UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
DEHRADUN

DATABASE SYSTEMS LAB

LAB 4
SQL Constraints

MTECH-COMPUTER SCIENCE
ENGINEERING
CYBER SECURITY AND FORENSICS

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Title: To understand and apply the concept of data constraints in SQL, focusing on Primary Key and Foreign Key constraints.
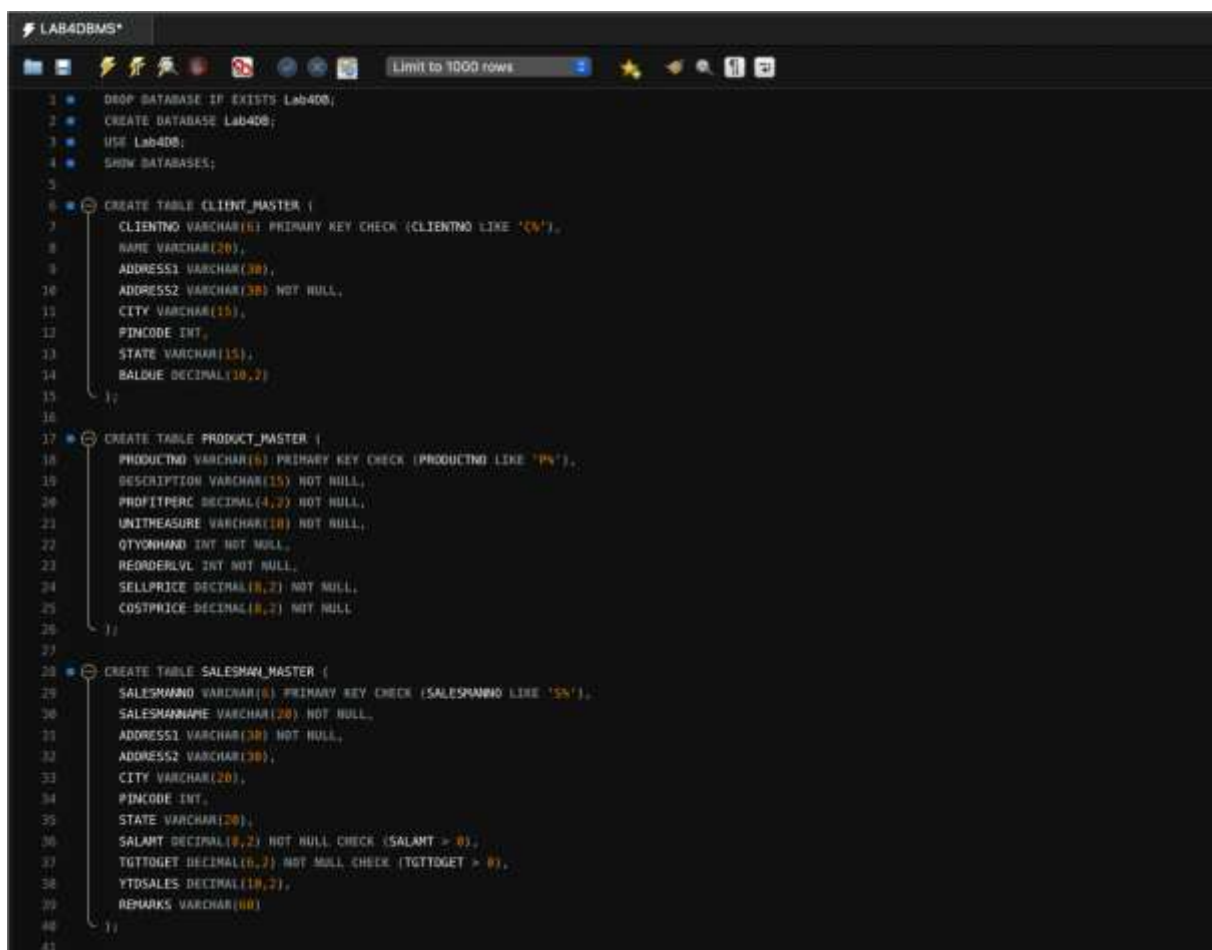
Objective: Apply various data constraints in SQL—Primary Key, Foreign Key, NOT NULL, and CHECK.

