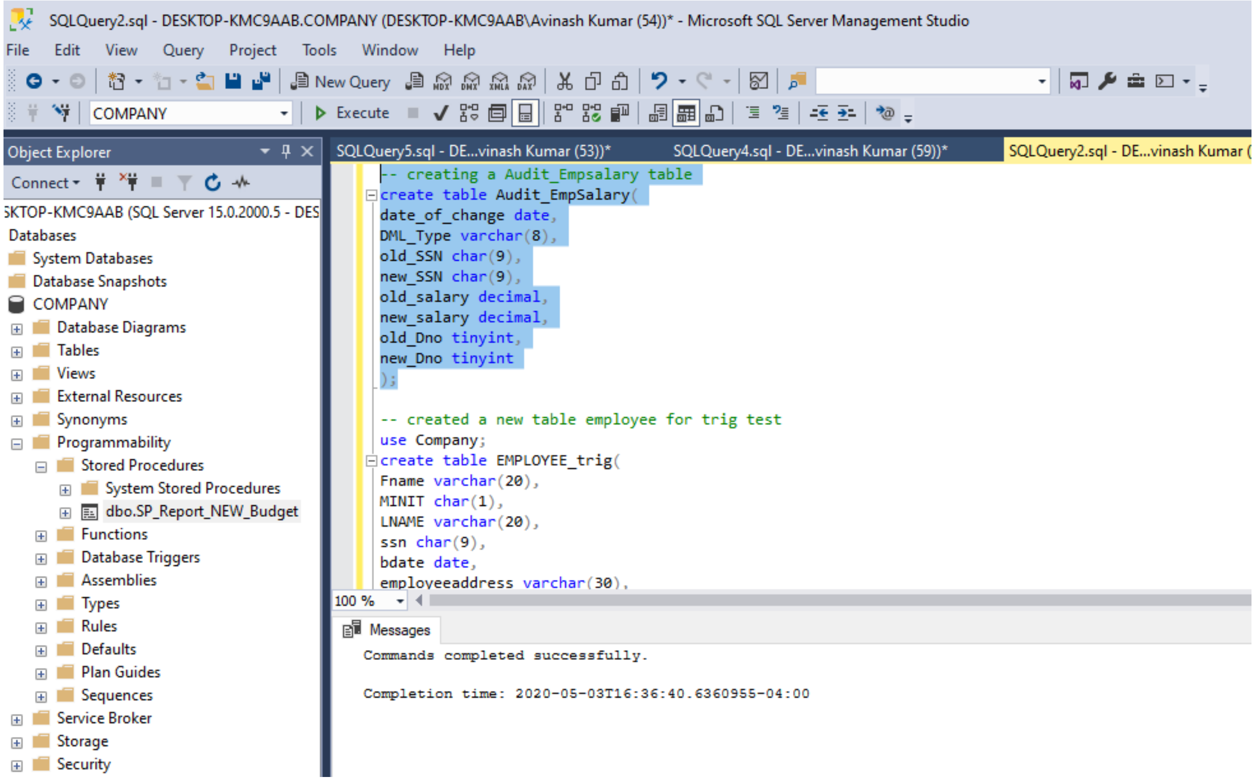
Name: LAVU MEGHA SRAVANI
CSU ID: 2762646
Description: Triggers and stored procedure in Microsoft SQL server

1)

```
-- created a new table employee for trigger test
use Company;
create table EMPLOYEE_trig(
Fname varchar(20),
MINIT char(1),
LNAME varchar(20),
ssn char(9),
bdate date,
employeeaddress varchar(30),
sex char(1),
employeesalary decimal,
superssn char(9),
DNO tinyint,
);

Insert into EMPLOYEE_trig values('John','B','Smith','123456789','09-Jan-55','731
Fondren,Houston,TX','M','30000','987654321','5');
Insert into EMPLOYEE_trig values('Franklin','T','Wong','333445555','08-Dec-45','638
Voss,Houston,TX','M','40000','888665555','5');
Insert into EMPLOYEE_trig values('Joyce','A','English','453453453','31-Jul-62','5631 Rice,
Houston,TX','F','25000','333445555','5');
Insert into EMPLOYEE_trig values('Ramesh','K','Narayan','666884444','15-Sep-52','975 Fire
Oak,Humble,TX','M','38000','333445555','5');
Insert into EMPLOYEE_trig values('James','E','Borg','888665555','10-Nov-27','450
Stone,Houston, TX','M','55000',NULL,'1');
Insert into EMPLOYEE_trig values('Jennifer','S','Wallace','987654321','20-Jun-31','291
Berry,Bellarie,TX','F','43000','888665555','4');
Insert into EMPLOYEE_trig values('Ahmad','V','Jabbar','987987987','29-Mar-59','980 Dallas,
Houston,TX','M','25000','987654321','4');
Insert into EMPLOYEE_trig values('Alicia','J','Zelaya','999887777','19-Jul-58','3321 Castle,
SPring,TX','F','25000','987654321','4');
```

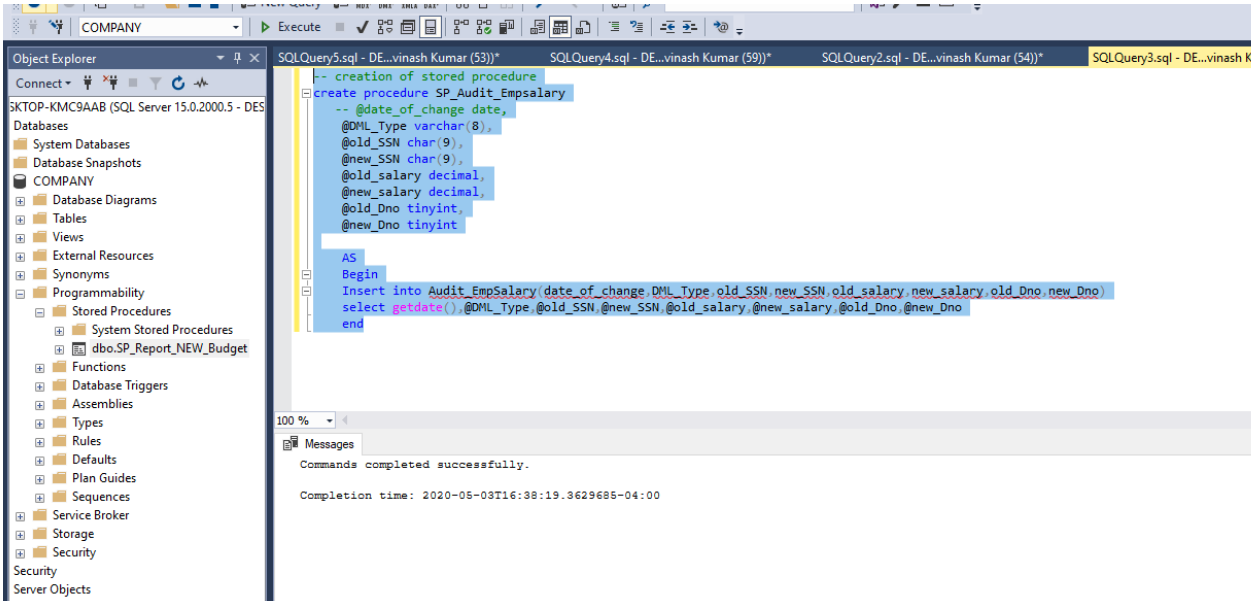
```
-- creating a Audit_Empsalary table
create table Audit_EmpSalary(
date_of_change date,
DML_Type varchar(8),
old_SSN char(9),
new_SSN char(9),
old_salary decimal,
new_salary decimal,
old_Dno tinyint,
new_Dno tinyint
);
```



```
-- creating a Audit_Empsalary table
create table Audit_EmpSalary(
date_of_change date,
DML_Type varchar(8),
old_SSN char(9),
new_SSN char(9),
old_salary decimal,
new_salary decimal,
old_Dno tinyint,
new_Dno tinyint
);

-- created a new table employee for trig test
use Company;
create table EMPLOYEE_trig(
Fname varchar(20),
MINIT char(1),
LNAME varchar(20),
ssn char(9),
bdate date,
employeeaddress varchar(30),
```

```
Commands completed successfully.

Completion time: 2020-05-03T16:36:40.6360955-04:00
```

