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Description: Querying a Relational Database COMPANY database using Microsoft SQL

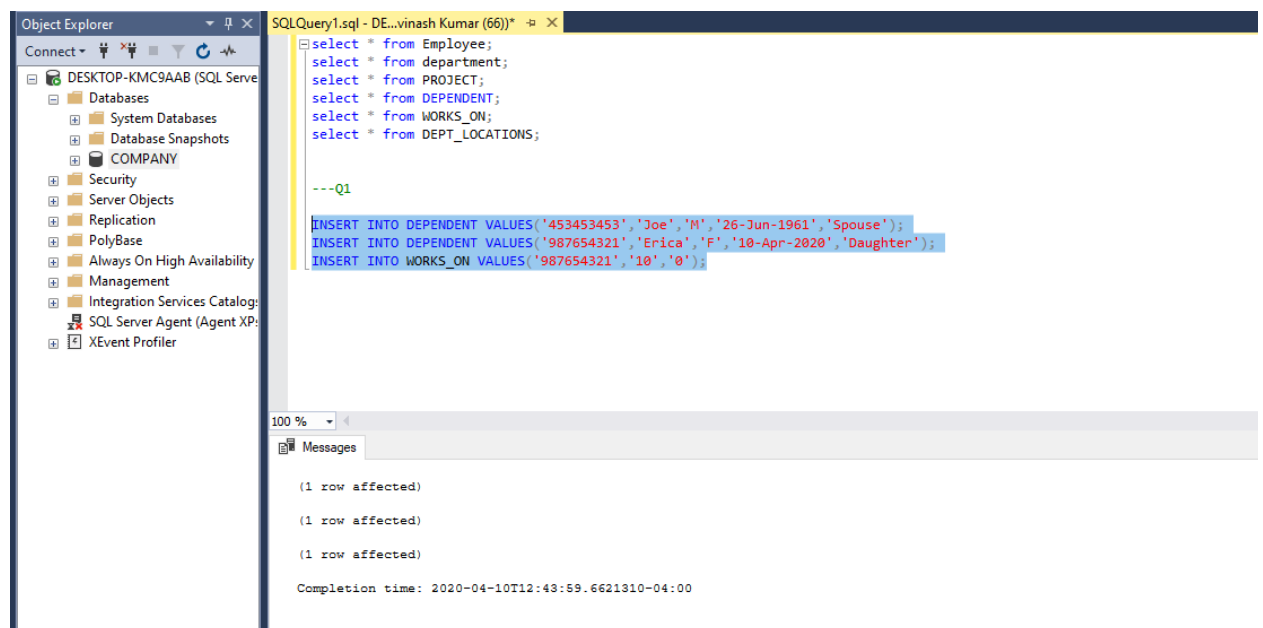
1. Update the following new changes into the database:
 - 1) Joyce English with SSN = 453453453 got married with Joe Anderson. (Joe is not an employee of the Company and do NOT change the last name of Joyce to Anderson)
 - 2) Jenifer Wallace with SSN = 987654321 just had a new daughter named Erica.
 - 3) Jenifer Wallace with SSN = 987654321 is just assigned to a new project number '10' to work on with 0 initial hours.

Add these new entries into Dependent, Works_On tables in your database then Select * from Dependent and Select * from Works_On to show the updated table content. Note that if you don't insert these data as directed, your query results for Q1 – Q5 won't be correct.

Answer:

---Q1

```
INSERT INTO DEPENDENT VALUES('453453453','Joe','M','26-Jun-1961','Spouse');
INSERT INTO DEPENDENT VALUES('987654321','Erica','F','10-Apr-2020','Daughter');
INSERT INTO WORKS_ON VALUES('987654321','10','0');
```