Tasks outline from the manual: 1. Create three master tables with constraints:

- ○ CLIENT_MASTER
- ○ PRODUCT_MASTER
- ○ SALESMAN_MASTER

2. **Insert sample data into each table.**
3. **Run retrieval queries (will help show data and confirm constraints work).**

CREATE TABLE : CLIENT_MASTER / PRODUCT_MASTER / SALESMAN_MASTER

INSERT INTO: CLIENT_MASTER / PRODUCT_MASTER / SALESMAN_MASTER

1. Created tables using *CREATE TABLE;*
2. Insert data in the query using *INSERT INTO;*

While creating tables I encountered various errors which are listed at the end of the document.

ERRORS ENCOUNTERED / RESOLVED:

1. **CREATE TABLE CLIENT_MASTER (CLIENTNO VARCHAR(6) PRIMARY KEY CHECK (CLIENTNO LIKE 'C%'), NAME VARCHAR(20), ADDRESS1 VARCHAR(30), ADDRESS2 VARCHAR(30) NOT NULL, CITY VARCHAR(15), PINCODE INT(8), STATE VARCHAR(15), BALDUE DECIMAL(10,2)) 0 row(s) affected, 1 warning(s): 1681 Integer display width is deprecated and will be removed in a future release.**

In newer versions of mysql specifying INT Width is not necessary. After removing width from the INT constraints the error was resolved.

```
12  │   PINCODE INT,
```

2. **INSERT INTO SALESMAN_MASTER VALUES ('S00001', 'Aman', 'A/14', 'Worli', 'Mumbai', 400002, 'Maharashtra', 3000, 100, 50, 'Good'), ('S00002', 'Omkar', '65', 'Nariman', 'Mumbai', 400001, 'Maharashtra', 3000, 200, 100, 'Good'), ('S00003', 'Raj', NULL, 'Bandra', 'Mumbai', 400032, 'Maharashtra', 3000, 200, 100, 'Good'), ('S00004', 'Ashish', 'A/5', 'Juhu', 'Mumbai', 400044, 'Maharashtra', 3500, 200, 150, 'Good')   Error Code: 1048. Column 'ADDRESS1' cannot be null**

In the given data address 1 for Raj was not specified and it fell under NOT NULL condition. To resolve this error we have two ways, a) remove NOT NULL condition, b) add a temporary address.

We cannot use method a) because Address 1 cannot be null. Therefore the error was resolved using method b). temporary address : qwerty

```
SALESMANNAME VARCHAR(20) NOT NULL,
ADDRESS1 VARCHAR(30) NOT NULL,
ADDRESS2 VARCHAR(30),
CITY VARCHAR(20)
```

```
63 •   INSERT INTO SALESMAN_MASTER
64     VALUES
65     ('S00001', 'Aman', 'A/14', 'Worli', 'Mumbai', 400002, 'Maharashtra', 3000, 100, 50, 'Good'),
66     ('S00002', 'Omkar', '65', 'Nariman', 'Mumbai', 400001, 'Maharashtra', 3000, 200, 100, 'Good'),
67     ('S00003', 'Raj','qwerty', 'Bandra', 'Mumbai', 400032, 'Maharashtra', 3000, 200, 100, 'Good'),
68     ('S00004', 'Ashish', 'A/5', 'Juhu', 'Mumbai', 400044, 'Maharashtra', 3500, 200, 150, 'Good');
69
```

SHOW TABLES;

3. Exercises on Retrieving Records

3.1 Find out the names of all the clients.

```
70 •   SHOW TABLES;
71     SELECT NAME FROM CLIENT_MASTER;
72
```
32:71

Result Grid   Filter Rows: Q Search   Export:

NAME
Ivan Bayross
Mamta Muzumdar
Chhaya Bankar
Ashwini Joshi
Hansel Colaco
Deepak Sharma

3.2 Retrieve the entire contents of the Client_Master table.

```
72 •   SELECT * FROM CLIENT_MASTER;
73
```
29:72

Result Grid   Filter Rows: Q Search   Edit: Export/Import:

CLIENTNO	NAME	ADDRESS1	ADDRESS2	CITY	PINCODE	STATE	BALDUE
C00001	Ivan Bayross	A/14	Worli	Mumbai	400054	Maharashtra	15000.00
C00002	Mamta Muzumdar	65	Nariman	Madras	780001	Tamil Nadu	0.00
C00003	Chhaya Bankar	P-7	Bandra	Mumbai	400057	Maharashtra	5000.00
C00004	Ashwini Joshi	A/5	Juhu	Mumbai	400001	Maharashtra	2000.00
C00005	Hansel Colaco	B/2	MG Road	Bangalore	560001	Karnataka	0.00
C00006	Deepak Sharma	D-45	Koramangala	Bangalore	560001	Karnataka	0.00
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

