



Problem Statement: Design and Develop SQL DDL statements which demonstrate the use of SQL objects such as Table, View, Index, Sequence, Synonym

CREATE TABLE:

```
CREATE TABLE PLATFORM(
    PNO INT PRIMARY KEY,
    ARR DECIMAL(4,2),
    DEPART DECIMAL(4,2)
);
```

Object Type **TABLE** Object **PLATFORM**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
<u>PLATFORM</u>	<u>PNO</u>	Number	-	-	0	1	-	-	-
	<u>ARR</u>	Number	-	4	2	-	✓	-	-
	<u>DEPART</u>	Number	-	4	2	-	✓	-	-
1 - 3									

```
CREATE TABLE PASSENGER(
    NO NUMBER(2),
    NAME VARCHAR2(10),
    GENDER VARCHAR2(6),
    AGE NUMBER(3),
    MOBILE_NO NUMBER(10),
    AADHAR_NO VARCHAR2(12) PRIMARY KEY
);
```

Object Type **TABLE** Object **PASSENGER**

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
<u>PASSENGER</u>	<u>NO</u>	Number	-	2	0	-	✓	-	-
	<u>NAME</u>	Varchar2	10	-	-	-	✓	-	-
	<u>GENDER</u>	Varchar2	6	-	-	-	✓	-	-
	<u>AGE</u>	Number	-	3	0	-	✓	-	-
	<u>MOBILE_NO</u>	Number	-	10	0	-	✓	-	-
	<u>AADHAR_NO</u>	Varchar2	12	-	-	1	-	-	-
1 - 6									

```
CREATE TABLE TRAIN(
    TNO NUMBER(5) PRIMARY KEY,
    T_NAME VARCHAR2(20),
    ARR DECIMAL(4,2),
    DEPART DECIMAL(4,2),
    PNO NUMBER(3), FOREIGN KEY(PNO) REFERENCES PLATFORM(PNO)
);
```

Object Type TABLE Object TRAIN

[illegible]

CREATE TABLE RESERVATION

```
(
    PNR NUMBER(10) PRIMARY KEY,
    AADHAR VARCHAR2(12), FOREIGN KEY(AADHAR) REFERENCES PASSENGER(AADHAR_NO),
    TNO NUMBER(5), FOREIGN KEY(TNO) REFERENCES TRAIN(TNO),
    DT DATE,
    P_FROM VARCHAR2(10),
    P_TO VARCHAR2(10),
    R_STATUS VARCHAR2(10),
    R_CLASS VARCHAR2(10)
);
```

Object Type TABLE Object RESERVATION

[illegible]

ALTERING TABLE:

```
ALTER TABLE PASSENGER ADD ADDRESSS VARCHAR2(10);
```

Object Type TABLE Object PASSENGER

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
PASSENGER	<u>NO</u>	Number	-	2	0	-	✓	-	-
	<u>NAME</u>	Varchar2	10	-	-	-	✓	-	-
	<u>GENDER</u>	Varchar2	6	-	-	-	✓	-	-
	<u>AGE</u>	Number	-	3	0	-	✓	-	-
	<u>MOBILE_NO</u>	Number	-	10	0	-	✓	-	-
	<u>AADHAR_NO</u>	Varchar2	12	-	-	1	-	-	-
	<u>ADDRESSS</u>	Varchar2	10	-	-	-	✓	-	-

1 - 7

DROP TABLE:

DROP TABLE RESERVATION;

Table dropped.

CREATE VIEW:

CREATE VIEW TICKET_2 AS SELECT RESERVATION.PNR, PASSENGER.NAME,RESERVATION. DT ,RESERVATION.TNO ,RESERVATION.P_FROM ,RESERVATION.P_TO FROM RESERVATION,PASSENGER WHERE RESERVATION.AADHAR=PASSENGER.AADHAR_NO;

View created.