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```
select * from DEPENDENT;
```

The screenshot shows the SQL Server Enterprise Manager interface. On the left is the Object Explorer showing the database structure for 'DESKTOP-KMC9AAB (SQL Serve)'. The main window displays a SQL query script in 'SQLQuery1.sql'. The script includes several SELECT statements for Employee, department, DEPENDENT, PROJECT, DEPT_LOCATIONS, and WORKS_ON. It also contains DELETE statements for EMPLOYEE, DEPENDENT, and WORKS_ON based on SSN and ESSN values. Finally, it has INSERT statements into DEPENDENT and WORKS_ON tables. Below the script, the 'Results' tab is active, showing a grid of data from the DEPENDENT table. The grid has columns for ESSN, DEPENDENT_NAME, SEX, BDATE, and RELATIONSHIP. There are 9 rows of data displayed.

	ESSN	DEPENDENT_NAME	SEX	BDATE	RELATIONSHIP
1	123456789	Alice	F	1978-12-31	Daughter
2	123456789	Elizabeth	F	1957-05-05	Spouse
3	123456789	Michael	M	1978-01-01	Son
4	333445555	Alice	F	1976-04-05	Daughter
5	333445555	Joy	F	2048-05-03	Spouse
6	333445555	Theodore	M	1973-10-25	Son
7	453453453	Joe	M	1961-06-26	Spouse
8	987654321	Abner	M	2032-02-29	Spouse
9	987654321	Erica	F	2020-04-10	Daughter

```
select * from WORKS_ON;
```

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The screenshot shows the SQL Server Enterprise Manager interface. On the left is the Object Explorer showing the server structure. The central pane displays a SQL query window with the following code:

```

select * from Employee;
select * from department;
select * from DEPENDENT;
select * from PROJECT;
select * from DEPT_LOCATIONS;
select * from WORKS_ON;

DELETE from EMPLOYEE where ssn='203456987';
DELETE from DEPENDENT where ESSN='203456987';
DELETE from WORKS_ON where ESSN='203456987';

INSERT INTO DEPENDENT VALUES('453453453','Joe','M','26-Jun-1961','Spouse');
INSERT INTO DEPENDENT VALUES('987654321','Erica','F','10-Apr-2020','Daughter');
INSERT INTO WORKS_ON VALUES('987654321','10','0');
  
```

Below the query window, the Results tab is active, showing a table with the following data:

	ESSN	PNO	NHours
1	123456789	1	33
2	123456789	2	8
3	333445555	2	10
4	333445555	3	10
5	333445555	10	10
6	333445555	20	10
7	453453453	1	20
8	453453453	2	20
9	666884444	3	40
10	888665555	20	NULL
11	987654321	10	0
12	987654321	20	15
13	987654321	30	20
14	987987987	10	35
15	987987987	30	5
16	999887777	10	10
17	999887777	30	30

2. Write SQL Select statements to retrieve data in the followings:

Q1: For each department, list the first and last name of each employee who is working in the department with the first and last name of his or her immediate supervisor with the department number and name together. Include all the departments including the departments that do not have any employee and all the employees including the ones who do not have any supervisors. List the result in the order of each department number and the first name of each employee.

So, your result of Q1 will list all the department 1, 4, 5, 7 and all the related employees with his/her supervisors including the ones who do not have supervisors.

```

select d.Dnumber,d.Dname,e.Fname,e.Lname,s.Fname,s.Lname
from department d LEFT OUTER JOIN Employee e ON d.Dnumber=e.DNO LEFT OUTER JOIN Employee
s ON e.superssn=s.ssn
order by d.Dnumber,e.Fname;
  
```

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The screenshot shows the SQL Server Enterprise Manager interface. The Object Explorer on the left displays the database structure for 'DESKTOP-KMC9AAB (SQL Serve)'. The central query window, titled 'SQLQuery1.sql - DE...vinash Kumar (58)', contains the following SQL code:

```
DELETE from EMPLOYEE where ssn='203456987';
DELETE from DEPENDENT where ESSN='203456987';
DELETE from WORKS_ON where ESSN='203456987';

INSERT INTO DEPENDENT VALUES('453453453','Joe','M','26-Jun-1961','Spouse');
INSERT INTO DEPENDENT VALUES('987654321','Erica','F','10-Apr-2020','Daughter');
INSERT INTO WORKS_ON VALUES('987654321','10','0');

