**📘 Task 2: Data Insertion and Handling NULLs – Detailed Explanation**

**In this task, you worked on the existing LibraryDB schema that you created in Task 1. You populated the database using DML (Data Manipulation Language) and learned how to handle different real-world situations like missing values, partial data, and updates/deletions.**

**🧩 What You Did in Task 2**

**🔹 1. Used the Existing Database**

**Before inserting data, you connected to the LibraryDB using:**

**sql**

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**USE LibraryDB;**

**This ensures that all operations are applied to the correct database.**

**🔹 2. INSERT – Adding New Data**

**You used the INSERT INTO command to add records to each table.**

**✅ Author Table:**

**sql**

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**INSERT INTO Author (name, bio)**

**VALUES**

**('J.K. Rowling', 'British author...'),**

**('George Orwell', 'English novelist...');**

* **You inserted 2 authors.**
* **Notice that bio can be descriptive or even NULL if missing.**

**✅ Book Table:**

**sql**

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**INSERT INTO Book (title, category, available\_copies, author\_id)**

**VALUES**

**('Harry Potter...', 'Fantasy', 5, 1),**

**('1984', 'Dystopian', 3, 2),**

**('Animal Farm', 'Satire', NULL, 2); -- NULL handling**

* **You added 3 books.**
* **The third book had available\_copies = NULL to simulate missing stock data.**

**✅ Student Table:**

**sql**

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**INSERT INTO Student (name, email, phone)**

**VALUES**

**('Alice Johnson', 'alice.j@gmail.com', '9876543210'),**

**('Bob Smith', NULL, NULL); -- Incomplete data**

* **Demonstrated how to add a student with incomplete data (NULL email and phone).**

**✅ Loan Table:**

**sql**

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**INSERT INTO Loan (student\_id, book\_id, issue\_date, return\_date)**

**VALUES**

**(1, 1, '2025-06-01', '2025-06-15'),**

**(1, 2, '2025-06-16', NULL), -- Not returned**

**(2, 3, '2025-06-10', NULL); -- Still borrowed**

* **Added records to track which student borrowed which book and when.**
* **Used NULL for return\_date to show books still not returned.**

**✅ Librarian Table:**

**sql**

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**INSERT INTO Librarian (name, email, phone)**

**VALUES**

**('Mr. Thomas', 'thomas.library@univ.edu', '9123456780');**

* **Inserted one librarian with complete data.**

**✅ Insert with Partial Data:**

**sql**

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**INSERT INTO Student (name)**

**VALUES ('Charlie Brown');**

* **Shows how to insert only one column (others will be NULL by default).**

**🔹 3. UPDATE – Modifying Existing Data**

**You updated data in two ways:**

**✅ Decreasing Book Copies:**

**sql**

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**UPDATE Book**

**SET available\_copies = available\_copies - 1**

**WHERE book\_id IN (1, 2);**

* **Simulates issuing books, reducing the stock count.**

**✅ Updating Student Info Later:**

**sql**

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**UPDATE Student**

**SET email = 'bob.smith@gmail.com', phone = '9000000001'**

**WHERE name = 'Bob Smith';**

* **Updates Bob’s missing data after it becomes available.**

**🔹 4. DELETE – Removing Data**

**✅ Deleting a Loan Record:**

**sql**

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**DELETE FROM Loan**

**WHERE loan\_id = 1;**

* **Removes a record where a student has returned the book or mistakenly issued.**

**🔹 5. NULL Handling and Checking**

**✅ Example SELECT to Find Incomplete Entries:**

**sql**

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**SELECT \* FROM Student**

**WHERE email IS NULL;**

* **Shows how to filter and find rows where data is missing (NULL).**

**🧠 Key Concepts Practiced:**

| **Concept** | **Description** |
| --- | --- |
| **INSERT** | **Add new rows to a table** |
| **UPDATE** | **Modify existing values** |
| **DELETE** | **Remove rows from a table** |
| **NULL** | **Represents missing or unknown data** |
| **IS NULL** | **Condition to check for missing values** |
| **Partial Insert** | **Insert into specific columns only** |
| **Default value insert** | **Uses table’s default value if not provided** |
| **Referential integrity** | **You used foreign keys from Task 1** |

**✅ Outcome of Task 2:**

**By the end of this task, you:**

* **Populated real-world data across multiple tables**
* **Handled missing values using NULL**
* **Practiced DML commands to manipulate your data**
* **Learned how to track and clean database information effectively**