0.27 seconds

SELECT *FROM TICKET_2 ORDER BY PNR;

PNR	NAME	DT	TNO	P_FROM	P_TO
1200600321	Shruti	28-JUN-21	13907	Pune	Mumbai
1200600506	Priyanka	01-JUL-21	12331	Latur	Mumbai
1200612345	Rohit	02-JUL-21	23410	Varanasi	Mumbai
1200700845	Mayur	10-JUL-21	10345	SC	Porbandar

4 rows returned in 0.19 seconds

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CREATE SEQUENCE:

CREATE SEQUENCE SEQUENCE_2

START WITH 1

INCREMENT BY 1

MINVALUE 0

MAXVALUE 50;

DESC SEQUENCE_2;

Object Type SEQUENCE Object SEQUENCE_2

CREATE INDEX:

CREATE INDEX IDX_RESERVATION ON RESERVATION(DT);

CREATE INDEX IDX_PASSENGER ON PASSENGER(NO);

CREATE INDEX IDX_TRAIN ON TRAIN(PNO);

Index created.

DROP INDEX:

DROP INDEX IDX_PASSENGER ;

Index dropped.

Problem Statement: Design at least 10 SQL queries for suitable database application using SQL DML statements: Insert, Select, Update, Delete with operators, functions and set operator.

INSERT DATA INTO TABLE:

BEGIN

INSERT INTO TRAIN VALUES

(12331,'LATUR CSTM','19.00','19.30',4);

INSERT INTO TRAIN VALUES

(13907,'INDRAYANI EXPRESS','19.20','20.20',6);

INSERT INTO TRAIN VALUES

(10345,'SC PBR SPECIAL','20.30','20.50',8);

INSERT INTO TRAIN VALUES

(23410,'BSB CSTM SPECIAL','21.15','21.30',3);

INSERT INTO TRAIN VALUES

(12232,'PUNE TPJ SPECIAL','21.30','21.56',2);

INSERT INTO TRAIN VALUES

(80876,'YPR JP EXPRESS','22.45','23.15',5);

INSERT INTO TRAIN VALUES

(22578,'KOP LTT SPECIAL','01.00','01.30',10);

INSERT INTO TRAIN VALUES

(30076,'PUNE TPL SPECIAL','2.00','2.30',8);

END;

/

TNO	T_NAME	ARR	DEPART	PNO
12331	LATUR CSTM	19	19.3	4
13907	INDRAYANI EXPRESS	19.2	20.2	6
10345	SC PBR SPECIAL	20.3	20.5	8
23410	BSB CSTM SPECIAL	21.15	21.3	3
12232	PUNE TPJ SPECIAL	21.3	21.56	2
80876	YPR JP EXPRESS	22.45	23.15	5
22578	KOP LTT SPECIAL	1	1.3	10
30076	PUNE TPL SPECIAL	2	2.3	8

8 rows returned in 0.06 seconds

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UPDATAE TABLE:

UPDATAE TRAIN

SET PNO=4

WHERE TNO=30076;

1 row(s) updated.

22578	KOP LTT SPECIAL	1	1.3	10
30076	PUNE TPL SPECIAL	2	2.3	4

DELETE DATA FROM TABLE:

DELETE FROM TRAIN

WHERE TNO=30076;

1 row(s) deleted.

TNO	T_NAME	ARR	DEPART	PNO
12331	LATUR CSTM	19	19.3	4
13907	INDRAYANI EXPRESS	19.2	20.2	6
10345	SC PBR SPECIAL	20.3	20.5	8
23410	BSB CSTM SPECIAL	21.15	21.3	3
12232	PUNE TPJ SPECIAL	21.3	21.56	2
80876	YPR JP EXPRESS	22.45	23.15	5
22578	KOP LTT SPECIAL	1	1.3	10

7 rows returned in 0.00 seconds

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FUNCTION:

COUNT:

SELECT COUNT(*) FROM TRAIN

COUNT(*)
7

SUM

SELECT SUM(PNO) FROM TRAIN

SUM(PNO)
38

MIN

SELECT MIN(PNO) FROM TRAIN

MIN(PNO)
2

1 rows returned in 0.02 seconds

MAX

SELECT MAX(PNO) FROM TRAIN

MAX(PNO)
10

SET OPERATION:

ID	NAME
1	Rohit
2	Priyanka
3	Shruti

TABLE1:

ID	NAME
4	Manas
5	Mrunal
6	Ajit
3	Shruti

TABLE2:

UNION:

SELECT *FROM TABLE1 UNION SELECT *FROM TABLE2;

ID	NAME
1	Rohit
2	Priyanka
3	Shruti
4	Manas
5	Mrunal
6	Ajit

6 rows returned in 0.11 seconds

UNION ALL:

SELECT *FROM TABLE1 UNION ALL SELECT *FROM TABLE2;

ID	NAME
1	Rohit
2	Priyanka
3	Shruti
4	Manas
5	Mrunal
6	Ajit
3	Shruti

7 rows returned in 0.03 seconds

INTERSECT:

SELECT *FROM TABLE1 INTERSECT SELECT *FROM TABLE2;

ID	NAME
3	Shruti

1 rows returned in 0.08 seconds

MINUS :

SELECT *FROM TABLE1 MINUS SELECT *FROM TABLE2;

ID	NAME
1	Rohit
2	Priyanka

2 rows returned in 0.00 seconds

Problem Statement: SQL Queries – all types of Join, Sub-Query and View: Write at least 10 SQL queries for suitable database application using SQL DML statements.

INNER JOIN

```
SELECT TABLE1.ID, TABLE1.NAME, TABLE2.ID, TABLE2.NAME
FROM TABLE1
INNER JOIN TABLE2 ON TABLE1.ID = TABLE2.ID;
```

ID	NAME	ID	NAME
3	Shruti	3	Shruti

RIGHT OUTER JOIN

```
SELECT TABLE1.ID, TABLE1.NAME, TABLE2.ID, TABLE2.NAME
FROM TABLE1
RIGHT OUTER JOIN TABLE2 ON TABLE1.ID = TABLE2.ID;
```

ID	NAME	ID	NAME
3	Shruti	3	Shruti
-	-	6	Ajit
-	-	5	Mrunal
-	-	4	Manas

4 rows returned in 0.05 seconds

LEFT OUTER JOIN

```
SELECT TABLE1.ID, TABLE1.NAME, TABLE2.ID, TABLE2.NAME
FROM TABLE1
LEFT OUTER JOIN TABLE2 ON TABLE1.ID = TABLE2.ID;
```

ID	NAME	ID	NAME
3	Shruti	3	Shruti
1	Rohit	-	-
2	Priyanka	-	-

3 rows returned in 0.00 seconds

FULL OUTER JOIN

```
SELECT TABLE1.ID, TABLE1.NAME, TABLE2.ID, TABLE2.NAME
FROM TABLE1
FULL OUTER JOIN TABLE2 ON TABLE1.ID = TABLE2.ID;
```


ID	NAME	ID	NAME
3	Shruti	3	Shruti
1	Rohit	-	-
2	Priyanka	-	-
-	-	4	Manas
-	-	5	Mrunal
-	-	6	Ajit

6 rows returned in 0.30 seconds

CROSS JOIN

SELECT * FROM TABLE1 CROSS JOIN TABLE2;

ID	NAME	ID	NAME
1	Rohit	4	Manas
1	Rohit	5	Mrunal
1	Rohit	6	Ajit
1	Rohit	3	Shruti
2	Priyanka	4	Manas
2	Priyanka	5	Mrunal
2	Priyanka	6	Ajit
2	Priyanka	3	Shruti
3	Shruti	4	Manas
3	Shruti	5	Mrunal
More than 10 rows available. Increase rows selector to view more rows.			

10 rows returned in 0.16 seconds

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View:

Create A Sql View:

CREATE VIEW SIMPLEVIEW AS

SELECT NAME

FROM TABLE1

WHERE ID< 3;

View created.

