

CIS 430: Lab Assignment 4

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Object: Querying a Relational Database COMPANY Database

1. Updated new changes into Dependent and Works_On tables in DB.

```
-- Insert Joe Anderson as a spouse for Joyce English
INSERT INTO DEPENDENT (ESSN, DEPENDENT_NAME, SEX, BDATE, RELATIONSHIP)
VALUES ('453453453', 'Joe Anderson', 'M', NULL, 'Spouse');

-- Insert Erica as a daughter for Jenifer Wallace
INSERT INTO DEPENDENT (ESSN, DEPENDENT_NAME, SEX, BDATE, RELATIONSHIP)
VALUES ('987654321', 'Erica', 'F', GETDATE(), 'Daughter');

-- Insert a new entry in the WORKS_ON table for Jenifer Wallace
INSERT INTO WORKS_ON (ESSN, PNO, HOURS)
VALUES ('987654321', 10, 0);

SELECT * FROM DEPENDENT
SELECT * FROM WORKS_ON
```

The screenshot shows the Microsoft SQL Server Enterprise Manager interface. The left pane displays the Object Explorer with the 'COMPANY_yVagula' database selected. The right pane shows the SQL query editor with the following queries executed:

```
-- Insert Joe Anderson as a spouse for Joyce English
INSERT INTO DEPENDENT (ESSN, DEPENDENT_NAME, SEX, BDATE, RELATIONSHIP)
VALUES ('453453453', 'Joe Anderson', 'M', NULL, 'Spouse');

-- Insert Erica as a daughter for Jenifer Wallace
INSERT INTO DEPENDENT (ESSN, DEPENDENT_NAME, SEX, BDATE, RELATIONSHIP)
VALUES ('987654321', 'Erica', 'F', GETDATE(), 'Daughter');

-- Insert a new entry in the WORKS_ON table for Jenifer Wallace
INSERT INTO WORKS_ON (ESSN, PNO, HOURS)
VALUES ('987654321', 10, 0);

SELECT * FROM DEPENDENT
SELECT * FROM WORKS_ON
```

The bottom pane shows the results of the queries. The 'DEPENDENT' table contains 12 rows, and the 'WORKS_ON' table contains 12 rows. The status bar at the bottom indicates 'Query executed successfully.' and '12 rows'.

ESSN	DEPENDENT_NAME	SEX	BDATE	RELATIONSHIP
123456789	Alice	F	1978-12-31	Daughter
123456789	Elizabeth	F	1957-05-05	Spouse
123456789	Michael	M	1978-01-01	Son
333445555	Alice	F	1978-04-05	Daughter
333445555	Joy	F	1948-05-03	Spouse
333445555	Theodore	M	1973-10-25	Son
453453453	Joe Anderson	M	NULL	Spouse
777777777	Timmy	M	2022-05-01	Bird
987654321	Abner	M	1932-02-29	Spouse
987654321	Erica	F	2024-05-03	Daughter
999999999	Jane	F	2010-05-05	Daughter
999999999	Timmy	M	2022-05-01	Bird

Lab 4.sql - LAPTOP-LSLNUIE\COMPANY_yVagula (LAPTOP-LSLNUIE\Yuvav (63)) - Microsoft SQL Server Management Studio

File Edit View Query Project Tools Window Help

COMPANY_yVagula

Object Explorer

- Connect
 - Server
 - Database
 - Table
 - View
 - Schema
 - Security
 - Integration Services Catalogs
 - SQL Server Agent (Agent XPs disabled)
 - XEvent Profiler
- LAPTOP-LSLNUIE (SQL Server 15.0.2116)
 - Databases
 - System Databases
 - Database Snapshots
 - COMPANY_yVagula
 - Database Diagrams
 - Tables
 - System Tables
 - FileTables
 - External Tables
 - Graph Tables
 - dbo.DEPARTMENT
 - dbo.EMPLOYEE
 - Views
 - External Resources
 - Synonyms
 - Programmability
 - Service Broker
 - Storage
 - Security
 - Server Objects
 - Replication
 - PolyBase
 - Always On High Availability
 - Management
 - Integration Services Catalogs

