------+------+
| 001         | Ndlovu        | Mike          | 2022-04-09      |   89 |
| 002         | Muhammed      | Ali           | 2022-07-09      |   18 |
| 003         | Samuel        | Atif          | 2022-04-03      |   12 |
| 004         | Liam          | Jean          | 2022-02-11      |   13 |
+-------------+---------------+---------------+-----------------+------+
4 rows in set (0.00 sec)
```

9. We can also enter in data only for specific attributes/fields. Let's insert only a student's last name and first name;

```
INSERT INTO students (student_lname, student_fname)
VALUES ("Ola", "Olaperi");
```

```
mysql> select * from students;
+-------------+---------------+---------------+-----------------+------+
| student_num | student_lname | student_fname | enrollment_date | age  |
+-------------+---------------+---------------+-----------------+------+
| 001         | Ndlovu        | Mike          | 2022-04-09      |   89 |
| 002         | Muhammed      | Ali           | 2022-07-09      |   18 |
| 003         | Samuel        | Atif          | 2022-04-03      |   12 |
| 004         | Liam          | Jean          | 2022-02-11      |   13 |
| NULL        | Ola           | Olaperi       | NULL            | NULL |
+-------------+---------------+---------------+-----------------+------+
5 rows in set (0.00 sec)
```

10. This method can also be used to enter data into all columns. Each data value is entered based on the specification of the column names in the query. Execute the following command:

```
INSERT INTO students (enrollment_date, age,
student_lname, student_num, student_fname) VALUES
('202204-09', 9, "Godfred", "006", "Ayanda");
```

```
mysql> select * from students;
+-------------+---------------+---------------+-----------------+------+
| student_num | student_lname | student_fname | enrollment_date | age  |
+-------------+---------------+---------------+-----------------+------+
| 001         | Ndlovu        | Mike          | 2022-04-09      |   89 |
| 002         | Muhammed      | Ali           | 2022-07-09      |   18 |
| 003         | Samuel        | Atif          | 2022-04-03      |   12 |
| 004         | Liam          | Jean          | 2022-02-11      |   13 |
| NULL        | Ola           | Olaperi       | NULL            | NULL |
| 006         | Godfred       | Ayanda        | 2022-04-09      |    9 |
+-------------+---------------+---------------+-----------------+------+
6 rows in set (0.00 sec)
```

11. With the SELECT command, we can also specify the column we want to view, rather than all the columns in the table. To do that, we specify the column names. Let's view all student's enrolment dates.

```
SELECT enrollment_date FROM students;
```

```
mysql> SELECT enrollment_date FROM students;
+-----------------+
| enrollment_date |
+-----------------+
| 2022-04-09      |
| 2022-07-09      |
| 2022-04-03      |
| 2022-02-11      |
| NULL            |
| 2022-04-09      |
+-----------------+
6 rows in set (0.00 sec)
```

12. Next, let's select all the student's first and last names.

```
mysql> SELECT student_lname, student_fname FROM students;
+---------------+---------------+
| student_lname | student_fname |
+---------------+---------------+
| Ndlovu        | Mike          |
| Muhammed      | Ali           |
| Samuel        | Atif          |
| Liam          | Jean          |
| Ola           | Olaperi       |
| Godfred       | Ayanda        |
+---------------+---------------+
6 rows in set (0.00 sec)
```

D. Saving Your Data

13. You must save your data after inserting into the database, otherwise all the data will be lost if you leave the MySQL prompt. To save, we use the COMMIT keyword. Execute the following command:

```
COMMIT;
```

E. Updating Table Rows

14. Using the UPDATE command, we can change values of data already inserted into the database. Let's update the last name of the student with ***student_num*** 004 to Jeanette

```
UPDATE students SET student_lname = 'Jeanette' WHERE
student_num = '004';
```

Run the SELECT command to view the changes.

```
mysql> select * from students;
+-------------+---------------+---------------+-----------------+------+
| student_num | student_lname | student_fname | enrollment_date | age  |
+-------------+---------------+---------------+-----------------+------+
| 001         | Ndlovu        | Mike          | 2022-04-09      |   89 |
| 002         | Muhammed      | Ali           | 2022-07-09      |   18 |
| 003         | Samuel        | Atif          | 2022-04-03      |   12 |
| 004         | Jeanette      | Jean          | 2022-02-11      |   13 |
| NULL        | Ola           | Olaperi       | NULL            | NULL |
| 006         | Godfred       | Ayanda        | 2022-04-09      |    9 |
+-------------+---------------+---------------+-----------------+------+
6 rows in set (0.00 sec)
```

15. Update the age of the student with ***age*** 89 to 16.