SELECT * FROM SIMPLEVIEW;

NAME
Rohit

1 rows returned in 0.25 seconds

Update An Sql View

```
CREATE OR REPLACE VIEW SIMPLEVIEW AS
```

```
SELECT NAME
```

```
FROM TABLE1
```

```
WHERE ID > 2;
```

```
SELECT * FROM SIMPLEVIEW;
```

NAME
Shruti

1 rows returned in 0.00 seconds

Insert New Record In The View

```
INSERT INTO SIMPLEVIEW(NAME) VALUES ('AISHU');
```

Delete The Existing Row From The View

```
DELETE FROM SIMPLEVIEW WHERE NAME='ROHIT';
```

NAME
Shruti
AISHU

2 rows returned in 0.01 seconds

Drop A View

```
DROP VIEW SIMPLEVIEW ;
```

```
View dropped.
```

Problem Statement: Unnamed PL/SQL code block: Use of Control structure and Exception handling is mandatory. Write a PL/SQL block of code for the following requirements:- Schema: 1. Borrower(Roll,Name,DateofIssue, NameofBook, Status 2. Fine (Roll, Date, Amt) Accept Roll & Name of book from user. Check the number of days (from date of issue), if days are between 15 to 30 then fine amounts will be Rs 5/ day. If no. of days>30, per day fine will be Rs 50 per day & for days less than 30, Rs. 5 per day. After submitting the book, status will change from I to R. If condition of fine is true, then details will be stored into fine table.

```
create table Borrower(  
Roll_no number not null,  
Name varchar2(20) not null,  
DateofIssue date,  
NameofBook varchar2(20),  
Status varchar2(2)  
);
```

```
insert into Borrower values (1,'Aishwarya', TO_DATE('08/09/2002','dd-mm-yyyy'),'CN','A');  
insert into Borrower values (2,'Priyanka', TO_DATE('20/09/2002','dd/mm/yyyy'),'DBMS','A');  
insert into Borrower values (3,'Madhav', TO_DATE('25/10/2002','dd/mm/yyyy'),'TOC','A');  
insert into Borrower values (5,'Shruti', TO_DATE('27/10/2002','dd/mm/yyyy'),'SPOS','A');  
insert into Borrower values (1,'Aishwarya', TO_DATE('03/10/2002','dd/mm/yyyy'),'TOC','A');  
insert into Borrower values (4,'Shree', TO_DATE('25/09/2020','dd/mm/yyyy'),'DBMS','I');
```

```
select * from Borrower;
```

ROLL_NO	NAME	DATEOFISSUE	NAMEOFBOOK	STATUS
1	Aishwarya	08-SEP-02	CN	A
2	Priyanka	20-SEP-02	DBMS	A
3	Madhav	25-OCT-02	TOC	A
5	Shruti	27-OCT-02	SPOS	A
1	Aishwarya	03-OCT-02	TOC	A
4	Shree	25-SEP-20	DBMS	I

6 rows returned in 0.03 seconds

[CSV Export](#)

```
CREATE TABLE Fine(  
Roll_no NUMBER,  
Date_Return DATE,  
Amt NUMBER  
);
```

Procedure Finer:

```
create or replace procedure finer(r in number, book_name in varchar2) as
    days number;
begin
    select trunc(sysdate - DateofIssue) into days
    from Borrower
    where Roll_no = r and NameofBook = book_name;

    if days < 15 then
        insert into Fine values (r, sysdate, 0);
    elsif days >= 15 and days < 30 then
        insert into Fine values (r, sysdate, 0);
        update Fine set Amt = Amt + (days * 5) where Roll_no = r;
    else
        days := days - 30;
        insert into Fine values (r, sysdate, 0);
        update Fine set Amt = Amt + (days * 50) + 75 where Roll_no = r;
    end if;

    update Borrower set Status = 'R' where Roll_no = r and NameofBook = book_name;
end;
```

/

Execution:

```
BEGIN
    finer(1, 'CN');
END;
```

/

```
select * from Fine;
```

ROLL_NO	DATE_RETURN	AMT
1	11-OCT-23	383725

1 rows returned in 0.03 seconds

[CSV Export](#)

BEGIN

finer(1, 'TOC');

finer(2, 'DBMS');

END;

/

select * from Fine;

ROLL_NO	DATE_RETURN	AMT
1	11-OCT-23	766200
1	11-OCT-23	382475
2	11-OCT-23	383125

3 rows returned in 0.00 seconds [CSV Export](#)