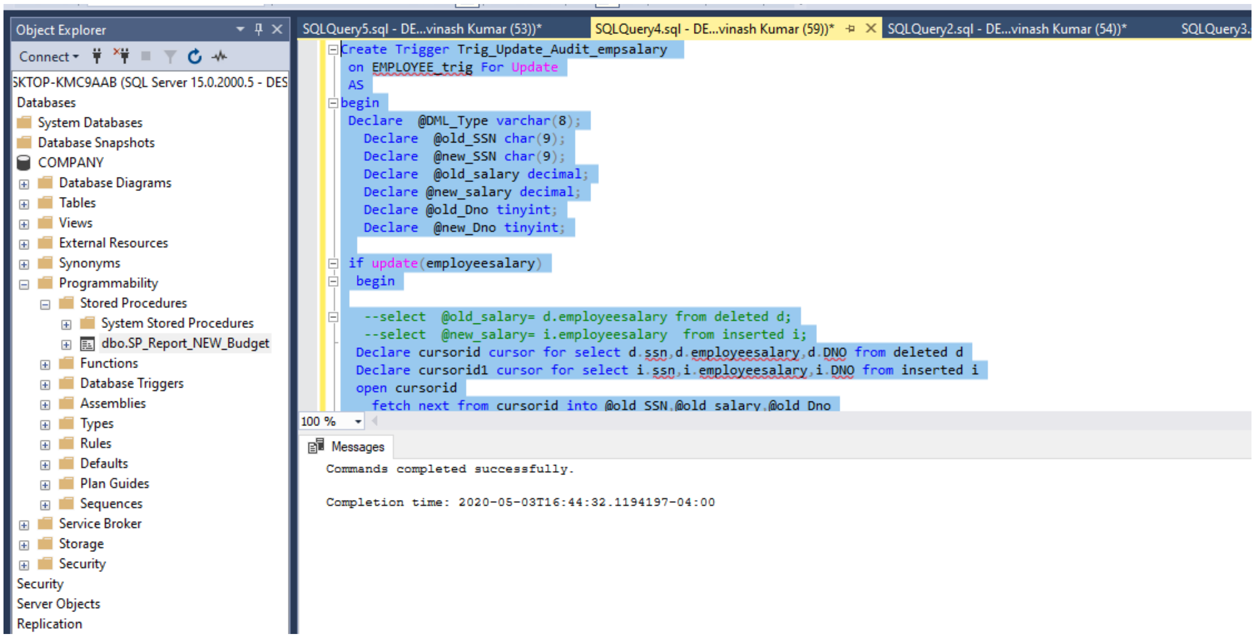
```
-- creation of stored procedure
create procedure SP_Audit_Empsalary
  -- @date_of_change date,
   @DML_Type varchar(8),
   @old_SSN char(9),
   @new_SSN char(9),
   @old_salary decimal,
        @new_salary decimal,
        @old_Dno tinyint,
        @new_Dno tinyint

        AS
        Begin
        Insert into
Audit_EmpSalary(date_of_change,DML_Type,old_SSN,new_SSN,old_salary,new_salary,old_Dno,new_Dno)
        select
getdate(),@DML_Type,@old_SSN,@new_SSN,@old_salary,@new_salary,@old_Dno,@new_Dno
        end
```



```
-- creation of stored procedure
create procedure SP_Audit_Empsalary
   -- @date_of_change date,
    @DML_Type varchar(8),
    @old_SSN char(9),
    @new_SSN char(9),
    @old_salary decimal,
    @new_salary decimal,
    @old_Dno tinyint,
    @new_Dno tinyint

    AS
    Begin
    Insert into Audit_EmpSalary(date_of_change,DML_Type,old_SSN,new_SSN,old_salary,new_salary,old_Dno,new_Dno)
    select getdate(),@DML_Type,@old_SSN,@new_SSN,@old_salary,@new_salary,@old_Dno,@new_Dno
    end
```

```
Commands completed successfully.

Completion time: 2020-05-03T16:38:19.3629685-04:00
```

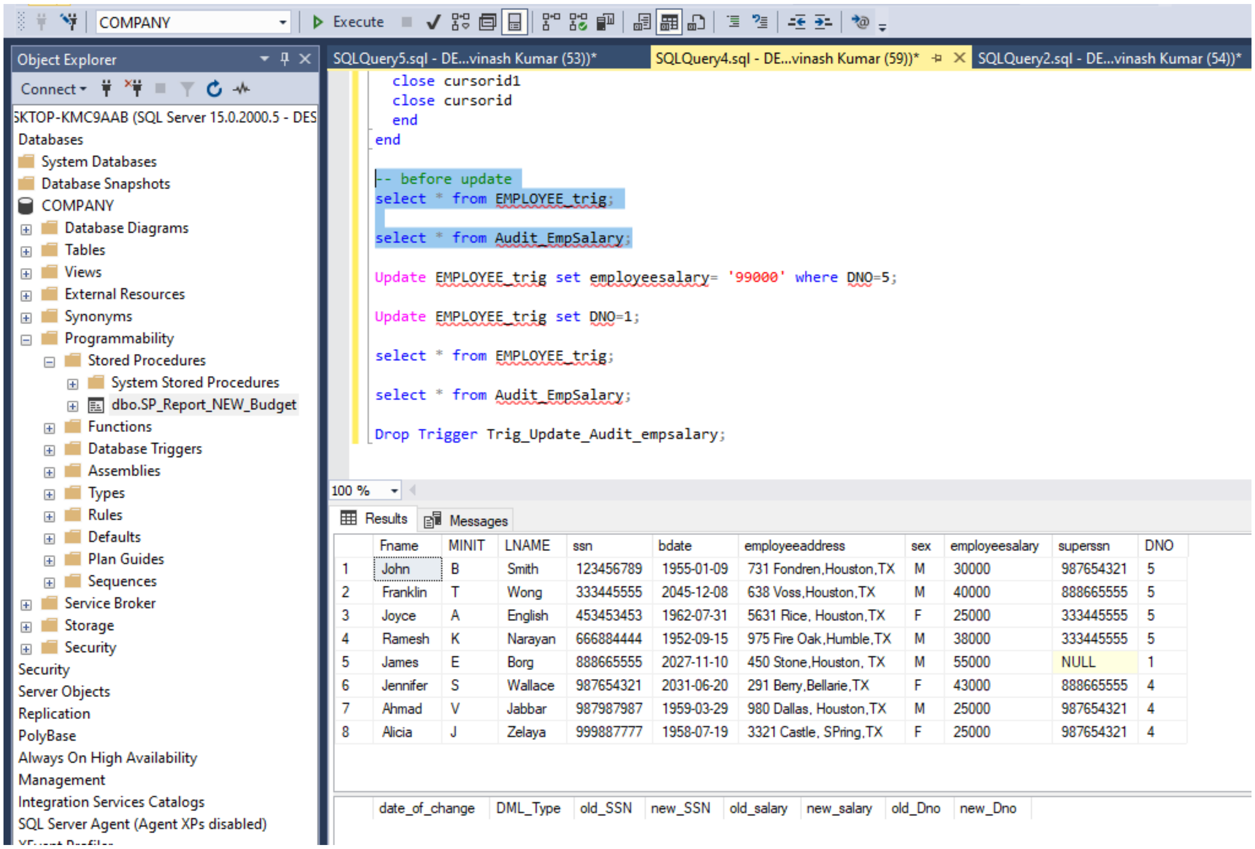
```
Create Trigger Trig_Update_Audit_empsalary
 on EMPLOYEE_trig For Update
 AS
begin
 Declare  @DML_Type varchar(8);
   Declare  @old_SSN char(9);
   Declare  @new_SSN char(9);
   Declare  @old_salary decimal;
   Declare @new_salary decimal;
   Declare @old_Dno tinyint;
   Declare        @new_Dno tinyint;

 if update(employeesalary)
  begin

   --select  @old_salary= d.employeesalary from deleted d;
   --select  @new_salary= i.employeesalary  from inserted i;
  Declare cursorid cursor for select d.ssn,d.employeesalary,d.DNO from deleted d
  Declare cursorid1 cursor for select i.ssn,i.employeesalary,i.DNO from inserted i
  open cursorid
    fetch next from cursorid into @old_SSN,@old_salary,@old_Dno
  open cursorid1
  fetch next from cursorid1 into @new_SSN,@new_salary,@new_Dno


  while @@fetch_status = 0
  begin
      set @DML_type ='Update';

                    EXEC SP_Audit_Empsalary
@DML_type,@old_SSN,@new_SSN,@old_salary,@new_salary,@old_Dno,@new_Dno
                     fetch next from cursorid into @old_SSN,@old_salary,@old_Dno
                      fetch next from cursorid1 into @new_SSN,@new_salary,@new_Dno
   end
  close cursorid1
  close cursorid
  end
end
```



```
Create Trigger Trig_Update_Audit_empsalary
 on EMPLOYEE_trig For Update
 AS
begin
 Declare  @DML_Type varchar(8);
   Declare  @old_SSN char(9);
   Declare  @new_SSN char(9);
   Declare  @old_salary decimal;
   Declare @new_salary decimal;
   Declare @old_Dno tinyint;
   Declare  @new_Dno tinyint;

 if update(employeesalary)
  begin

   --select  @old_salary= d.employeesalary from deleted d;
   --select  @new_salary= i.employeesalary  from inserted i;
  Declare cursorid cursor for select d.ssn,d.employeesalary,d.DNO from deleted d
  Declare cursorid1 cursor for select i.ssn,i.employeesalary,i.DNO from inserted i
  open cursorid
    fetch next from cursorid into @old_SSN,@old_salary,@old_Dno
```

```
Commands completed successfully.

Completion time: 2020-05-03T16:44:32.1194197-04:00
```

```
-- before update
select * from EMPLOYEE_trig;

select * from Audit_EmpSalary;
```