--Q1
select d.Dnumber,d.Dname,e.Fname,e.Lname,s.Fname,s.Lname
from department d LEFT OUTER JOIN Employee e ON d.Dnumber=e.DNO LEFT OUTER JOIN Employee s ON e.superssn=s.ssn
order by d.Dnumber,e.Fname;

select d.Dnumber,d.Dname,e.Fname,e.Lname,s.Fname,s.Lname
from Employee e LEFT OUTER JOIN Employee s ON e.superssn=s.ssn,department d
where e.DNO=d.Dnumber
order by d.Dnumber,e.Fname;
```

The Results tab at the bottom shows the output of the first query (Q1). The results are as follows:

	Dnumber	Dname	Fname	Lname	Fname	Lname
1	1	Headquarters	James	Borg	NULL	NULL
2	4	Administration	Ahmad	Jabbar	Jennifer	Wallace
3	4	Administration	Alicia	Zelaya	Jennifer	Wallace
4	4	Administration	Jennifer	Wallace	James	Borg
5	5	Research	Franklin	Wong	James	Borg
6	5	Research	John	Smith	Jennifer	Wallace
7	5	Research	Joyce	English	Franklin	Wong
8	5	Research	Ramesh	Narayan	Franklin	Wong
9	7	Automation	NULL	NULL	NULL	NULL

Different version of Q1: Q1_1: List the same information as Q1 with a change: List all the employees including the ones who do not have any supervisor, but do not include the departments that do not have any employee in the output. So, your result of Q1_1 will list the department 1, 4, 5 and all the related employees with his/her supervisors including the ones who do not have supervisors. So it will be the same as Q1 except the department 7 won't be included.

```
select d.Dnumber,d.Dname,e.Fname,e.Lname,s.Fname,s.Lname
from Employee e LEFT OUTER JOIN Employee s ON e.superssn=s.ssn,department d
where e.DNO=d.Dnumber
order by d.Dnumber,e.Fname;
```

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The screenshot shows the SQL Server Enterprise Manager interface. On the left is the Object Explorer showing the database structure. The main window displays a SQL query window titled 'SQLQuery1.sql - DE...vinash Kumar (58)'. The query contains several DELETE and INSERT statements, followed by two SELECT queries. The first SELECT query is labeled '--Q1' and the second is labeled 'Q2'. The results of the first query are displayed in a grid below the query window.

```

DELETE from EMPLOYEE where ssn='203456987';
DELETE from DEPENDENT where ESSN='203456987';
DELETE from WORKS_ON where ESSN='203456987';

INSERT INTO DEPENDENT VALUES('453453453','Joe','M','26-Jun-1961','Spouse');
INSERT INTO DEPENDENT VALUES('987654321','Erica','F','10-Apr-2020','Daughter');
INSERT INTO WORKS_ON VALUES('987654321','10','0');

--Q1
select d.Dnumber,d.Dname,e.Fname,e.Lname,s.Fname,s.Lname
from department d LEFT OUTER JOIN Employee e ON d.Dnumber=e.DNO LEFT OUTER JOIN Employee s ON e.superssn=s.ssn
order by d.Dnumber,e.Fname;

Q2
select d.Dnumber,d.Dname,e.Fname,e.Lname,s.Fname,s.Lname
from Employee e LEFT OUTER JOIN Employee s ON e.superssn=s.ssn,department d
where e.DNO=d.Dnumber
order by d.Dnumber,e.Fname;

```

	Dnumber	Dname	Fname	Lname	Fname	Lname
1	1	Headquarters	James	Borg	NULL	NULL
2	4	Administration	Ahmad	Jabbar	Jennifer	Wallace
3	4	Administration	Alicia	Zelaya	Jennifer	Wallace
4	4	Administration	Jennifer	Wallace	James	Borg
5	5	Research	Franklin	Wong	James	Borg
6	5	Research	John	Smith	Jennifer	Wallace
7	5	Research	Joyce	English	Franklin	Wong
8	5	Research	Ramesh	Narayan	Franklin	Wong

Q2: Get SSN and the last name of married female employees who work on three or more projects

```

select e.ssn,e.Lname from Employee e
where e.ssn IN (select e.ssn from DEPENDENT d1
                where e.sex='F' and e.ssn=d1.ESSN and d1.RELATIONSHIP='SPOUSE')
AND e.ssn IN(select w.ESSN from WORKS_ON w
              group by w.ESSN
              HAVING count(w.ESSN)>=3);

```

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The screenshot shows the SQL Server Enterprise Manager interface. The Object Explorer on the left displays the database structure for 'DESKTOP-KMC9AAB (SQL Server)'. The main window shows a query editor with three queries labeled --Q1, --Q2, and --Q3. The results grid at the bottom shows the output of the first query, which lists the SSN and Lname of employees.