```
UPDATE students SET age = 16 WHERE age = 89;
```

```
mysql> UPDATE students SET age = 16 WHERE age = 89;
Query OK, 1 row affected (0.06 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from students;
+-------------+---------------+---------------+-----------------+------+
| student_num | student_lname | student_fname | enrollment_date | age  |
+-------------+---------------+---------------+-----------------+------+
| 001         | Ndlovu        | Mike          | 2022-04-09      |   16 |
| 002         | Muhammed      | Ali           | 2022-07-09      |   18 |
| 003         | Samuel        | Atif          | 2022-04-03      |   12 |
| 004         | Jeanette      | Jean          | 2022-02-11      |   13 |
| NULL        | Ola           | Olaperi       | NULL            | NULL |
| 006         | Godfred       | Ayanda        | 2022-04-09      |    9 |
+-------------+---------------+---------------+-----------------+------+
6 rows in set (0.00 sec)
```

F. Deleting Table Rows

16. Next let's delete the details of the student with ***student_num*** 004.

```
DELETE FROM students WHERE student_num = '004';
```

Run the select command to confirm that the student's details have been deleted.

```
mysql> DELETE FROM students WHERE student_num = '004';
Query OK, 1 row affected (0.00 sec)

mysql> select * from students;
+-------------+--------------+--------------+-----------------+------+
| student_num | student_lname | student_fname | enrollment_date | age  |
+-------------+--------------+--------------+-----------------+------+
| 001         | Ndlovu       | Mike         | 2022-04-09      |   16 |
| 002         | Muhammed     | Ali          | 2022-07-09      |   18 |
| 003         | Samuel       | Atif         | 2022-04-03      |   12 |
| NULL        | Ola          | Olaperi      | NULL            | NULL |
| 006         | Godfred      | Ayanda       | 2022-04-09      |    9 |
+-------------+--------------+--------------+-----------------+------+
5 rows in set (0.00 sec)
```

17. Watch out, if you do not specify the WHERE condition, all the rows in the table will be deleted.

```
DELETE FROM students;
```

```
mysql> DELETE FROM students;
Query OK, 5 rows affected (0.06 sec)

mysql> select * from students;
Empty set (0.00 sec)
```

Now, we are back to the Empty set again.

PART 2 – YOUR TASK

Write the SQL commands to perform the following tasks. Upload all the files into the Gradescope assignment – **Lab 3**.

1. Write the SQL command to create a new table called ***students***. The table properties are shown:

ATTRIBUTE (FIELD NAME)	DATA TYPE
student_num	CHAR(3)
student_lname	VARCHAR(25)
student_fname	VARCHAR(25)
enrollment_date	DATE
age	INTEGER

Save your SQL command in a file called **lab3_q1.txt**

2. Write SQL statements to insert the following data into the student's table

student_num	student_lname	student_fname	enrollment_date	age
101	Mbatha	Thando	2019-05-23	18

102	Nkosi	Sibongile	2018-08-13	20
103	Zulu	Mandla	2017-11-09	19
104	Davis	Charles	2020-03-17	17
105	Smith	John	2018-12-05	21
106	Khoza	Lebo	2018-08-13	18

Save your SQL command in a file called **lab3_q2.txt**

3. Write the SQL command to insert a new row of data with the following details.
   student_num: 54
   age: 7
   Save your SQL command in a file called **lab3_q3.txt**

4. Write the SQL command to insert a new row of data with the following details.
   student_num: 76 *student_lname:* Vukosi enrollment_date: 2021-09-09
   Save your SQL command in a file called **lab3_q4.txt**

5. Write the SQL command to view all the data in the ***students*** table. Save your command in a file called **lab3_q5.txt**.

6. Write the SQL command to view only the ***student_num*** and ***age*** columns of all students. Save your command in a file called **lab3_q6.txt**.

7. Write the SQL command to update the first name of the student with ***student_num*** 104 to Mark. Save your command in a file called **lab3_q7.txt**.

8. Write the SQL command to delete all rows of data where the ***age*** is 18. Save your command in a file called **lab3_q8.txt.**

9. Write the SQL command to delete all the rows of data in table **students.** Note that you are not to delete the table itself, only delete the data in the table.
   Save your command in a file called **lab3_q9.txt.**