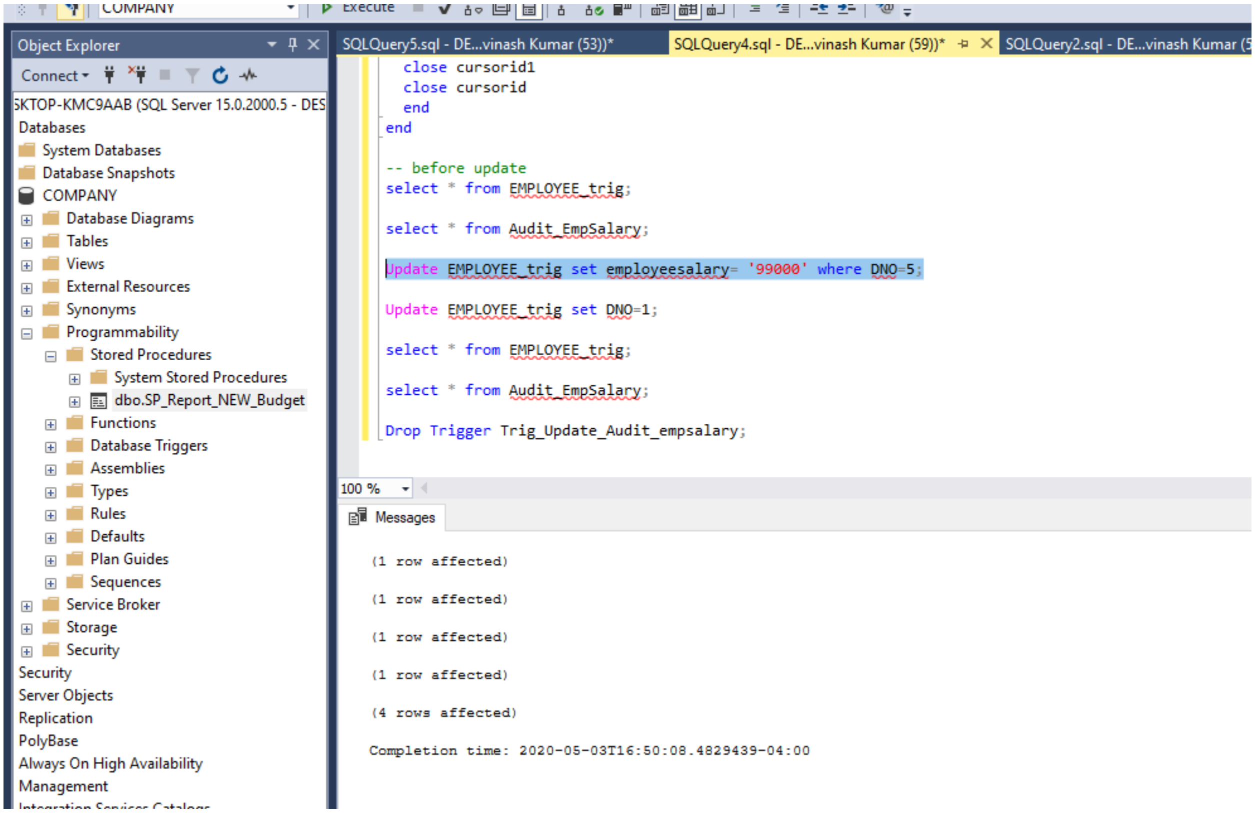


```
  close cursorid1
  close cursorid
  end
end

-- before update
select * from EMPLOYEE_trig;

select * from Audit_EmpSalary;

Update EMPLOYEE_trig set employeesalary= '99000' where DNO=5;

Update EMPLOYEE_trig set DNO=1;

select * from EMPLOYEE_trig;

select * from Audit_EmpSalary;

Drop Trigger Trig_Update_Audit_empsalary;
```

	Fname	MINIT	LNAME	ssn	bdate	employeeaddress	sex	employeesalary	superssn	DNO
1	John	B	Smith	123456789	1955-01-09	731 Fondren,Houston,TX	M	30000	987654321	5
2	Franklin	T	Wong	333445555	2045-12-08	638 Voss,Houston,TX	M	40000	888665555	5
3	Joyce	A	English	453453453	1962-07-31	5631 Rice, Houston,TX	F	25000	333445555	5
4	Ramesh	K	Narayan	666884444	1952-09-15	975 Fire Oak,Humble,TX	M	38000	333445555	5
5	James	E	Borg	888665555	2027-11-10	450 Stone,Houston, TX	M	55000	NULL	1
6	Jennifer	S	Wallace	987654321	2031-06-20	291 Berry,Bellarie,TX	F	43000	888665555	4
7	Ahmad	V	Jabbar	987987987	1959-03-29	980 Dallas, Houston,TX	M	25000	987654321	4
8	Alicia	J	Zelaya	999887777	1958-07-19	3321 Castle, SPring,TX	F	25000	987654321	4