```

--Q1
from department d LEFT OUTER JOIN Employee e ON d.Dnumber=e.DNO LEFT OUTER JOIN Employee s ON e.superssn=s.ssn
order by d.Dnumber,e.Fname;

--Q2
select d.Dnumber,d.Dname,e.Fname,e.Lname,s.Fname,s.Lname
from Employee e LEFT OUTER JOIN Employee s ON e.superssn=s.ssn,department d
where e.DNO=d.Dnumber
order by d.Dnumber,e.Fname;

--Q3
select e.ssn,e.Lname from Employee e
where e.ssn IN (select e.ssn from DEPENDENT d1
               where e.sex='F' and e.ssn=d1.ESSN and d1.RELATIONSHIP='SPOUSE')
AND e.ssn IN(select w.ESSN from WORKS_ON w
             group by w.ESSN
             HAVING count(w.ESSN)>=3);

--Q3
select e.Fname,e.Lname from Employee e

```

ssn	Lname
987654321	Wallace

Q3: List the name of employees who is working for 'Research' department and are married but have no children.

--Married = Select ESSN From Dependent Where relationship = 'spouse';

--Girls = Select ESSN From Dependent Where relationship = 'daughter';

--Boys = Select ESSN From Dependent Where relationship = 'son';

```

select e.Fname,e.Lname from Employee e
WHERE e.Fname IN (select e.Fname from Employee e,department d,DEPENDENT d1
where d.Dnumber=e.DNO AND d.Dname='Research' AND d1.RELATIONSHIP='Spouse' AND e.ssn
=d1.ESSN)
AND e.Fname NOT IN (select e.Fname from Employee e,DEPENDENT d1
where d1.RELATIONSHIP='Son'AND e.ssn =d1.ESSN)
AND e.Fname NOT IN (select e.Fname from Employee e,DEPENDENT d1 where
d1.RELATIONSHIP='Daughter' AND e.ssn =d1.ESSN);

```

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The screenshot shows the SQL Server Enterprise Manager interface. On the left is the Object Explorer showing the database structure. The main window displays a SQL query in a query editor. Below the query editor is a results grid showing the output of the query.

SQL Query:

```

where e.ssn IN (select e.ssn from DEPENDENT d1
               where e.sex='F' and e.ssn=d1.ESSN and d1.RELATIONSHIP='SPOUSE')
AND e.ssn IN(select w.ESSN from WORKS_ON w
             group by w.ESSN
             HAVING count(w.ESSN)>=3);

--Q3
select e.Fname,e.Lname from Employee e
WHERE e.Fname IN (select e.Fname from Employee e,department d,DEPENDENT d1
                 where d.Dnumber=e.DNO AND d.Dname='Research' AND d1.RELATIONSHIP='Spouse' AND e.ssn =d1.ESSN)
AND e.Fname NOT IN (select e.Fname from Employee e,DEPENDENT d1
                   where d1.RELATIONSHIP='Son'AND e.ssn =d1.ESSN)
AND e.Fname NOT IN (select e.Fname from Employee e,DEPENDENT d1 where
                   d1.RELATIONSHIP='Daughter' AND e.ssn =d1.ESSN);

--Q4
select e.Lname from Employee e
Where e.Fname IN (select e.Fname from Employee e,DEPENDENT d1
                 where d1.RELATIONSHIP='Spouse'AND e.ssn =d1.ESSN)
AND e.Fname NOT IN (select e.Fname from Employee e,DEPENDENT d1

```

Results Grid:

	Fname	Lname
1	Joyce	English

Q4: Get the last name of married employees who only have daughters. Married = Select ESSN From Dependent Where relationship = 'spouse'; Girls = Select ESSN From Dependent Where relationship = 'daughter'; Boys = Select ESSN From Dependent Where relationship = 'son';

```

select e.Lname from Employee e
Where e.Fname IN (select e.Fname from Employee e,DEPENDENT d1
                 where d1.RELATIONSHIP='Spouse'AND e.ssn =d1.ESSN)
AND e.Fname NOT IN (select e.Fname from Employee e,DEPENDENT d1
                   where d1.RELATIONSHIP='Son'AND e.ssn =d1.ESSN)
AND e.Fname IN (select e.Fname from Employee e,DEPENDENT d1
                where d1.RELATIONSHIP='Daughter'AND e.ssn =d1.ESSN)

```

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The screenshot shows the SQL Server Enterprise Manager interface. The Object Explorer on the left displays the database structure for 'DESKTOP-KMC9AAB (SQL Server)'. The central query window, titled 'SQLQuery1.sql - DE...vinash Kumar (58))', contains the following SQL code:

```
--Q3
select e.Fname,e.Lname from Employee e
WHERE e.Fname IN (select e.Fname from Employee e,department d,DEPENDENT d1
where d.Dnumber=e.DNO AND d.Dname='Research' AND d1.RELATIONSHIP='Spouse' AND e.ssn =d1.ESSN)
AND e.Fname NOT IN (select e.Fname from Employee e,DEPENDENT d1
where d1.RELATIONSHIP='Son'AND e.ssn =d1.ESSN)
AND e.Fname NOT IN (select e.Fname from Employee e,DEPENDENT d1 where
d1.RELATIONSHIP='Daughter' AND e.ssn =d1.ESSN);

--Q4
select e.Lname from Employee e
where e.Fname IN (select e.Fname from Employee e,DEPENDENT d1
where d1.RELATIONSHIP='Spouse'AND e.ssn =d1.ESSN)
AND e.Fname NOT IN (select e.Fname from Employee e,DEPENDENT d1
where d1.RELATIONSHIP='Son'AND e.ssn =d1.ESSN)
AND e.Fname IN (select e.Fname from Employee e,DEPENDENT d1
where d1.RELATIONSHIP='Daughter'AND e.ssn =d1.ESSN)

--Q5
```

The Results pane at the bottom shows a single row with the last name 'Wallace' for employee 1.

	Lname
1	Wallace

Q5: Give the last name and ssn of those employees who work in any project(s) where there are more female than male employees.

```
select e.Lname,e.ssn from WORKS_ON w join Employee e on e.ssn=w.ESSN
Where (select Count(*)
from Employee e1, WORKS_ON w1
where e1.ssn=w1.ESSN AND e1.sex='F' AND w1.PNO=w.PNO)
>
(select Count(*)
from Employee e2, WORKS_ON w2
where e2.ssn=w2.ESSN AND e2.sex='M' AND w2.PNO=w.PNO);
```


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The screenshot displays the SQL Server Enterprise Manager interface. On the left, the Object Explorer shows the server hierarchy for 'DESKTOP-KMC9AAB (SQL Server)'. The central pane shows a SQL query in 'SQLQuery1.sql'. The query is a complex SELECT statement with multiple subqueries and joins. The bottom pane shows the 'Results' tab with a table containing three rows of data.

Object Explorer:

- DESKTOP-KMC9AAB (SQL Server)
- Databases
 - System Databases
 - Database Snapshots
 - COMPANY
 - Database Diagrams
 - Tables
 - Views
 - External Resources
 - Synonyms
 - Programmability
 - Service Broker
 - Storage
 - Full Text Catalogs
 - Partition Schemes
 - Partition Functions
 - Full Text Stoplists
 - Search Property Lists
 - Security
 - Server Objects
 - Replication
 - PolyBase
 - Always On High Availability
 - Management
 - Integration Services Catalogs
 - SQL Server Agent (Agent XPs)
 - XEvent Profiler

SQL Query:

```
where e.Fname IN (select e.Fname from Employee e,DEPENDENT d1
where d1.RELATIONSHIP='Spouse' AND e.ssn =d1.ESSN)
AND e.Fname NOT IN (select e.Fname from Employee e,DEPENDENT d1
where d1.RELATIONSHIP='Son' AND e.ssn =d1.ESSN)
AND e.Fname IN (select e.Fname from Employee e,DEPENDENT d1
where d1.RELATIONSHIP='Daughter' AND e.ssn =d1.ESSN)

--Q5

select e.Lname,e.ssn from WORKS_ON w join Employee e on e.ssn=w.ESSN
where (select Count(*)
from Employee e1, WORKS_ON w1
where e1.ssn=w1.ESSN AND e1.sex='F' AND w1.PNO=w.PNO)
>
(select Count(*)
from Employee e2, WORKS_ON w2
where e2.ssn=w2.ESSN AND e2.sex='M' AND w2.PNO=w.PNO);
```

Results:

	Lname	ssn
1	Wallace	987654321
2	Jabbar	987987987
3	Zelaya	999887777