Problem Statement: Write a PL/SQL code block to calculate the area of a circle for a value of radius varying from 5 to 9. Store the radius and the corresponding values of calculated area in an empty table named areas, consisting of two columns, radius and area.

```
CREATE TABLE areas (radius number, area number);
```

```
desc areas;
```

Object Type TABLE Object AREAS

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
AREAS	RADIUS	Number	-	-	-	-	✓	-	-
	AREA	Number	-	-	-	-	✓	-	-
1 - 2									

```
declare
```

```
radius_var number;
```

```
area_var number;
```

```
pi number:= 3.14;
```

```
begin
```

```
dbms_output.put_line('Area of circle from radius 5 to 9');
```

```
for radius_var in 5..9 loop
```

```
area_var:=pi*radius_var*radius_var;
```

```
dbms_output.put_line(area_var);
```

```
insert into areas values(radius_var,area_var);
```

```
end loop;
```

```
end;
```

```
/
```

```
Area of circle from radius 5 to 9
78.5
113.04
153.86
200.96
254.34
```

```
Statement processed.
```

select * from areas;

RADIUS	AREA
5	78.5
6	113.04
7	153.86
8	200.96
9	254.34

5 rows returned in 0.26 seconds

Problem Statement: Named PL/SQL Block: PL/SQL Stored Procedure and Stored Function.

Write a Stored Procedure namely proc_Grade for the categorization of student. If marks scored by students in examination is ≤ 1500 and marks ≥ 990 then student will be placed in distinction category if marks scored are between 989 and 900 category is first class, if marks 899 and 825 category is Higher Second Class. Write a PL/SQL block for using procedure created with above requirement. Stud_Marks(name, total_marks)
Result(Roll, Name, Class)

--student marks

```
create table Stud_Marks(  
    STUD_NAME varchar2(20),  
    TOTAL_MARKS number(5)  
);
```

begin

```
insert into Stud_Marks values ('Aishwarya', 1400);
```

```
insert into Stud_Marks values ('Priyanka', 800);
```

```
insert into Stud_Marks values ('Madhav', 830);
```

```
insert into Stud_Marks values ('Shruti', 900);
```

```
insert into Stud_Marks values ('Pritam', 990);
```

```
insert into Stud_Marks values ('Ram', 300);
```

```
end;
```

/

RADIUS	AREA
5	78.5
6	113.04
7	153.86
8	200.96
9	254.34

5 rows returned in 0.26 seconds

-- Result table

```
create table Result(  
    STUD_NAME varchar2(20),  
    ROLL_NO number(5),  
    CLASS varchar2(20)  
);
```



```

create or replace PROCEDURE PROC_GRADE1 AS
BEGIN
    FOR i IN (SELECT * FROM Stud_Marks)
    LOOP
        DBMS_OUTPUT.PUT_LINE('Student Name: ' || i.Stud_Name || ' Student Marks: ' || i.Total_Marks);
        IF i.Total_Marks <=1500 AND i.Total_Marks >=990 THEN
            INSERT INTO Result (STUD_NAME,CLASS) VALUES (i.Stud_Name,'Distinction');
        ELSIF i.Total_Marks <=989 AND i.Total_Marks >=900 THEN
            INSERT INTO Result (STUD_NAME,CLASS) VALUES (i.Stud_Name,'First Class');
        ELSIF i.Total_Marks <=825 AND i.Total_Marks >=899 THEN
            INSERT INTO Result (STUD_NAME,CLASS) VALUES (i.Stud_Name,'Higher Second
Class');
        END IF;
    END LOOP;
    COMMIT;
END;

EXEC PROC_GRADE1;

```

```

SQL> EXEC PROC_GRADE1;
Student Name: Aishwarya Student Marks: 1400
Student Name: Priyanka Student Marks: 800
Student Name: Madhav Student Marks: 830
Student Name: Shruti Student Marks: 900
Student Name: Pritam Student Marks: 990
Student Name: Ram Student Marks: 300

PL/SQL procedure successfully completed.