	date_of_change	DML_Type	old_SSN	new_SSN	old_salary	new_salary	old_Dno	new_Dno

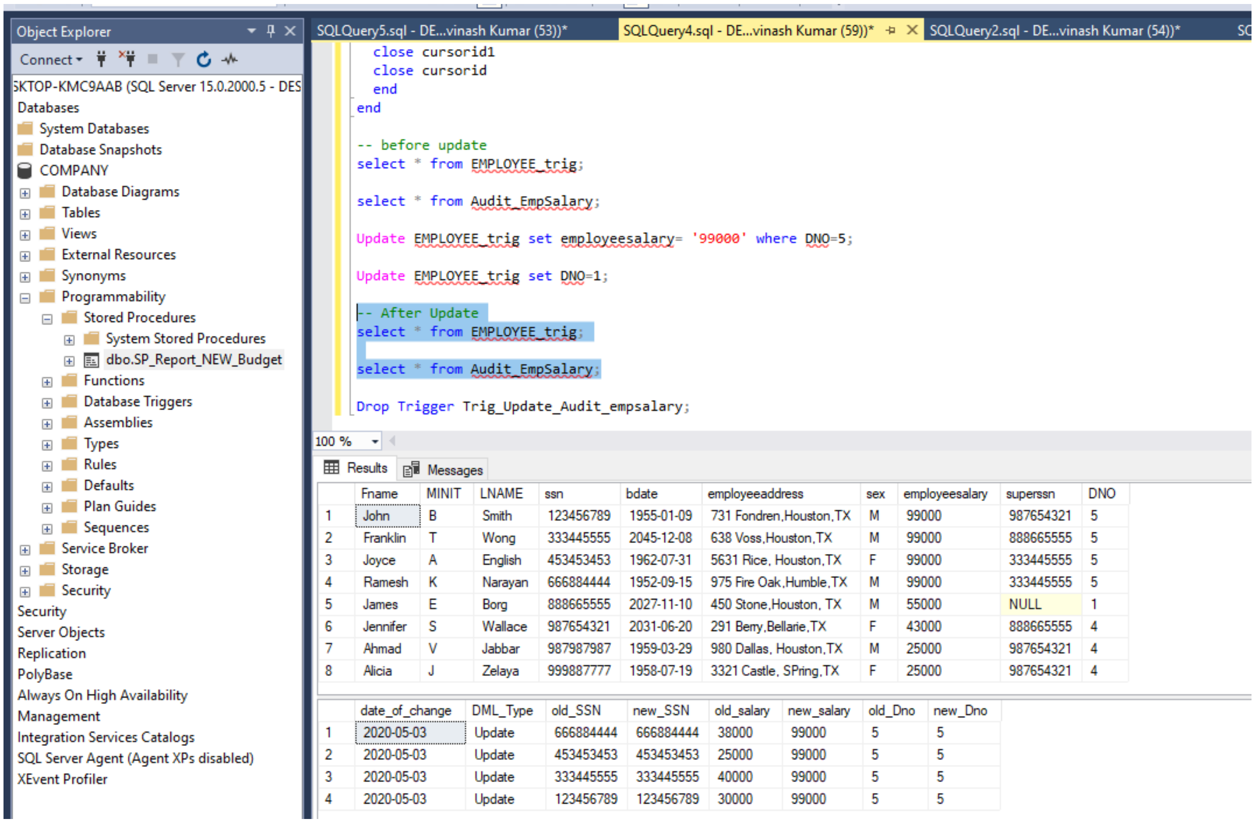
Update EMPLOYEE_trig set employeesalary= '99000' where DNO=5;



```
        close cursorid1
        close cursorid
        end
    end

    -- before update
    select * from EMPLOYEE_trig;

    select * from Audit_EmpSalary;

    Update EMPLOYEE_trig set employeesalary= '99000' where DNO=5;

    Update EMPLOYEE_trig set DNO=1;

    select * from EMPLOYEE_trig;

    select * from Audit_EmpSalary;

    Drop Trigger Trig_Update_Audit_empsalary;
```

```
(1 row affected)

(1 row affected)

(1 row affected)

(1 row affected)

(4 rows affected)

Completion time: 2020-05-03T16:50:08.4829439-04:00
```

```
-- After Update
select * from EMPLOYEE_trig;

select * from Audit_EmpSalary;
```

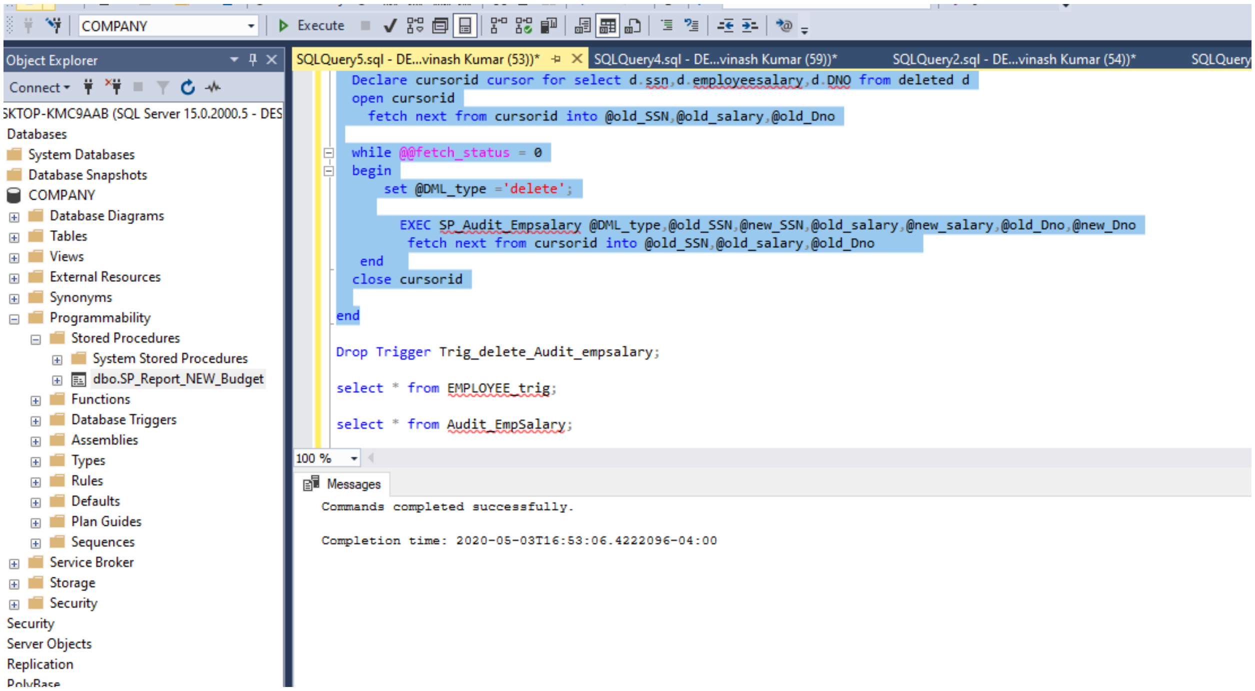


```
  close cursorid1
  close cursorid
  end
end

-- before update
select * from EMPLOYEE_trig;

select * from Audit_EmpSalary;

Update EMPLOYEE_trig set employeesalary= '99000' where DNO=5;

Update EMPLOYEE_trig set DNO=1;

-- After Update
select * from EMPLOYEE_trig;

select * from Audit_EmpSalary;

Drop Trigger Trig_Update_Audit_empsalary;
```

	Fname	MINIT	LNAME	ssn	bdate	employeeaddress	sex	employeesalary	superssn	DNO
1	John	B	Smith	123456789	1955-01-09	731 Fondren,Houston,TX	M	99000	987654321	5
2	Franklin	T	Wong	333445555	2045-12-08	638 Voss,Houston,TX	M	99000	888665555	5
3	Joyce	A	English	453453453	1962-07-31	5631 Rice, Houston,TX	F	99000	333445555	5
4	Ramesh	K	Narayan	666884444	1952-09-15	975 Fire Oak,Humble,TX	M	99000	333445555	5
5	James	E	Borg	888665555	2027-11-10	450 Stone,Houston, TX	M	55000	NULL	1
6	Jennifer	S	Wallace	987654321	2031-06-20	291 Berry,Bellarie,TX	F	43000	888665555	4
7	Ahmad	V	Jabbar	987987987	1959-03-29	980 Dallas, Houston,TX	M	25000	987654321	4
8	Alicia	J	Zelaya	999887777	1958-07-19	3321 Castle, SPring,TX	F	25000	987654321	4

	date_of_change	DML_Type	old_SSN	new_SSN	old_salary	new_salary	old_Dno	new_Dno
1	2020-05-03	Update	666884444	666884444	38000	99000	5	5
2	2020-05-03	Update	453453453	453453453	25000	99000	5	5
3	2020-05-03	Update	333445555	333445555	40000	99000	5	5
4	2020-05-03	Update	123456789	123456789	30000	99000	5	5

```
Create Trigger Trig_delete_Audit_empsalary
 on EMPLOYEE_trig For delete
 AS
begin
  Declare  @DML_Type varchar(8);
  Declare  @old_SSN char(9);
  Declare  @new_SSN char(9);
  Declare  @old_salary decimal;
  Declare @new_salary decimal;
  Declare @old_Dno tinyint;
  Declare       @new_Dno tinyint;
 Declare cursorid cursor for select d.ssn,d.employeesalary,d.DNO from deleted d
 open cursorid
   fetch next from cursorid into @old_SSN,@old_salary,@old_Dno
 while @@fetch_status = 0
 begin
     set @DML_type ='delete';

                    EXEC SP_Audit_Empsalary
@DML_type,@old_SSN,@new_SSN,@old_salary,@new_salary,@old_Dno,@new_Dno
                     fetch next from cursorid into @old_SSN,@old_salary,@old_Dno
  end
 close cursorid
end
```

