

ASSIGNMENT No 5 : PLSQL(Triggers)

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

```
mysql> use employee_database;
Database changed

mysql> select * from employee;
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| E_id | Ename  | Post      | Address | Phno      | Date_of_Joining | Annual_income | Gender | Did |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 1    | Vedika | analyst   | Delhi   | 8756998756 | 2010-07-09      | 500000        | F      | 1   |
| 2    | John   | analyst   | Delhi   | 8234997656 | 2000-09-01      | 700000        | M      | 4   |
| 3    | Rajas  | Manager   | Mumbai  | 8009781256 | 2005-02-12      | 900000        | M      | 3   |
| 4    | Ritika | Finance head | Mumbai  | 7559081256 | 2020-02-12      | 1000000       | F      | 1   |
| 5    | Neha   | clerk     | banglore | 8638739922 | 2020-04-04      | 200000        | F      | 13  |
| 6    | Sam    | clerk     | banglore | 8638712322 | 2020-09-08      | 200000        | M      | 1   |
| 7    | Anne   | clerk     | Hyderabad | 6738712300 | 2000-01-12      | 600000        | F      | 8   |
| 8    | Anita  | engineer   | Hyderabad | 9990012300 | 2007-01-12      | 900000        | F      | 10  |
| 9    | Asmita | clerk     | Pune     | 9988712300 | 2000-11-12      | 600000        | F      | 8   |
| 10   | Manish | Cashier   | Pune     | 9988714670 | 2019-01-19      | 700000        | M      | 9   |
| 11   | Rohit  | Tech Lead | Pune     | 9983976670 | 2019-08-19      | 900000        | M      | 10  |
| 12   | Ritesh | Manager   | Pune     | 9983112270 | 2005-07-11      | 900000        | M      | 15  |
| 13   | Soha   | Manager   | Nashik   | 7783112270 | 2003-07-11      | 1000000       | F      | 2   |
| 14   | Saniya | Manager   | Nashik   | 7783118760 | 2003-07-11      | 900000        | F      | 7   |
| 15   | anisha | Manager   | Nashik   | 9879875656 | 2008-07-12      | 900000        | F      | 11  |
| 18   | Girija | Manager   | Mumbai   | 8239780056 | 2000-02-12      | 2000000       | F      | 6   |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+
16 rows in set (1.75 sec)
```

```
mysql> create table employee_audit(
-> ea_id integer primary key,
-> e_id integer not null,
-> ename varchar(255) not null,
-> post varchar(255) not null,
-> address varchar(255) not null,
-> phno varchar(10) not null,
-> date_of_joining date not null,
-> annual_income integer not null,
-> gender varchar(255) not null,
-> did integer not null,
-> status varchar(10) not null);
Query OK, 0 rows affected (4.83 sec)
```

//AFTER INSERT TRIGGER

```
mysql> create trigger after_insert after insert on employee
-> for each row
-> begin
-> declare ptr integer;
-> select count(*) into ptr from employee_audit;
-> set ptr=ptr+1;
-> insert into employee_audit values
-> (ptr,new.e_id,new.ename,new.post,new.address,new.phno,new.date_of_joining,new.annual_income,new.gender,new.did,"I
nsert new");
-> end
-> //
Query OK, 0 rows affected (0.82 sec)

mysql> insert into employee(ename,post,address,phno,date_of_joining,annual_income,gender,did)
-> values
```

```
-> ('neha','manager','pune','9511268305','2021-07-02',500000,'F',1);
-> //
Query OK, 1 row affected (0.82 sec)

mysql> select * from employee_audit;
-> //
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| ea_id | e_id | ename | post | address | phno | date_of_joining | annual_income | gender | did | status |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 1 | 19 | neha | manager | pune | 9511268305 | 2021-07-02 | 500000 | F | 1 | Insert new |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
1 row in set (0.00 sec)
```

//AFTER DELETE TRIGGER

```
mysql> create trigger after_delete
-> after delete
-> on employee
-> for each row
-> begin
-> declare ptr integer;
-> select count(*) into ptr
-> from employee_audit;
-> set ptr=ptr+1;
-> insert into employee_audit
-> values
-> (ptr,old.e_id,old.ename,old.post,old.address,old.phno,old.date_of_joining,old.annual_income,old.gender,old.did,"Deleted value");
-> end
-> //
Query OK, 0 rows affected (0.35 sec)

mysql> delete from employee where e_id=18;
-> //
Query OK, 1 row affected (0.23 sec)
```

```
mysql> select * from employee_audit;
-> //
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| ea_id | e_id | Name | post | address | phno | date_of_joining | annual_income | gender | did | status |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 1 | 19 | neha | manager | pune | 9511268305 | 2021-07-02 | 500000 | F | 1 | Insert new |
| 2 | 5 | Neha | clerk | banglore | 8638739922 | 2020-04-04 | 200000 | F | 13 | updated |
| 3 | 18 | Girija | Manager | Mumbai | 8239780056 | 2000-02-12 | 2000000 | F | 6 | Deleted value |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
3 rows in set (0.00 sec)
```