```

select * from Result;

```

SQL> select * from Result;

STUD_NAME          CLASS
-----
Aishwarya          Distinction
Priyanka            Fail
Madhav             Higher Second Class
Shruti             First Class
Pritam             Distinction
Ram                Fail

6 rows selected.

```

Problem Statement: Write a PL/SQL block of code using parameterized Cursor, that will merge the data available in the newly created table Cust_New with the data available in the table Cust_Old. If the data in the first table already exist in the second table then that data should be skipped.

-- Create the tables

```
CREATE TABLE Cust_New (ID NUMBER, Name VARCHAR2(10), City VARCHAR2(10), Salary NUMBER);
```

```
CREATE TABLE Cust_Old (ID NUMBER, Name VARCHAR2(10), City VARCHAR2(10), Salary NUMBER);
```

-- Insert data into Cust_New

```
BEGIN
```

```
INSERT INTO Cust_New VALUES (1, 'Ajay', 'Pune', 20000);
```

```
INSERT INTO Cust_New VALUES (2, 'Ramesh', 'Pune', 15000);
```

```
INSERT INTO Cust_New VALUES (3, 'Umesh', 'Pune', 40000);
```

```
INSERT INTO Cust_New VALUES (4, 'Ram', 'Pune', 25000);
```

```
END;
```

```
/
```

```
select * from Cust_New;
```

ID	NAME	CITY	SALARY
1	Ajay	Pune	20000
2	Ramesh	Pune	15000
3	Umesh	Pune	40000
4	Ram	Pune	25000

4 rows returned in 1.60 seconds

```
select * from Cust_Old;
```

no data found

-- PL/SQL block to merge data from Cust_New into Cust_Old

```
DECLARE
```

```
v_id NUMBER;
```

```
v_name VARCHAR2(10);
```

```
v_city VARCHAR2(10);
```

```
v_salary NUMBER;
```

```
v_exists NUMBER;
```

```
CURSOR c_new_customers IS
```

```
  SELECT ID, Name, City, Salary
```

```
  FROM Cust_New;
```

```
BEGIN
```

```
  FOR cust_rec IN c_new_customers LOOP
```

```
    -- Check if the data already exists in Cust_Old
```

```
    SELECT COUNT(*) INTO v_exists
```

```
    FROM Cust_Old
```

```
    WHERE ID = cust_rec.ID
```

```
    AND Name = cust_rec.Name
```

```
    AND City = cust_rec.City
```

```
    AND Salary = cust_rec.Salary;
```

```
    -- If it doesn't exist, insert into Cust_Old
```

```
    IF v_exists = 0 THEN
```

```
      INSERT INTO Cust_Old (ID, Name, City, Salary)
```

```
      VALUES (cust_rec.ID, cust_rec.Name, cust_rec.City, cust_rec.Salary);
```

```
    END IF;
```

```
  END LOOP;
```

```
END;
```

```
/
```

```
1 row(s) inserted.
```

```
select * from Cust_Old;
```

ID	NAME	CITY	SALARY
1	Ajay	Pune	20000
2	Ramesh	Pune	15000
3	Umesh	Pune	40000
4	Ram	Pune	25000

4 rows returned in 0.00 seconds

Problem Statement: Database Trigger (All Types: Row level and Statement level triggers, Before and After Triggers). Write a database trigger on Library table. The System should keep track of the records that are being updated or deleted. The old value of updated or deleted records should be added in Library_Audit table.

-- Create the Library table

```
CREATE TABLE Library (  
    id NUMBER,  
    name VARCHAR2(10),  
    dept_no NUMBER  
);
```

-- Insert values in table

```
begin  
insert into Library values(1,'Aashi',1);  
insert into Library values(2,'Nitin',15);  
insert into Library values(3,'Nishi',8);  
insert into Library values(4,'Aditi',7);  
insert into Library values(5,'Roshni',1);  
end;  
/  
  
select *from Library;
```