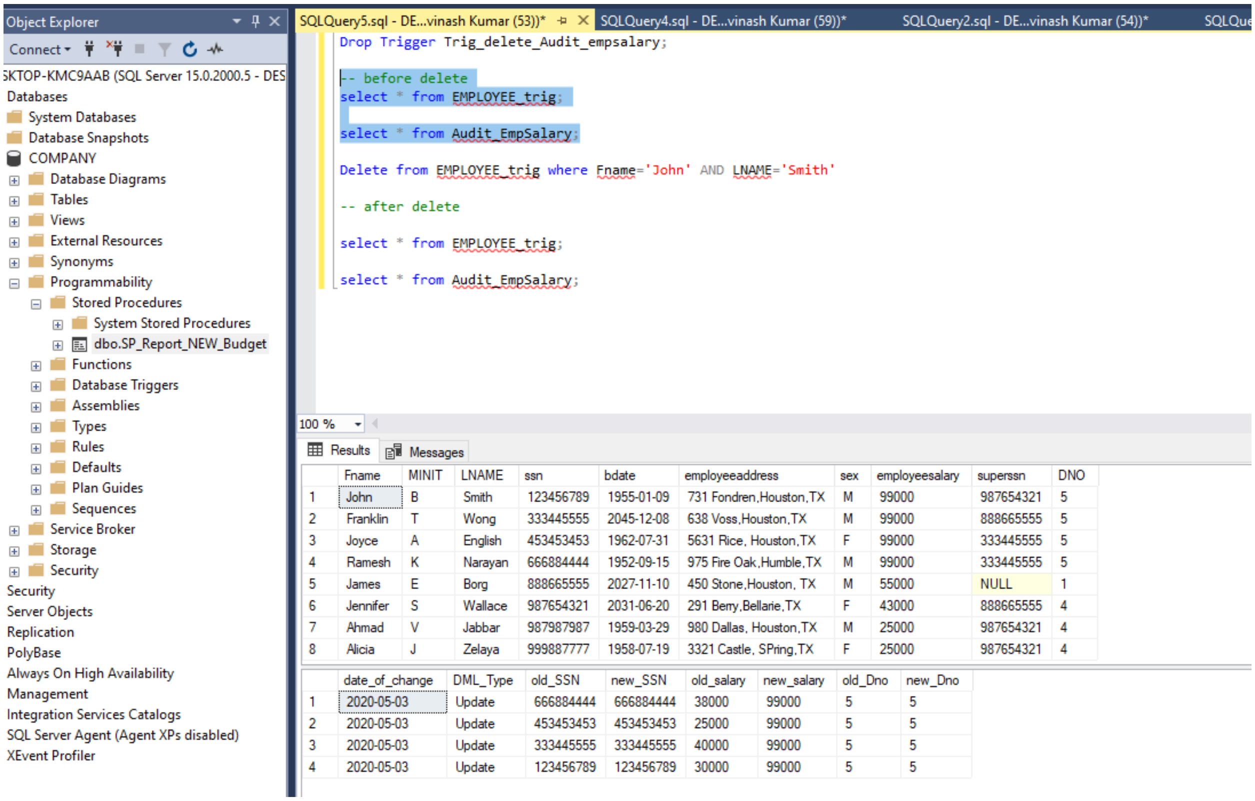


```
 Declare cursorid cursor for select d.ssn,d.employeesalary,d.DNO from deleted d
 open cursorid
   fetch next from cursorid into @old_SSN,@old_salary,@old_Dno

 while @@fetch_status = 0
 begin
     set @DML_type ='delete';

       EXEC SP_Audit_Empsalary @DML_type,@old_SSN,@new_SSN,@old_salary,@new_salary,@old_Dno,@new_Dno
        fetch next from cursorid into @old_SSN,@old_salary,@old_Dno
  end
 close cursorid

end

Drop Trigger Trig_delete_Audit_empsalary;

select * from EMPLOYEE_trig;

select * from Audit_EmpSalary;
```

```
Commands completed successfully.

Completion time: 2020-05-03T16:53:06.4222096-04:00
```

```
-- before delete
select * from EMPLOYEE_trig;
```

select * from Audit_EmpSalary;

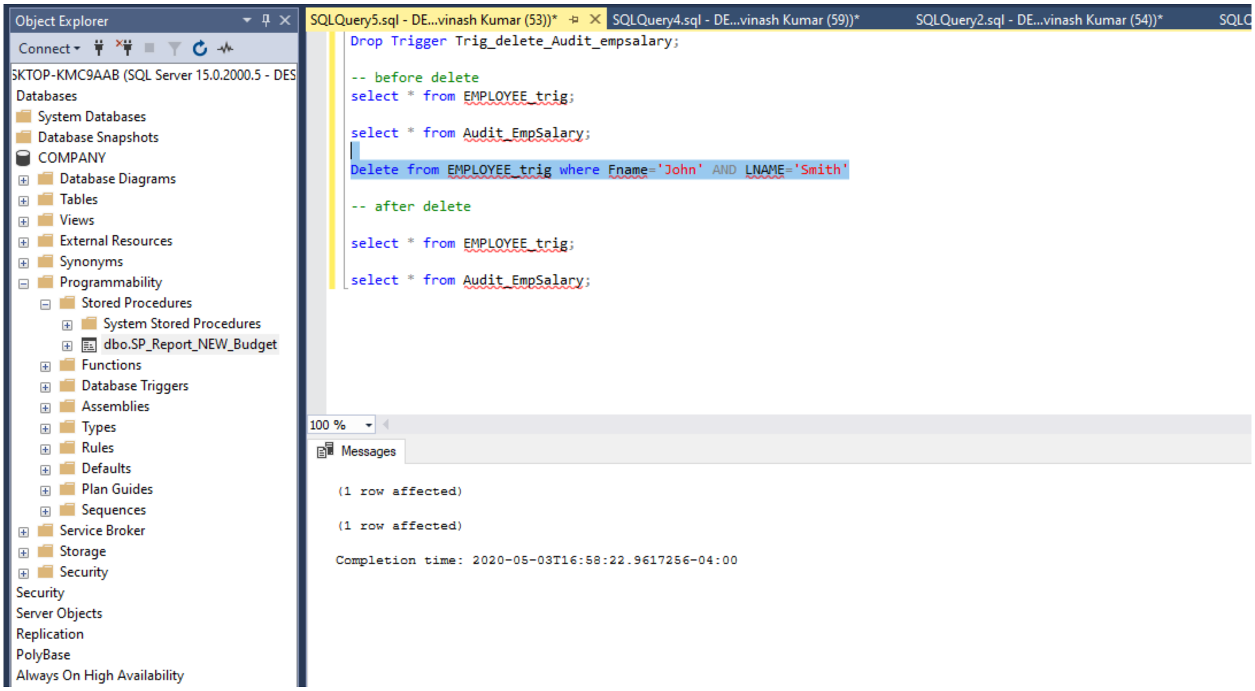


```
Drop Trigger Trig_delete_Audit_empsalary;

-- before delete
select * from EMPLOYEE_trig;

select * from Audit_EmpSalary;

Delete from EMPLOYEE_trig where Fname='John' AND LNAME='Smith'

-- after delete

select * from EMPLOYEE_trig;

select * from Audit_EmpSalary;
```