//AFTER UPDATE TRIGGER

```
mysql> create trigger after_update
-> after update
-> on employee
-> for each row
-> begin
-> declare ptr integer;
-> select count(*) into ptr from employee_audit;
-> set ptr=ptr+1;
-> insert into employee_audit
-> values
-> (ptr,new.e_id,new.ename,new.post,new.address,new.phno,new.date_of_joining,new.annual_income,new.gender,new.did,"updated");
-> end
-> //
Query OK, 0 rows affected (0.76 sec)

mysql> update employee set annual_income=200000 where e_id=5;
-> //
```

Query OK, 0 rows affected (0.36 sec)
Rows matched: 1 Changed: 0 Warnings: 0

```
mysql> select * from employee_audit;
-> //
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| ea_id | e_id | ename | post | address | phno | date_of_joining | annual_income | gender | did |
status |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 1 | 19 | neha | manager | pune | 9511268305 | 2021-07-02 | 500000 | F | 1 |
Insert new |
| 2 | 5 | Neha | clerk | banglore | 8638739922 | 2020-04-04 | 200000 | F | 13 |
updated |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
2 rows in set (0.00 sec)
```

// BEFORE INSERT TRIGGER

```
mysql> delimiter //
mysql> create trigger before_insert
-> before insert
-> on employee
-> for each row
-> begin
-> if new.ename="Shreya" then
-> signal sqlstate '45000'
-> set message_text = 'Invalid Ename';
-> end if;
-> end
-> //
```

Query OK, 0 rows affected (0.39 sec)

```
mysql> insert into employee(ename,post,address,phno,date_of_joining,annual_income,gender,did) values
-> ('Shreya','CEO','Nashik','9877456712','1998-09-12',9000000,'F',8);
-> //
ERROR 1644 (45000): Invalid Ename
mysql> select * from employee;
-> //
```

E_id	Ename	Post	Address	Phno	Date_of_Joining	Annual_income	Gender	Did
1	Vedika	analyst	Delhi	8756998756	2010-07-09	500000	F	1
2	John	analyst	Delhi	8234997656	2000-09-01	700000	M	4
3	Rajas	Manager	Mumbai	8009781256	2005-02-12	900000	M	3
4	Ritika	Finance head	Mumbai	7559081256	2020-02-12	1000000	F	1
5	Neha	clerk	banglore	8638739922	2020-04-04	200000	F	13
6	Sam	clerk	banglore	8638712322	2020-09-08	200000	M	1
7	Anne	clerk	Hyderabad	6738712300	2000-01-12	600000	F	8
8	Anita	engineer	Hyderabad	9990012300	2007-01-12	900000	F	10
9	Asmita	clerk	Pune	9988712300	2000-11-12	600000	F	8
10	Manish	Cashier	Pune	9988714670	2019-01-19	700000	M	9
11	Rohit	Tech Lead	Pune	9983976670	2019-08-19	900000	M	10
12	Ritesh	Manager	Pune	9983112270	2005-07-11	900000	M	15
13	Soha	Manager	Nashik	7783112270	2003-07-11	1000000	F	2
14	Saniya	Manager	Nashik	7783118760	2003-07-11	900000	F	7
15	anisha	Manager	Nashik	9879875656	2008-07-12	900000	F	11
19	neha	manager	pune	9511268305	2021-07-02	500000	F	1

16 rows in set (0.10 sec)

// BEFORE UPDATE TRIGGER

```
mysql> select * from employee;
-> //
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| E_id | Ename | Post | Address | Phno | Date_of_Joining | Annual_income | Gender | Did |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| 1 | Vedika | analyst | Delhi | 8756998756 | 2010-07-09 | 500000 | F | 1 |
| 2 | John | analyst | Delhi | 8234997656 | 2000-09-01 | 700000 | M | 4 |
| 3 | Rajas | Manager | Mumbai | 8009781256 | 2005-02-12 | 900000 | M | 3 |
| 4 | Ritika | Test engineer | Mumbai | 7559081256 | 2020-02-12 | 1000000 | F | 1 |
| 5 | Neha | clerk | banglore | 8638739922 | 2020-04-04 | 200000 | F | 13 |
| 6 | Sam | clerk | banglore | 8638712322 | 2020-09-08 | 200000 | M | 1 |
| 7 | Anne | clerk | Hyderabad | 6738712300 | 2000-01-12 | 600000 | F | 8 |
| 8 | Anita | engineer | Hyderabad | 9990012300 | 2007-01-12 | 900000 | F | 10 |
| 9 | Asmita | clerk | Pune | 9988712300 | 2000-11-12 | 600000 | F | 8 |
| 10 | Manish | Cashier | Pune | 9988714670 | 2019-01-19 | 700000 | M | 9 |
| 11 | Rohit | Tech Lead | Pune | 9983976670 | 2019-08-19 | 900000 | M | 10 |
```