ID	NAME	DEPT_NO
1	Aashi	1
2	Nitin	15
3	Nishi	8
4	Aditi	7
5	Roshni	1

5 rows returned in 0.00 seconds

-- Create the Library_Audit table

```
CREATE TABLE Library_Audit (  
    operation VARCHAR2(10),  
    old_id NUMBER,  
    old_name VARCHAR2(10),  
    old_dept_no NUMBER  
);
```

```
-- Create an AFTER DELETE trigger to log deleted records
CREATE OR REPLACE TRIGGER library_delete_trigger
AFTER DELETE ON Library
FOR EACH ROW
BEGIN
    INSERT INTO Library_Audit (operation, old_id, old_name, old_dept_no)
    VALUES ('Delete', :old.id, :old.name, :old.dept_no);
END;
```

```
-- Create an AFTER UPDATE trigger to log updated records
CREATE OR REPLACE TRIGGER library_update_trigger
AFTER UPDATE ON Library
FOR EACH ROW
BEGIN
    INSERT INTO Library_Audit (operation, old_id, old_name, old_dept_no)
    VALUES ('Update', :old.id, :old.name, :old.dept_no);
END;
```

Update Library set name='Aishu' where dept_no=7;

select *from Library_Audit;

OPERATION	OLD_ID	OLD_NAME	OLD_DEPT_NO
Update	4	Aditi	7

1 rows returned in 0.08 seconds

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delete from Library where id=3;

select *from Library_Audit;

OPERATION	OLD_ID	OLD_NAME	OLD_DEPT_NO
Update	4	Aditi	7
Delete	3	Nishi	8

2 rows returned in 0.00 seconds

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```
select *from Library;
```

ID	NAME	DEPT_NO
1	Aashi	1
2	Nitin	15
4	Aishu	7
5	Roshni	1

4 rows returned in 0.05 seconds

Problem Statement: Database Connectivity: Write a program to implement MySQL/Oracle database connectivity with any front end language to implement Database navigation operations (add, delete, edit etc.)

JDBC Statement:

```
import java.sql.*;
import java.util.Scanner;
import java.util.*;
import java.io.*;

public class JDBCPreparedStatementDemo
{
    static Connection con;
    static ResultSet rs;
    static PreparedStatement pstmt, pstmt1,
    pstmt2,pstmt3,pstmt4;
    static Scanner sc= new Scanner(System.in);

    public static void main(String args[])
    {
        JDBCPreparedStatementDemo obj = new
        JDBCPreparedStatementDemo();
        //Creating a scanner object
        String selQuery1="select * from customer";
        String selQuery2="insert into customer
        values(?,?,?)";
        String selQuery3="update customer set Name=?
        where id=?";
        String selQuery4="delete from customer where
        id=?";
        String selQuery5="select * from customer where
        id=?";
        int ch=1, op;