	Fname	MINIT	LNAME	ssn	bdate	employeeaddress	sex	employeesalary	superssn	DNO
1	John	B	Smith	123456789	1955-01-09	731 Fondren,Houston,TX	M	99000	987654321	5
2	Franklin	T	Wong	333445555	2045-12-08	638 Voss,Houston,TX	M	99000	888665555	5
3	Joyce	A	English	453453453	1962-07-31	5631 Rice, Houston,TX	F	99000	333445555	5
4	Ramesh	K	Narayan	666884444	1952-09-15	975 Fire Oak,Humble,TX	M	99000	333445555	5
5	James	E	Borg	888665555	2027-11-10	450 Stone,Houston, TX	M	55000	NULL	1
6	Jennifer	S	Wallace	987654321	2031-06-20	291 Berry,Bellarie,TX	F	43000	888665555	4
7	Ahmad	V	Jabbar	987987987	1959-03-29	980 Dallas, Houston,TX	M	25000	987654321	4
8	Alicia	J	Zelaya	999887777	1958-07-19	3321 Castle, SPring,TX	F	25000	987654321	4

	date_of_change	DML_Type	old_SSN	new_SSN	old_salary	new_salary	old_Dno	new_Dno
1	2020-05-03	Update	666884444	666884444	38000	99000	5	5
2	2020-05-03	Update	453453453	453453453	25000	99000	5	5
3	2020-05-03	Update	333445555	333445555	40000	99000	5	5
4	2020-05-03	Update	123456789	123456789	30000	99000	5	5

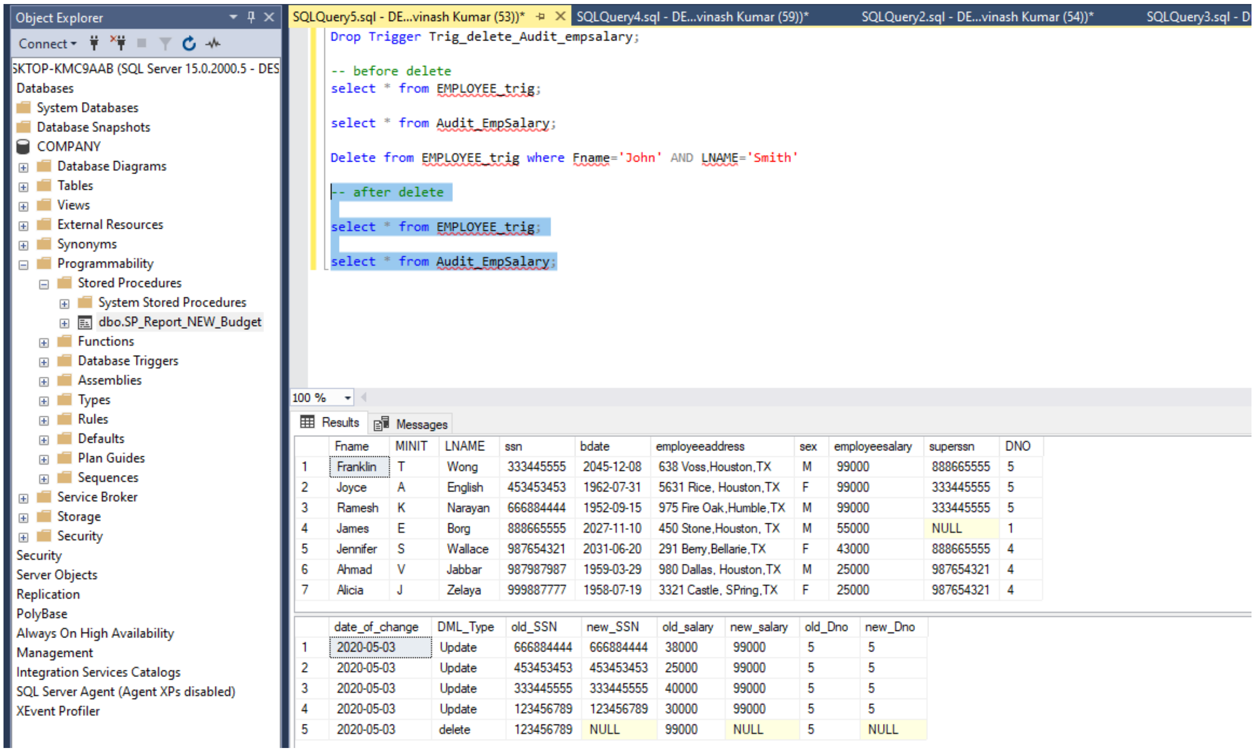
```
Delete from EMPLOYEE_trig where Fname='John' AND LNAME='Smith'
```



```
Drop Trigger Trig_delete_Audit_empsalary;

-- before delete
select * from EMPLOYEE_trig;

select * from Audit_EmpSalary;

Delete from EMPLOYEE_trig where Fname='John' AND LNAME='Smith'

-- after delete

select * from EMPLOYEE_trig;

select * from Audit_EmpSalary;
```

```
(1 row affected)

(1 row affected)

Completion time: 2020-05-03T16:58:22.9617256-04:00
```

```
-- after delete

select * from EMPLOYEE_trig;

select * from Audit_EmpSalary;
```

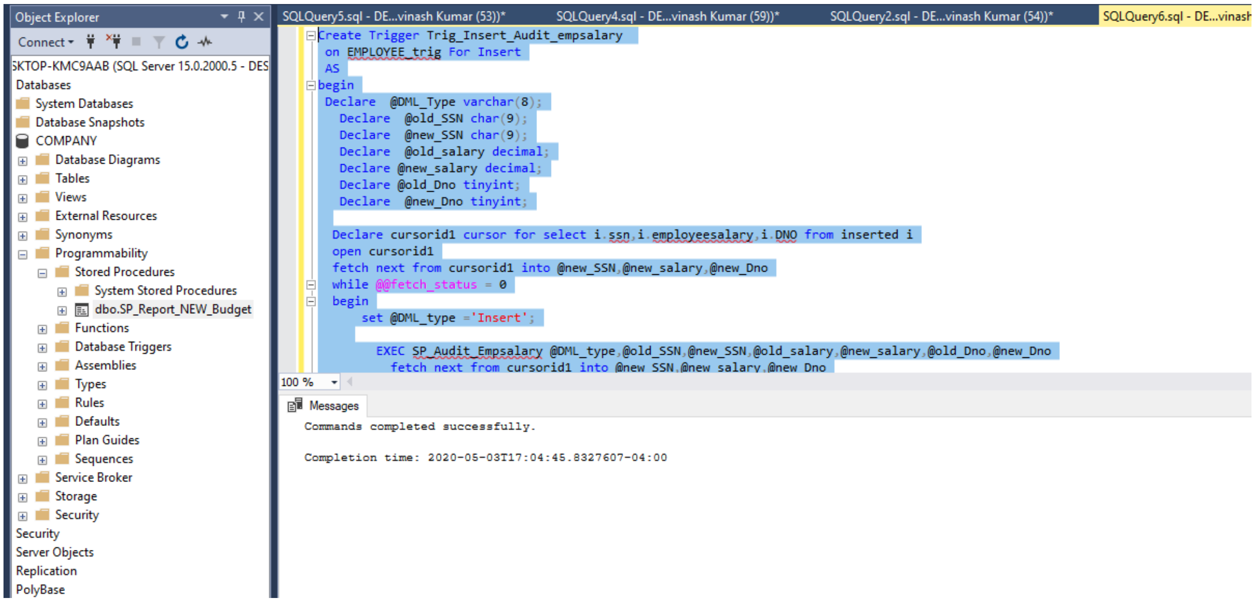


```
Drop Trigger Trig_delete_Audit_empsalary;

-- before delete
select * from EMPLOYEE_trig;

select * from Audit_EmpSalary;

Delete from EMPLOYEE_trig where Fname='John' AND LNAME='Smith'

-- after delete

select * from EMPLOYEE_trig;

select * from Audit_EmpSalary;
```

