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SUBJECT & SECTION: CC5 – 2I

Laboratory Activity 5: Data Manipulating Using SQL

1. **What is the main difference between inserting and updating data in a database?**
   - **INSERT INTO <table name>:** The Insert function in SQL is valuable for adding a new entry to a table that already exists. It is also a DML statement. DML statements are commands that are helpful in managing data without altering the database schema. Additionally, there are two choices for creating an Insert statement.
   - **UPDATE <table name> SET <values>:** The UPDATE command is handy for altering records already in a table. We are able to utilize it alongside the WHERE clause to adjust a particular record. A DML statement is another term for an update. Here is the format for an "update" statement.

2. **Why is the SELECT statement important for database manipulation?**
   - **SELECT * FROM <table name>:** When you choose a database, all following searches will be done within that database, simplifying interaction with its tables and objects. Moreover, the SELECT command in SQL is utilized to fetch and retrieve data from the tables in the chosen database.

3. **Explain the purpose of the WHERE clause when updating or deleting records.**
   - **WHERE <condition>:** The WHERE clause is utilized in SQL queries to select records that meet a specific condition. To elaborate, the WHERE clause is a crucial component of SQL (Structured Query Language) that is essential for manipulating and extracting stored data in relational databases.

4. **How would you explain the importance of a primary key to someone unfamiliar with databases?**
   - The main function of a primary key is to guarantee that records in a table are unique, preventing any duplicate primary key values in different rows. It also makes it easy to access data quickly by offering a simple method to search for records. Searching and sorting operations are much more efficient when records are indexed based on the primary key.

Step-by-Step Guide to Database Manipulation

Step 1: Understanding the Structure of a Database

- A **database** is a collection of data organized in tables.
- A **table** consists of rows (records) and columns (fields or attributes).
- Each table has a **primary key**, which uniquely identifies each record.

Question:

- What is the difference between a **record** and a **field** in a database?
  - A record in a database is a complete set of related data entries, while a field is a single piece of data within that record.

Step 2: SQL Basics

- **SQL** (Structured Query Language) is the standard language for interacting with databases. Here are some of the basic SQL operations:
- **Creating a Table:** This command is used to create a new table to store data.

```
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```

```
CREATE TABLE Students (
student_id INT PRIMARY KEY,
first_name VARCHAR(50),
last_name VARCHAR(50),
email VARCHAR(100)
);
```

This creates a table called Students with four columns: student_id, first_name, last_name, and email.

Question:

- What is the purpose of the PRIMARY KEY in the CREATE TABLE statement?

- The purpose of the PRIMARY KEY in the CREATE TABLE statement is to uniquely identify each record in the table, ensuring no duplicate values and providing a way to reference rows efficiently.

Step 3: Inserting Data into a Table

- Once a table is created, you can insert data into it using the INSERT command:

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```sql
CREATE TABLE Students (
student_id INT PRIMARY KEY,
first_name VARCHAR(50),
last_name VARCHAR(50),
email VARCHAR(100)
);

INSERT INTO Students (student_id, first_name, last_name, email) VALUES
(1, 'Brian Kim', 'Guevara', 'bkguevara@gmail.com'),
(2, 'Shamja', 'Chalmas', 'shchalmas@gmail.com'),
(3, 'Jackilyn', 'Copes', 'jackcopes@gmail.com'),
(4, 'Kathleen', 'Ilumin', 'kilumin@gmail.com'),
(5, 'Alithea', 'Cruz', 'alicruz@gmail.com');
```

- This command inserts a new record into the Students table.

Question:

- Why do you think it's important to specify the column names when inserting data?
  - Specifying column names when inserting data ensures that the values are correctly mapped to the intended columns, improving clarity and preventing errors if the table structure changes or if columns are omitted.