3.3 Retrieve the list of names, city and the state of all the clients.

```
73 •   SELECT NAME, CITY, STATE FROM CLIENT_MASTER;
74
```
45:73

Result Grid   Filter Rows: Q Search   Export:

NAME	CITY	STATE
Ivan Bayross	Mumbai	Maharashtra
Mamta Muzumdar	Madras	Tamil Nadu
Chhaya Bankar	Mumbai	Maharashtra
Ashwini Joshi	Mumbai	Maharashtra
Hansel Colaco	Bangalore	Karnataka
Deepak Sharma	Bangalore	Karnataka

3.4 List the various products available from the Product_Master table.

```
74 •    SELECT DESCRIPTION FROM PRODUCT_MASTER;
75
        40:74
```

DESCRIPTION
T-Shirt
Shirts
Cotton
Jeans
Trousers
Pull Overs
Denim Jeans
Lycra Tops
Skirts

3.5 List all the clients who are located in Mumbai.

```
75 •    SELECT * FROM CLIENT_MASTER WHERE CITY = 'Mumbai';
76
        51:75
```

CLIENTNO	NAME	ADDRESS1	ADDRESS2	CITY	PINCODE	STATE	BALDUE
C00001	Ivan Bayross	A/14	Worli	Mumbai	400054	Maharashtra	15000.00
C00003	Chhaya Bankar	P-7	Bandra	Mumbai	400057	Maharashtra	5000.00
C00004	Ashwini Joshi	A/5	Juhu	Mumbai	400001	Maharashtra	2000.00
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

3.6 Find the names of salesman who have a salary equal to Rs.3000.

```
76 •    SELECT SALESMANNAME FROM SALESMAN_MASTER WHERE SALAMT = 3000;
77
        62:76
```

SALESMANNAME
Aman
Omkar
Raj

4. Exercises on Updating Records

4.1 Change the city of ClientNo 'C00005' to 'Bangalore'.

```
78 ● UPDATE CLIENT_MASTER SET CITY = 'Bangalore' WHERE CLIENTNO = 'C00005';
79
    ↕  71:78
Action Output    ↕
      Time    Action                                              Response
● 63  15:14:38  UPDATE CLIENT_MASTER SET CITY = 'Bangalore' WHERE CLIENTNO...  0 row(s) affected Rows matched: 1 Changed: 0 Warnings: 0
```

4.2 Change the BalDue of ClientNo 'C00001' to Rs.1000.

```
79 ● UPDATE CLIENT_MASTER SET BALDUE = 1000 WHERE CLIENTNO = 'C00001';
80
    ↕  1:76
Action Output    ↕
      Time    Action                                              Response
● 90  19:09:36  UPDATE CLIENT_MASTER SET BALDUE = 1000 WHERE CLIENTNO = 'C00001'  0 row(s) affected Rows matched: 1 Changed: 0 Warnings: 0
```

4.4 Change the city of the salesman to Pune.

```
83 ● UPDATE SALESMAN_MASTER
84    SET CITY = 'Pune'
85    WHERE SALESMANNO = 'S00001';
86
    ↕  29:85
Action Output    ↕
      Time    Action                                              Response
● 68  19:04:15  UPDATE SALESMAN_MASTER SET CITY = 'Pune' WHERE SALESMANNO = 'S00001'  1 row(s) affected Rows matched: 1 Changed: 1 Warnings: 0
```

5. Exercises on Deleting Records

5.1 Delete all salesman from the Salesman_Master whose salaries are equal to Rs.3500.

```
87 •   DELETE FROM SALESMAN_MASTER WHERE SALAMT = 3500;
88
```

Time	Action	Response
99 20:50:59	DELETE FROM SALESMAN_MASTER WHERE SALAMT = 3500	0 row(s) affected

5.2 Delete all products from Product_Master where the quantity on hand is equal to 100.

```
87 •   DELETE FROM PRODUCT_MASTER WHERE QTYONHAND = 100;
88
```