	Fname	MINIT	LNAME	ssn	bdate	employeeaddress	sex	employeesalary	superssn	DNO
1	Franklin	T	Wong	333445555	2045-12-08	638 Voss,Houston,TX	M	99000	888665555	5
2	Joyce	A	English	453453453	1962-07-31	5631 Rice, Houston,TX	F	99000	333445555	5
3	Ramesh	K	Narayan	666884444	1952-09-15	975 Fire Oak,Humble,TX	M	99000	333445555	5
4	James	E	Borg	888665555	2027-11-10	450 Stone,Houston, TX	M	55000	NULL	1
5	Jennifer	S	Wallace	987654321	2031-06-20	291 Berry,Bellarie,TX	F	43000	888665555	4
6	Ahmad	V	Jabbar	987987987	1959-03-29	980 Dallas, Houston,TX	M	25000	987654321	4
7	Alicia	J	Zelaya	999887777	1958-07-19	3321 Castle, SPring,TX	F	25000	987654321	4

	date_of_change	DML_Type	old_SSN	new_SSN	old_salary	new_salary	old_Dno	new_Dno
1	2020-05-03	Update	666884444	666884444	38000	99000	5	5
2	2020-05-03	Update	453453453	453453453	25000	99000	5	5
3	2020-05-03	Update	333445555	333445555	40000	99000	5	5
4	2020-05-03	Update	123456789	123456789	30000	99000	5	5
5	2020-05-03	delete	123456789	NULL	99000	NULL	5	NULL

```
Create Trigger Trig_Insert_Audit_empsalary
 on EMPLOYEE_trig For Insert
 AS
begin
 Declare  @DML_Type varchar(8);
   Declare  @old_SSN char(9);
   Declare  @new_SSN char(9);
   Declare  @old_salary decimal;
   Declare @new_salary decimal;
   Declare @old_Dno tinyint;
   Declare       @new_Dno tinyint;

  Declare cursorid1 cursor for select i.ssn,i.employeesalary,i.DNO from inserted i
  open cursorid1
  fetch next from cursorid1 into @new_SSN,@new_salary,@new_Dno
  while @@fetch_status = 0
  begin
      set @DML_type ='Insert';

                        EXEC SP_Audit_Empsalary
@DML_type,@old_SSN,@new_SSN,@old_salary,@new_salary,@old_Dno,@new_Dno
                          fetch next from cursorid1 into @new_SSN,@new_salary,@new_Dno
   end
  close cursorid1
end
```

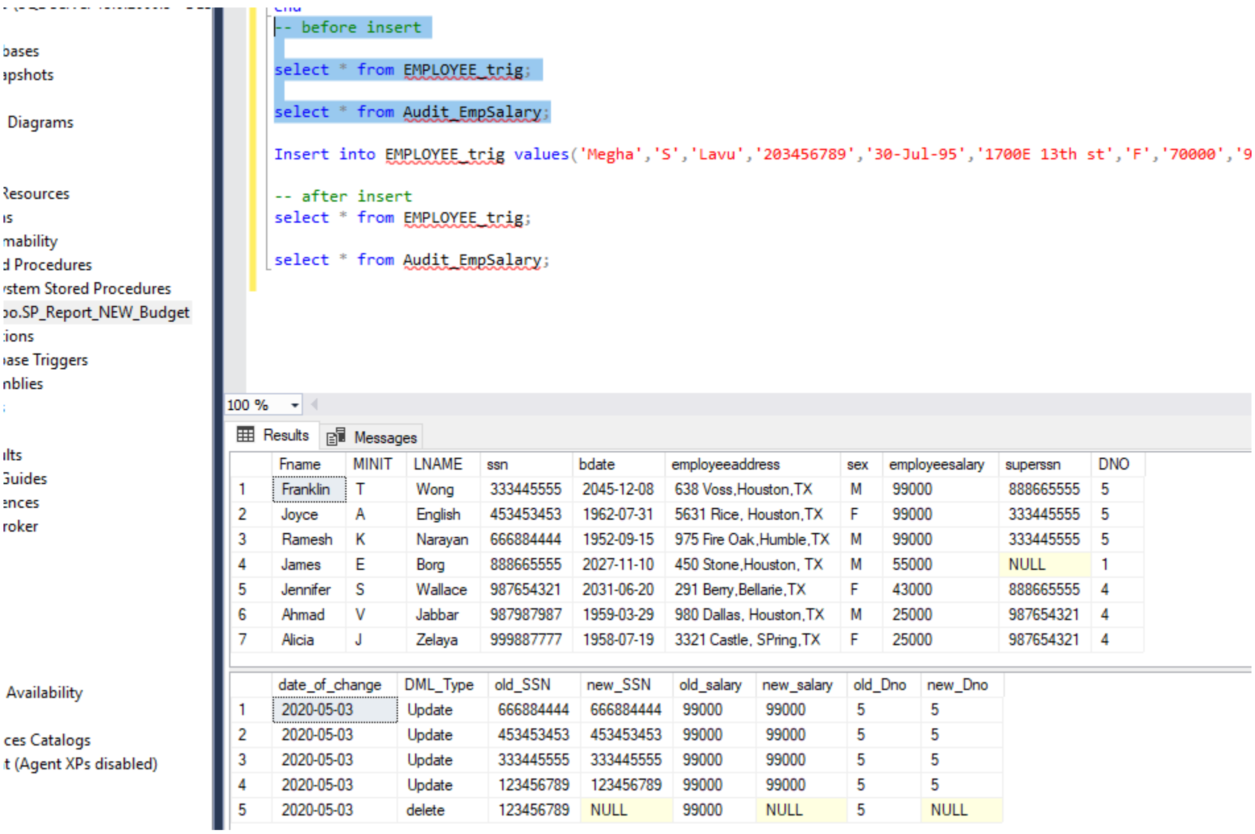


```
Create Trigger Trig_Insert_Audit_empsalary
 on EMPLOYEE_trig For Insert
 AS
begin
 Declare  @DML_Type varchar(8);
   Declare  @old_SSN char(9);
   Declare  @new_SSN char(9);
   Declare  @old_salary decimal;
   Declare @new_salary decimal;
   Declare @old_Dno tinyint;
   Declare  @new_Dno tinyint;

  Declare cursorid1 cursor for select i.ssn,i.employeesalary,i.DNO from inserted i
  open cursorid1
  fetch next from cursorid1 into @new_SSN,@new_salary,@new_Dno
  while @@fetch_status = 0
  begin
      set @DML_type ='Insert';

         EXEC SP_Audit_Empsalary @DML_type,@old_SSN,@new_SSN,@old_salary,@new_salary,@old_Dno,@new_Dno
           fetch next from cursorid1 into @new_SSN,@new_salary,@new_Dno
```

```
Commands completed successfully.

Completion time: 2020-05-03T17:04:45.8327607-04:00
```

```
-- before insert
```

```
select * from EMPLOYEE_trig;

select * from Audit_EmpSalary;
```

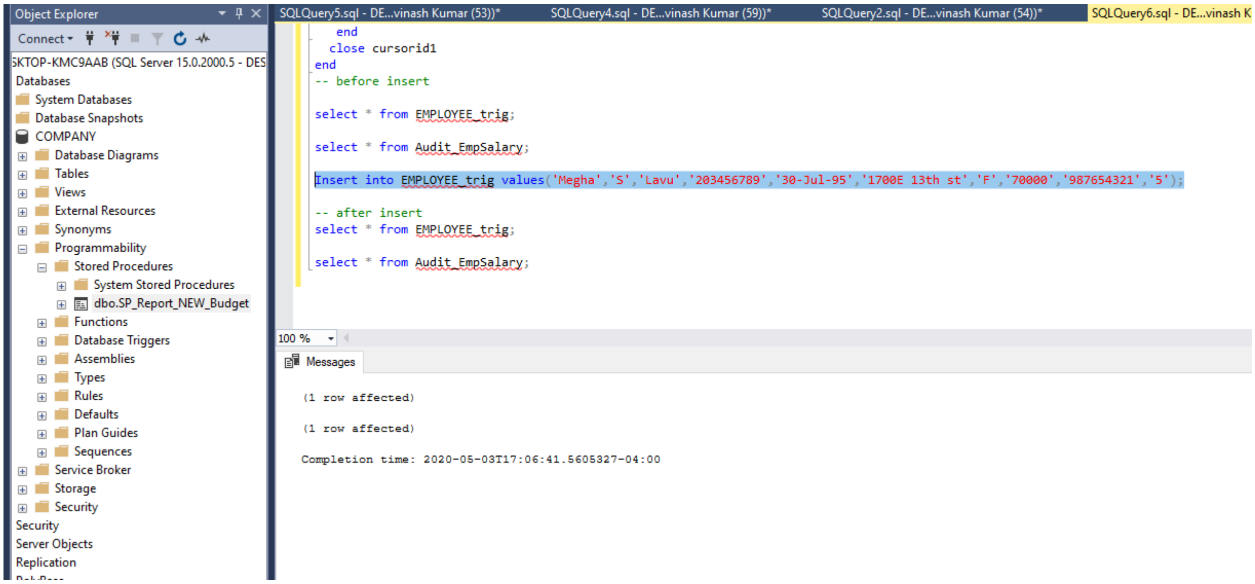


```
-- before insert

select * from EMPLOYEE_trig;

select * from Audit_EmpSalary;

Insert into EMPLOYEE_trig values('Megha','S','Lavu','203456789','30-Jul-95','1700E 13th st','F','70000','9

-- after insert
select * from EMPLOYEE_trig;

select * from Audit_EmpSalary;
```