Step 4: Retrieving Data from a Table

- To retrieve data from a table, the SELECT command is used:

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```sql
CREATE TABLE Students (
student_id INT PRIMARY KEY,
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last_name VARCHAR(50),
email VARCHAR(100)
);

INSERT INTO Students (student_id, first_name, last_name, email) VALUES
(1, 'Brian Kim', 'Guevara', 'bkguevara@gmail.com'),
(2, 'Shamja', 'Chalmas', 'shchalmas@gmail.com'),
(3, 'Jackilyn', 'Copes', 'jackcopes@gmail.com'),
(4, 'Kathleen', 'Ilumin', 'kilumin@gmail.com'),
(5, 'Alithea', 'Cruz', 'alicruz@gmail.com');

SELECT * FROM Students;
```

Output:

student_id	first_name	last_name	email
1	Brian Kim	Guevara	bkguevara@gmail.com
2	Shamja	Chalmas	shchalmas@gmail.com
3	Jackilyn	Copes	jackcopes@gmail.com
4	Kathleen	Ilumin	kilumin@gmail.com
5	Alithea	Cruz	alicruz@gmail.com

- This command retrieves all records from the Students table.

Question:

- What does the * symbol mean in the SELECT statement?

Step 5: Updating Data in a Table

- You can modify existing data using the UPDATE command.
  - The * symbol in the SELECT statement means "select all columns" from the specified table.

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```sql
CREATE TABLE Students (
student_id INT PRIMARY KEY,
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last_name VARCHAR(50),
email VARCHAR(100)
);

INSERT INTO Students (student_id, first_name, last_name, email) VALUES
(1, 'Brian Kim', 'Guevara', 'bkguevara@gmail.com'),
(2, 'Shamja', 'Chalmas', 'shchalmas@gmail.com'),
(3, 'Jackilyn', 'Copes', 'jackcopes@gmail.com'),
(4, 'Kathleen', 'Ilumin', 'kilumin@gmail.com'),
(5, 'Alithea', 'Cruz', 'alicruz@gmail.com');

UPDATE Students
SET last_name = 'Vilamin', email = 'kvilamin@gmail.com'
WHERE student_id = 4;

SELECT * FROM Students;
```

Output:

student_id	first_name	last_name	email
1	Brian Kim	Guevara	bkguevara@gmail.com
2	Shamja	Chalmas	shchalmas@gmail.com
3	Jackilyn	Copes	jackcopes@gmail.com
4	Kathleen	Vilamin	kvilamin@gmail.com
5	Alithea	Cruz	alicruz@gmail.com

- This command updates the email address of the student whose student_id is 1.

Question:

- Why is it necessary to include the WHERE clause in the UPDATE statement?
  - The WHERE clause in the UPDATE statement is necessary to specify which records should be updated, preventing unintended changes to all records in the table.

Step 6: Deleting Data from a Table

- To delete a record from a table, use the DELETE command:

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```sql
CREATE TABLE Students (
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last_name VARCHAR(50),
email VARCHAR(100)
);

INSERT INTO Students (student_id, first_name, last_name, email) VALUES
(1, 'Brian Kim', 'Guevara', 'bkguevara@gmail.com'),
(2, 'Shamja', 'Chalmas', 'shchalmas@gmail.com'),
(3, 'Jackilyn', 'Copes', 'jackcopes@gmail.com'),
(4, 'Kathleen', 'Ilumin', 'kilumin@gmail.com'),
(5, 'Alithea', 'Cruz', 'alicruz@gmail.com');

UPDATE Students
SET last_name = 'Vilamin', email = 'kvilamin@gmail.com'
WHERE student_id = 4;

DELETE FROM Students
WHERE student_id = 1;

SELECT * FROM Students;
```

Output:

student_id	first_name	last_name	email
2	Shamja	Chalmas	shchalmas@gmail.com
3	Jackilyn	Copes	jackcopes@gmail.com
4	Kathleen	Vilamin	kvilamin@gmail.com
5	Alithea	Cruz	alicruz@gmail.com

- This command removes the record of the student with student_id 1 from the Students table.

Question:

- What could happen if you forget to include the WHERE clause in a DELETE statement?

- If you forget to include the WHERE clause in a DELETE statement, all records in the table will be deleted, potentially leading to the loss of important data.

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