        try
        {
            //step1 load the driver class
```

```
Class.forName("oracle.jdbc.driver.OracleDriver");
```

```
//step2 create the connection object
```

```
con=DriverManager.getConnection(
```

```
"jdbc:oracle:thin:@localhost:1521:xe","system","
password");
```

```
//step3 create the statement object
```

```
pstmt=con.prepareStatement(selQuery1);
```

```
pstmt1=con.prepareStatement(selQuery2);
```

```
pstmt2=con.prepareStatement(selQuery3);
```

```
pstmt3=con.prepareStatement(selQuery4);
```

```
pstmt4=con.prepareStatement(selQuery5);
```

```
do
```

```
{
```

```
    System.out.println("\nWhich operation you
    want to do?");
```

```
    System.out.println("1. Display a table");
```

```
    System.out.println("2. Insert a record");
```

```
    System.out.println("3. Delete a record");
```

```
    System.out.println("4. Update a record");
```

```
    System.out.println("5. Search a record");
```

```
    System.out.println("\nEnter your Choice: ");
```

```
    ch = sc.nextInt();
```

```
    sc.nextLine();
```

```
    switch(ch){
```

```
        case 1:
```


obj.display();	public void display() throws SQLException
break;	{
case 2:	rs=pstmt.executeQuery();
obj.insert();	System.out.println("\nID\tName\tAmount");
break;	while(rs.next())
case 3:	{
obj.delete();	System.out.println(rs.getInt(1)+"
break;	"+rs.getString(2)+" "+rs.getInt(3));
	}
case 4:	} //End of display() method
obj.update();	
break;	public void insert() throws SQLException
	{
case 5:	int id, amount;
obj.search();	String name;
break;	System.out.println("Enter a id: ");
	id = sc.nextInt();
} //End of switch	sc.nextLine();
	System.out.println("Enter a Name: ");
}while(ch<5);	name=sc.nextLine();
	System.out.println("Enter a amount: ");
//step5 close the connection object	amount = sc.nextInt();
con.close();	
	pstmt1.setInt(1,id);
} //End of try block	pstmt1.setString(2,name);
	pstmt1.setInt(3,amount);
catch(Exception e)	pstmt1.executeUpdate();
{	
System.out.println(e);	System.out.println("Successfully insert a id
}	"+id);
	} //End of display() method
} //End of main method	
	public void update() throws SQLException

```

{
    int id;
    String name;
    System.out.println("Enter a id: ");
    id = sc.nextInt();
    sc.nextLine();
    System.out.println("Enter a Name: ");
    name=sc.nextLine();

    pstmt2.setString(1,name);
    pstmt2.setInt(2,id);
    pstmt2.executeUpdate();

    System.out.println("Successfully update a
name of id "+id);
} //End of display() method

public void delete() throws SQLException
{
    int id;
    System.out.println("Enter a id: ");
    id = sc.nextInt();
    sc.nextLine();
    pstmt3.setInt(1,id);
    pstmt3.executeUpdate();

    System.out.println("Successfully delted id
"+id);
} //End of display() method

} //End of display() method

public void search() throws SQLException
{
    int id;
    System.out.println("Enter a id: ");
    id = sc.nextInt();
    sc.nextLine();
    pstmt3.setInt(1,id);
    rs=pstmt.executeQuery();
    System.out.println("ID\tName\tAmount");

    if(rs.next()==true)
    {
        System.out.println(rs.getInt(1)+"
"+rs.getString(2)+" "+rs.getInt(3));
    }
    else
    {
        System.out.println("Invalid ID");
    }
} //End of display() method

```

```
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```

Which operation you want to do?

1. Display a table
2. Insert a record
3. Delete a record
4. Update a record
5. Search a record

Enter your Choice:

1

ID	Name	Amount
----	------	--------

Which operation you want to do?

1. Display a table
2. Insert a record
3. Delete a record
4. Update a record
5. Search a record

Enter your Choice:

2

Enter a id:

1

Enter a Name:

Aishu

Enter a amount:

200

Successfully insert a id 1

Which operation you want to do?

1. Display a table
2. Insert a record
3. Delete a record
4. Update a record
5. Search a record

Enter your Choice:

2

Enter a id:

2

Enter a Name:

Shruti

Enter a amount:

400

Successfully insert a id 2

Which operation you want to do?

1. Display a table
2. Insert a record
3. Delete a record
4. Update a record
5. Search a record

Enter your Choice:

1

ID	Name	Amount
----	------	--------

1	Aishu	200
---	-------	-----

2	Shruti	400
---	--------	-----

Which operation you want to do?

1. Display a table
2. Insert a record
3. Delete a record
4. Update a record
5. Search a record

Enter your Choice:

4

Enter a id:

2

Enter a Name:

Arjun

Successfully update a name of id 2

Which operation you want to do?

1. Display a table
2. Insert a record
3. Delete a record

Enter your Choice:

1

ID	Name	Amount
----	------	--------

1	Aishu	200
---	-------	-----

2	Arjun	400
---	-------	-----

Which operation you want to do?

1. Display a table
2. Insert a record
3. Delete a record
4. Update a record
5. Search a record

Enter your Choice:

3

Enter a id:

2

Successfully delted id 2

Which operation you want to do?

1. Display a table
2. Insert a record
3. Delete a record
4. Update a record
5. Search a record

Enter your Choice:

1

ID	Name	Amount
----	------	--------

1	Aishu	200
---	-------	-----