	Fname	MINIT	LNAME	ssn	bdate	employeeaddress	sex	employeesalary	superssn	DNO
1	Franklin	T	Wong	333445555	2045-12-08	638 Voss,Houston,TX	M	99000	888665555	5
2	Joyce	A	English	453453453	1962-07-31	5631 Rice, Houston,TX	F	99000	333445555	5
3	Ramesh	K	Narayan	666884444	1952-09-15	975 Fire Oak,Humble,TX	M	99000	333445555	5
4	James	E	Borg	888665555	2027-11-10	450 Stone,Houston, TX	M	55000	NULL	1
5	Jennifer	S	Wallace	987654321	2031-06-20	291 Berry,Bellarie,TX	F	43000	888665555	4
6	Ahmad	V	Jabbar	987987987	1959-03-29	980 Dallas, Houston,TX	M	25000	987654321	4
7	Alicia	J	Zelaya	999887777	1958-07-19	3321 Castle, SPring,TX	F	25000	987654321	4

	date_of_change	DML_Type	old_SSN	new_SSN	old_salary	new_salary	old_Dno	new_Dno
1	2020-05-03	Update	666884444	666884444	99000	99000	5	5
2	2020-05-03	Update	453453453	453453453	99000	99000	5	5
3	2020-05-03	Update	333445555	333445555	99000	99000	5	5
4	2020-05-03	Update	123456789	123456789	99000	99000	5	5
5	2020-05-03	delete	123456789	NULL	99000	NULL	5	NULL

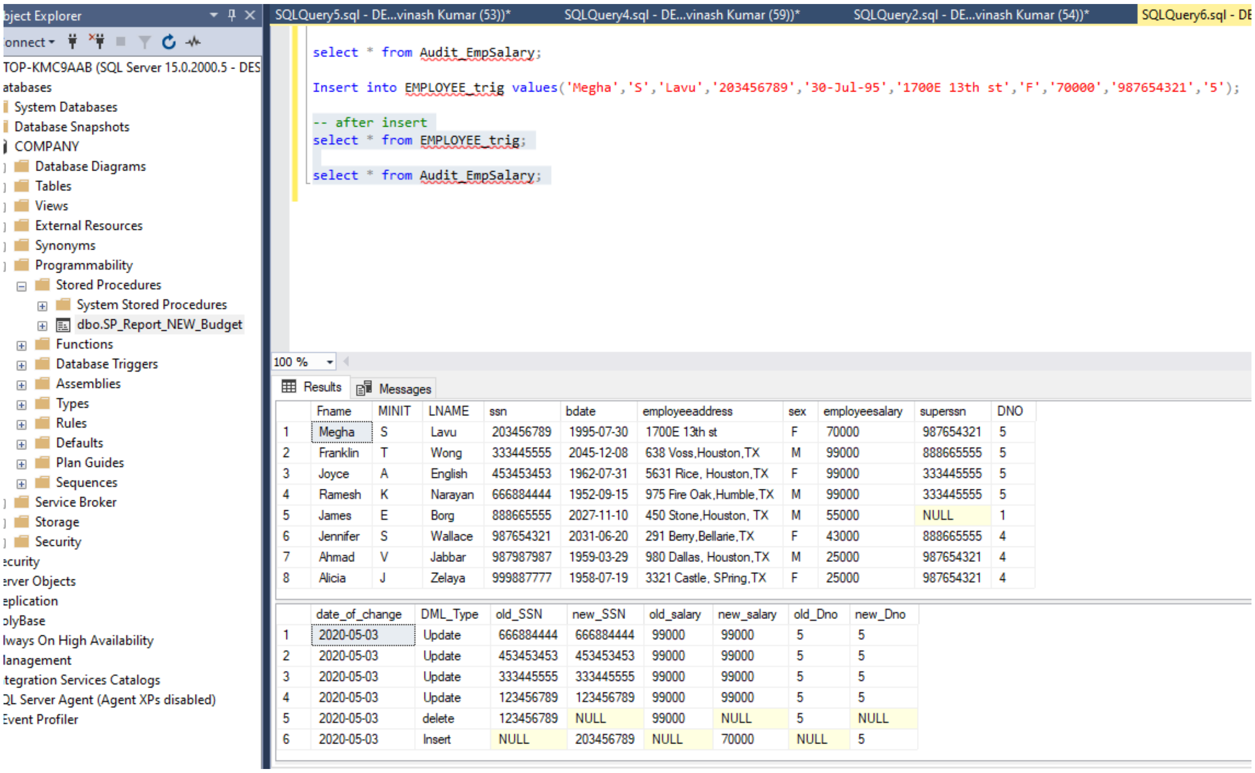
```
Insert into EMPLOYEE_trig values('Megha','S','Lavu','203456789','30-Jul-95','1700E 13th st','F','70000','987654321','5');
```



```
    end
  close cursorid1
end
-- before insert

select * from EMPLOYEE_trig;

select * from Audit_EmpSalary;

Insert into EMPLOYEE_trig values('Megha','S','Lavu','203456789','30-Jul-95','1700E 13th st','F','70000','987654321','5');

-- after insert
select * from EMPLOYEE_trig;

select * from Audit_EmpSalary;
```

```
(1 row affected)

(1 row affected)

Completion time: 2020-05-03T17:06:41.5605327-04:00
```

```
-- after insert
select * from EMPLOYEE_trig;

select * from Audit_EmpSalary;
```



```
select * from Audit_EmpSalary;

Insert into EMPLOYEE_trig values('Megha','S','Lavu','203456789','30-Jul-95','1700E 13th st','F','70000','987654321','5');

-- after insert
select * from EMPLOYEE_trig;

select * from Audit_EmpSalary;
```

	Fname	MINIT	LNAME	ssn	bdate	employeeaddress	sex	employeesalary	superssn	DNO
1	Megha	S	Lavu	203456789	1995-07-30	1700E 13th st	F	70000	987654321	5
2	Franklin	T	Wong	333445555	2045-12-08	638 Voss,Houston,TX	M	99000	888665555	5
3	Joyce	A	English	453453453	1962-07-31	5631 Rice, Houston,TX	F	99000	333445555	5
4	Ramesh	K	Narayan	666884444	1952-09-15	975 Fire Oak,Humble,TX	M	99000	333445555	5
5	James	E	Borg	888665555	2027-11-10	450 Stone,Houston, TX	M	55000	NULL	1
6	Jennifer	S	Wallace	987654321	2031-06-20	291 Berry,Bellarie,TX	F	43000	888665555	4
7	Ahmad	V	Jabbar	987987987	1959-03-29	980 Dallas, Houston,TX	M	25000	987654321	4
8	Alicia	J	Zelaya	999887777	1958-07-19	3321 Castle, SPring,TX	F	25000	987654321	4

	date_of_change	DML_Type	old_SSN	new_SSN	old_salary	new_salary	old_Dno	new_Dno
1	2020-05-03	Update	666884444	666884444	99000	99000	5	5
2	2020-05-03	Update	453453453	453453453	99000	99000	5	5
3	2020-05-03	Update	333445555	333445555	99000	99000	5	5
4	2020-05-03	Update	123456789	123456789	99000	99000	5	5
5	2020-05-03	delete	123456789	NULL	99000	NULL	5	NULL
6	2020-05-03	Insert	NULL	203456789	NULL	70000	NULL	5