	12		Ritesh		Manager		Pune		9983112270		2005-07-11		900000		M		15	
	13		Soha		Manager		Nashik		7783112270		2003-07-11		1000000		F		2	
	14		Saniya		Manager		Nashik		7783118760		2003-07-11		900000		F		7	
	15		anisha		Manager		Nashik		9879875656		2008-07-12		900000		F		11	
	19		neha		manager		pune		9511268305		2021-07-02		500000		F		1	
+-----+-----+-----+-----+-----+-----+-----+-----+-----+																		

16 rows in set (0.00 sec)

```
mysql> delimiter //
mysql> create trigger before_update
-> before
-> update on employee
-> for each row
-> begin
-> if new.post="Finance head" then
-> signal sqlstate '45000'
-> set message_text = 'Cannot update the post';
-> end if;
-> end
-> //
```

Query OK, 0 rows affected (0.16 sec)

```
mysql> update employee set post="Finance head" where post="Test engineer";
-> //
```

ERROR 1644 (45000): Cannot update the post

```
mysql> select * from employee;
-> //
```

	E_id		Ename		Post		Address		Phno		Date_of_Joining		Annual_income		Gender		Did	
+-----+-----+-----+-----+-----+-----+-----+-----+-----+																		
	1		Vedika		analyst		Delhi		8756998756		2010-07-09		500000		F		1	
	2		John		analyst		Delhi		8234997656		2000-09-01		700000		M		4	
	3		Rajas		Manager		Mumbai		8009781256		2005-02-12		900000		M		3	
	4		Ritika		Test engineer		Mumbai		7559081256		2020-02-12		1000000		F		1	
	5		Neha		clerk		banglore		8638739922		2020-04-04		200000		F		13	
	6		Sam		clerk		banglore		8638712322		2020-09-08		200000		M		1	
	7		Anne		clerk		Hyderabad		6738712300		2000-01-12		600000		F		8	
	8		Anita		engineer		Hyderabad		9990012300		2007-01-12		900000		F		10	
	9		Asmita		clerk		Pune		9988712300		2000-11-12		600000		F		8	
	10		Manish		Cashier		Pune		9988714670		2019-01-19		700000		M		9	
	11		Rohit		Tech Lead		Pune		9983976670		2019-08-19		900000		M		10	
	12		Ritesh		Manager		Pune		9983112270		2005-07-11		900000		M		15	
	13		Soha		Manager		Nashik		7783112270		2003-07-11		1000000		F		2	
	14		Saniya		Manager		Nashik		7783118760		2003-07-11		900000		F		7	
	15		anisha		Manager		Nashik		9879875656		2008-07-12		900000		F		11	
	19		neha		manager		pune		9511268305		2021-07-02		500000		F		1	
+-----+-----+-----+-----+-----+-----+-----+-----+-----+																		

16 rows in set (0.00 sec)

// BEFORE Delete TRIGGER

```
mysql> CREATE TRIGGER before_delete
-> BEFORE
-> DELETE ON EMPLOYEE
-> FOR EACH ROW
-> BEGIN
-> IF old.Ename="Vedika" THEN
-> SIGNAL SQLSTATE '45000'
-> SET MESSAGE_TEXT = 'Cannot delete Vedika';
-> END IF;
-> END
-> //
```

Query OK, 0 rows affected (0.20 sec)

```
mysql> delete from employee where ename="Vedika";
-> //
```

ERROR 1644 (45000): Cannot delete Vedika

```
mysql> select * from employee;
-> //
```

	E_id		Ename		Post		Address		Phno		Date_of_Joining		Annual_income		Gender		Did	
+-----+-----+-----+-----+-----+-----+-----+-----+-----+																		
	1		Vedika		analyst		Delhi		8756998756		2010-07-09		500000		F		1	
	2		John		analyst		Delhi		8234997656		2000-09-01		700000		M		4	
	3		Rajas		Manager		Mumbai		8009781256		2005-02-12		900000		M		3	
	4		Ritika		Test engineer		Mumbai		7559081256		2020-02-12		1000000		F		1	
	5		Neha		clerk		banglore		8638739922		2020-04-04		200000		F		13	
	6		Sam		clerk		banglore		8638712322		2020-09-08		200000		M		1	
	7		Anne		clerk		Hyderabad		6738712300		2000-01-12		600000		F		8	
	8		Anita		engineer		Hyderabad		9990012300		2007-01-12		900000		F		10	
	9		Asmita		clerk		Pune		9988712300		2000-11-12		600000		F		8	

	10		Manish		Cashier		Pune		9988714670		2019-01-19		700000		M		9	
	11		Rohit		Tech Lead		Pune		9983976670		2019-08-19		900000		M		10	
	12		Ritesh		Manager		Pune		9983112270		2005-07-11		900000		M		15	
	13		Soha		Manager		Nashik		7783112270		2003-07-11		1000000		F		2	
	14		Saniya		Manager		Nashik		7783118760		2003-07-11		900000		F		7	
	15		anisha		Manager		Nashik		9879875656		2008-07-12		900000		F		11	
	19		neha		manager		pune		9511268305		2021-07-02		500000		F		1	
+-----+-----+-----+-----+-----+-----+-----+-----+-----+																		

16 rows in set (0.00 sec)