Time	Action	Response
100 20:52:19	DELETE FROM PRODUCT_MASTER WHERE QTYONHAND = 100	3 row(s) affected

5.3 Delete from Client_Master where the column state holds the value 'Tamil Nadu'.

```
88 •   DELETE FROM CLIENT_MASTER WHERE STATE = 'Tamil Nadu';
89
90
```

Time	Action	Response
101 20:53:21	DELETE FROM CLIENT_MASTER WHERE STATE = 'Tamil Nadu'	1 row(s) affected

6. Exercises on Altering Table Structure

6.1 Add a column called 'Telephone' of data type integer to the Client_Master table.

```
90 •    ALTER TABLE CLIENT_MASTER ADD TELEPHONE INT;
91 •    DESCRIBE CLIENT_MASTER;
        ⟳  53:87
```

Result Grid | Filter Rows: Q Search   Export:

Field	Type	Null	Key	Default	Extra
CLIENTNO	varchar(6)	NO	PRI	NULL	
NAME	varchar(20)	YES		NULL	
ADDRESS1	varchar(30)	YES		NULL	
ADDRESS2	varchar(30)	NO		NULL	
CITY	varchar(15)	YES		NULL	
PINCODE	int	YES		NULL	
STATE	varchar(15)	YES		NULL	
BALDUE	decimal(10,2)	YES		NULL	
TELEPHONE	int	YES		NULL	

Result 24

Action Output   ⟳

	Time	Action	Response
✔ 103	20:56:10	DESCRIBE CLIENT_MASTER	9 row(s) returned

6.2 Change the size of SellPrice column in Product_Master to 10,2.

```
93 •    ALTER TABLE PRODUCT_MASTER MODIFY SELLPRICE DECIMAL(10,2);
94 •    DESCRIBE PRODUCT_MASTER;
        ⟳  25:94                    ⬆
```

Result Grid | Filter Rows: Q Search   Export:

Field	Type	Null	Key	Default	Extra
PRODUCTNO	varchar(6)	NO	PRI	NULL	
DESCRIPTION	varchar(15)	NO		NULL	
PROFITPERC	decimal(4,2)	NO		NULL	
UNITMEASURE	varchar(10)	NO		NULL	
QTYONHAND	int	NO		NULL	
REORDERLVL	int	NO		NULL	
SELLPRICE	decimal(10,2)	YES		NULL	
COSTPRICE	decimal(8,2)	NO		NULL	
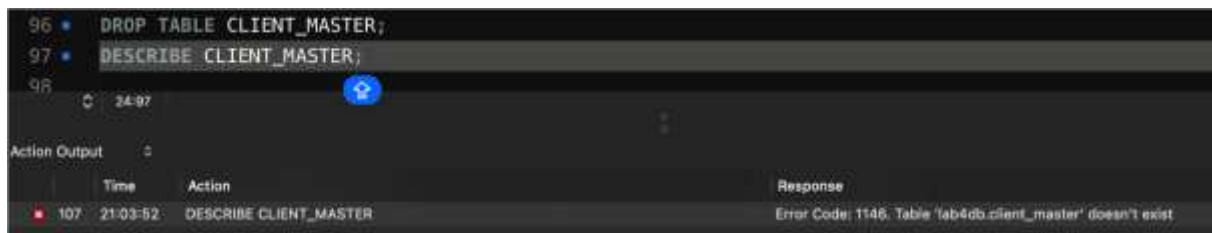
Result 25

Action Output   ⟳

	Time	Action	Response
✔ 105	20:59:56	DESCRIBE PRODUCT_MASTER	8 row(s) returned

7. Exercise on Deleting Table Structure

7.1 Destroy the table Client_Master along with its data.

Key Observation: SAFE MODE in MySQL

- **MySQL Workbench enables Safe Update Mode by default.**
- **In this mode, UPDATE and DELETE queries must include a WHERE clause using a key column (like Primary Key), or they will be blocked.**

- **This feature prevents accidental modification or deletion of all rows in a table.**

UPDATE SALESMAN_MASTER SET CITY = 'Pune'; **was blocked because it had**
no WHERE condition.

The query works if written as:
UPDATE SALESMAN_MASTER SET CITY = 'Pune' WHERE SALESMANNO = 'S00001';

Alternatively, Safe Mode can be disabled temporarily by running:
SET SQL_SAFE_UPDATES = 0; **or permanently via Workbench Preferences.**