Intermediate level DDL Commands and Simple DML statements

Lab Objective

Familiarize students with intermediate level DDL commands and simple DML statements in SQL.

Lab Outcome

After completing this lab successfully, students will be able to:

1. **Understand and execute** DDL commands to define integrity constraints and modify the database schema.
2. **Construct** DML statements to perform queries involving distinct keyword, generalized projection, simple multi-table queries and so on.

Psychomotor Learning Levels

This lab involves activities that encompass the following learning levels in psychomotor domain.

Level	Category	Meaning	Keywords
P1	Imitation	Copy action of another; observe and replicate.	Relate, Repeat, Choose, Copy, Follow, Show, Identify, Isolate.
P2	Manipulation	Reproduce activity from instruction or memory	Copy, response, trace, Show, Start, Perform, Execute, Recreate.

Lab Activities

1. **Schema Definition along with Integrity Constraints**

```
CREATE TABLE <table_name>
(
  <attribute_name1> <datatype> [NOT NULL ],
  <attribute_name2> <datatype> [NOT NULL ],
  ...,
  [constraint <constraint_name>] primary key (<attribute_name,…>),
  [constraint <constraint_name>] foreign key (<attribute_name,…>)
references <parent_table_name>(<attribute>) [ON DELETE CASCADE]),
  [constraint <constraint_name>] check <condition>
);
```

2. **Schema Modification**

Dropping a Table (both data and schema):

```
DROP TABLE <table_name>;
```

Altering a Table (changing schema of a table):

Adding a new attribute:

```
ALTER TABLE <table_name> ADD <attribute_name> <datatype>;
```

Adding multiple attributes:

```
ALTER TABLE <table_name> ADD (<attribute_name> <datatype>,. );
```

Dropping an attribute:

```
ALTER TABLE <table_name> DROP column <attribute_name>;
```

Dropping multiple attributes:

```
ALTER TABLE <table_name> DROP column (<attribute_name1>, … );
```

Modifying data type of an attribute (Column must be empty):

```
ALTER TABLE <table_name> MODIFY <attribute_name> <new_type>;
```

Renaming an attribute:

```
ALTER TABLE <table_name> RENAME column <attribute_name> to
<new_attribute_name>;
```

Renaming a table:

```
ALTER TABLE <table_name> RENAME TO <new_table_name>;
```

Adding a constraint into a table (primary key constraint, foreign key constriant):

```
ALTER TABLE <table_name> ADD CONSTRAINT <constraint_name>
<constraint>;
```

Deleting a constraint from a table:

```
ALTER TABLE <table_name> DROP CONSTRAINT <constraint_name>;
```

3. Manipulating Data (DML)

Basic Query Structure

```
SELECT A1, A2, ..., An [list of attributes]
FROM r1, r2, ..., rm [list of relations]
WHERE P [condition]
```

Using distinct keyword (remove duplicates):

```
select distinct dept_name
from instructor;
```

Applying arithmetic operations (generalized projection) in SELECT clause:

```
select ID, name, salary/12
from instructor;
```

Cartesian product:

```
select *
from instructor, department;
```

Natural join:

```
select * from instructor natural join department;
```

Deleting records from a table:

```
delete from <table_name> where <condition>;
```

Updating values of a record in a table:

```
update <table_name>
set <attribute> = <value>
where <condition>;
```

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CSE 301: LAB 02 (Exercise)
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Write all SQL statements in notepad first and save them with a. sql extension. Then execute your SQL scripts.

Lab Task # 01 (Schema Definition):

Write SQL statements to create the following tables with the given constraints.

i) account

account_no	char(5)	primary key
balance	number	Not null and cannot be less than 0

ii) customer

customer_no	char(5)	primary key
customer_name	varchar2(20)	Not null
customer_city	varchar2(10)	(e.g.: DHK, KHL etc.)

iii) depositor

account_no	char(5)	
customer_no	char(5)	
		primary key (account_no, customer_no)

Lab Task # 02 (Schema Modification):

After executing each of these SQL statements execute the command – **desc <table_name>** to confirm the changes.

i. Write SQL statement to add a new attribute 'date_of_birth' (date type) in customer table.
ii. Write SQL statement to drop the attribute 'date_of_birth' from customer table.
iii. Write SQL statement to rename the attribute account_no, customer_no from depositor table to a_no and c_no, respectively.
iv. Write SQL statements to add two foreign key constraints 'depositor_fk1' and 'depositor_fk2' which identifies a_no and c_no as a foreign key.

Lab Task # 03 (Inserting Records into Tables):

Write appropriate SQL statements to insert the records as shown below.

Account

ACCOUNT_NO	BALANCE
A-101	12000
A-102	6000
A-103	2500

Customer

CUSTOMER_NO	CUSTOMER_NAME	CUSTOMER_CITY
C-101	Alice	Dhaka
C-102	Annie	Dhaka
C-103	Bob	Chittagong
C-104	Charlie	Khulna

Depositor

A_NO	C_NO
A-101	C-101
A-103	C-102
A-103	C-104
A-102	C-103