



Lab sheet – 11 (L9+L10)

Triggers

Trigger: A trigger is a stored procedure in database which automatically invokes whenever a special event in the database occurs. For example, a trigger can be invoked when a row is inserted into a specified table or when certain table columns are being updated.

Practice Exercises

Create a table student. Create a "Trigger" which calculates the percentage automatically.

```
create table student
  (grno number(3),
   name varchar2(15),
   m1 number(3),
   m2 number(3),
   total number(3),
   per number(5,2));

create or replace trigger stud
before update or insert on student
references new as new
for each row
declare
  tot number(3);
  per number(5,2);
begin
  tot:=:new.m1+:new.m2;
  per:=tot/2;
  :new.total:=tot;
  :new.per:=per;
end;
/

insert into student values(01,'ABCDE', 20, 20, 0, 0);
insert into student values(02,'PQRS', 10, 30, 0, 0);
```

```

SQL> create table student
  2  (grno number(3), name varchar2(15), m1 number(3),
  3  m2 number(3), total number(3), per number(5,2));

Table created.

SQL>
SQL> create or replace trigger stud before update or insert on student references new as new
  2  for each row declare
  3  tot number(3); per number(5,2);
  4  begin
  5  tot:=:new.m1+:new.m2; per:=tot/2;
  6  :new.total:=tot;
  7  :new.per:=per;
  8  end;
  9  /

Trigger created.

SQL>
SQL> insert into student values(01,'ABCDE', 20, 20, 0, 0);

1 row created.

SQL> insert into student values(02,'PQRS', 10, 30, 0, 0);

1 row created.

```

(Q) Write a trigger which allows only positive values while inserting record.

```

create table emp
(no number(5));

create or replace trigger positive
before insert or delete on emp
references old as old new as new
for each row
begin
    if :NEW.no<0 then
        RAISE_APPLICATION_ERROR(-20005,'Insert only
positive value');
    end if;
end;
/

Operation

insert into emp values(1020);
insert into emp values(-7);

```

```

SQL> create table emp (no number(5));

Table created.

SQL>
SQL> create or replace trigger positive before insert or delete on emp references old as old new as new for each row
  2  begin
  3  if :NEW.no<0 then
  4  RAISE_APPLICATION_ERROR(-20005,'Insert only
  5  positive value');
  6  end if;
  7  end;
  8  /

Trigger created.

```

Q. Write a block that backup of all the rows automatically when they are deleted.

```
create table emp1
(no number(5),
name varchar2(30));

create table emp1_backup
(no number(5),
name varchar2(30),
backup_date date);

insert into emp1 values (1,'Rishi');
insert into emp1 values (2,'RishiVIT');

create or replace trigger backup
before delete on emp1
references old as old new as new
for each row
begin
    insert into emp1_backup values
    (:old.no,:old.name,sysdate);
end;
/

DELETE FROM emp1 WHERE name= 'RishiVIT';
```

```
SQL> create table emp1 (no number(5),
2 name varchar2(30));

Table created.

SQL>
SQL> create table emp1_backup (no number(5),
2 name varchar2(30), backup_date date);

Table created.

SQL> insert into emp1 values (1,'Rishi');

1 row created.

SQL> insert into emp1 values (2,'RishiVIT');

1 row created.

SQL> create or replace trigger backup before delete on emp1
2 references old as old new as new for each row
3 begin
4 insert into emp1_backup values (:old.no,:old.name,sysdate);
5 end;
6 /

Trigger created.

SQL> DELETE FROM emp1 WHERE name= 'RishiVIT';

1 row deleted.
```

Exercise Questions

Table: EMP

Column Name	Data Type	Size	Description
Empno	NUMBER	4	Employee's Identification Number
Ename	VARCHAR2	30	Employee's Name
Job	VARCHAR2	15	Employee's Designation
Sal	NUMBER	8,2	Employee's Salary
DeptNo	NUMBER	2	Employee's Department id
Commission	NUMBER	7,2	Employee's Commission

```
SQL> create table emp_mia1127 (empno number(4), ename varchar2(20), job varchar2(15), sal number(8,2),deptno number(2),
commission number(7,2));

Table created.

SQL> desc emp_mia1127;
Name                               Null?    Type
-----
EMPNO                               NUMBER(4)
ENAME                               VARCHAR2(20)
JOB                                 VARCHAR2(15)
SAL                                 NUMBER(8,2)
DEPTNO                             NUMBER(2)
COMMISSION                         NUMBER(7,2)

SQL> select *
2  from emp_mia1127;

  EMPNO  ENAME      JOB      SAL      DEPTNO  COMMISSION
-----
      1  abc      teacher  30000      10      1000
      2  xyz      helper   20000      11      1000
```

(a) Create a trigger, which verify that updated salary of employee must be greater than his/her previous salary

Answer:

```
SQL> create or replace trigger salary_history_triggers
2  before update on emp_mia1127
3  references old as old new as new
4  for each row begin
5  if :new.sal<:old.sal then
6  raise_application_error(-3007,'new salary cannot be less than old salary');
7  end if;
8  end;
9  /

Trigger created.

SQL> update emp_mia1127 set sal=27000 where ename='abc';
update emp_mia1127 set sal=27000 where ename='abc'
*

ERROR at line 1:
ORA-21000: error number argument to raise_application_error of -3007 is out of
range
ORA-06512: at "SYSTEM.SALARY_HISTORY_TRIGGERS", line 3
ORA-04088: error during execution of trigger 'SYSTEM.SALARY_HISTORY_TRIGGERS'
```

(b) Create a trigger, which verify that for the department 2, the number of employees should not exceed than 5.

Answer:

```
SQL> create or replace trigger dcheck
  2  before insert or update on emp_mia1127
  3  for each row
  4  declare
  5  vnum number(3);
  6  begin
  7  select count(*) into vnum from emp_mia1127 where deptno=2;
  8  if vnum>5
  9  then
 10  raise_application_error(-10001,'cannot exceed 5');
 11  end if;
 12
 13  end;
 14  /
```

Trigger created.

```
SQL> insert into emp_mia1127 values(0003,'dishant','manager',40000,2,1570);
```

1 row created.

```
SQL> insert into emp_mia1127 values(0004,'alice','manager',40000,2,1570);
```

1 row created.

```
SQL> insert into emp_mia1127 values(0005,'shivansh','manager',40000,2,1570);
```

1 row created.

```
SQL> insert into emp_mia1127 values(0006,'jaiman','manager',40000,2,1570);
```

1 row created.

```
SQL> insert into emp_mia1127 values(0007,'bharghav','manager',40000,2,1570);
```

1 row created.

```
SQL> insert into emp_mia1127 values(0008,'vaibhav','manager',40000,2,1570);
```

1 row created.

```
SQL> insert into emp_mia1127 values(7891,'rach','manager',40000,2,1570);
```

```
insert into emp_mia1127 values(7891,'rach','manager',40000,2,1570)
```

*

ERROR at line 1:

ORA-21000: error number argument to raise_application_error of -10001 is out of range

ORA-06512: at "SYSTEM.DCHECK", line 7

ORA-04088: error during execution of trigger 'SYSTEM.DCHECK'