Lab 4.sql - LAPTOP-LSLNUIE\Yuvav (63)

```

172 -- Insert Joe Anderson as a spouse for Joyce English
173 INSERT INTO DEPENDENT (ESSN, DEPENDENT_NAME, SEX, BDATE, RELATIONSHIP)
174 VALUES ('453453453', 'Joe Anderson', 'M', NULL, 'Spouse');
175
176 -- Insert Erica as a daughter for Jennifer Wallace
177 INSERT INTO DEPENDENT (ESSN, DEPENDENT_NAME, SEX, BDATE, RELATIONSHIP)
178 VALUES ('987654321', 'Erica', 'F', GETDATE(), 'Daughter');
179
180 -- Insert a new entry in the WORKS_ON table for Jennifer Wallace
181 INSERT INTO WORKS_ON (ESSN, PNO, HOURS)
182 VALUES ('987654321', 10, 0);
183
184 SELECT * FROM DEPENDENT
185 SELECT * FROM WORKS_ON
186
187
188
189
190
191
192
193
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195
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197
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199
200

```

100 %

Results Messages

	ESSN	PNO	HOURS
1	123456789	1	32.5
2	123456789	2	7.5
3	333445555	2	10.0
4	333445555	3	10.0
5	333445555	10	10.0
6	333445555	20	10.0
7	453453453	1	20.0
8	453453453	2	20.0
9	666554444	3	40.0
10	777777777	1	20.0
11	777777777	3	20.0
12	888665555	20	NULL
13	987654321	10	0.0
14	987654321	20	15.0
15	987654321	30	20.0
16	987987987	10	35.0
17	987987987	30	5.0
18	999887777	10	10.0
19	999887777	30	30.0
20	999999999	1	20.0

Query executed successfully.

LAPTOP-LSLNUIE (15.0 RTM) LAPTOP-LSLNUIE\Yuvav (63) COMPANY_yVagula 00:00:00 20 rows

Ready Ln 185 Col 1 Ch 1 INS

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.

```

SELECT
    D.DNUMBER,
    D.DNAME,
    E.FNAME AS EMP_FNAME,
    E.LNAME AS EMP_LNAME,
    S.FNAME AS SUP_FNAME,
    S.LNAME AS SUP_LNAME
FROM
    DEPARTMENT D
LEFT JOIN
    EMPLOYEE E ON D.DNUMBER = E.DNO
LEFT JOIN
    EMPLOYEE S ON E.SUPERSSN = S.SSN
ORDER BY
    D.DNUMBER, E.FNAME;

```

The screenshot shows the Microsoft SQL Server Enterprise Manager interface. The left pane displays the Object Explorer with the database structure of 'COMPANY_yVagula'. The right pane shows a query window with the following SQL code:

```

SELECT * FROM DEPENDENT
SELECT * FROM WORKS_ON
SELECT
    D.DNUMBER,
    D.DNAME,
    E.FNAME AS EMP_FNAME,
    E.LNAME AS EMP_LNAME,
    S.FNAME AS SUP_FNAME,
    S.LNAME AS SUP_LNAME
FROM
    DEPARTMENT D
LEFT JOIN
    EMPLOYEE E ON D.DNUMBER = E.DNO
LEFT JOIN
    EMPLOYEE S ON E.SUPERSSN = S.SSN
ORDER BY
    D.DNUMBER, E.FNAME;

```

Below the query window, the 'Results' pane displays the output of the query. The results are as follows:

	DNUMBER	DNAME	EMP_FNAME	EMP_LNAME	SUP_FNAME	SUP_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	Doe	John	Smith
7	5	Research	John	Smith	Jennifer	Wallace
8	5	Research	Joyce	English	Franklin	Wong
9	5	Research	Ramesh	Narayan	Franklin	Wong
10	7	Automation	NULL	NULL	NULL	NULL

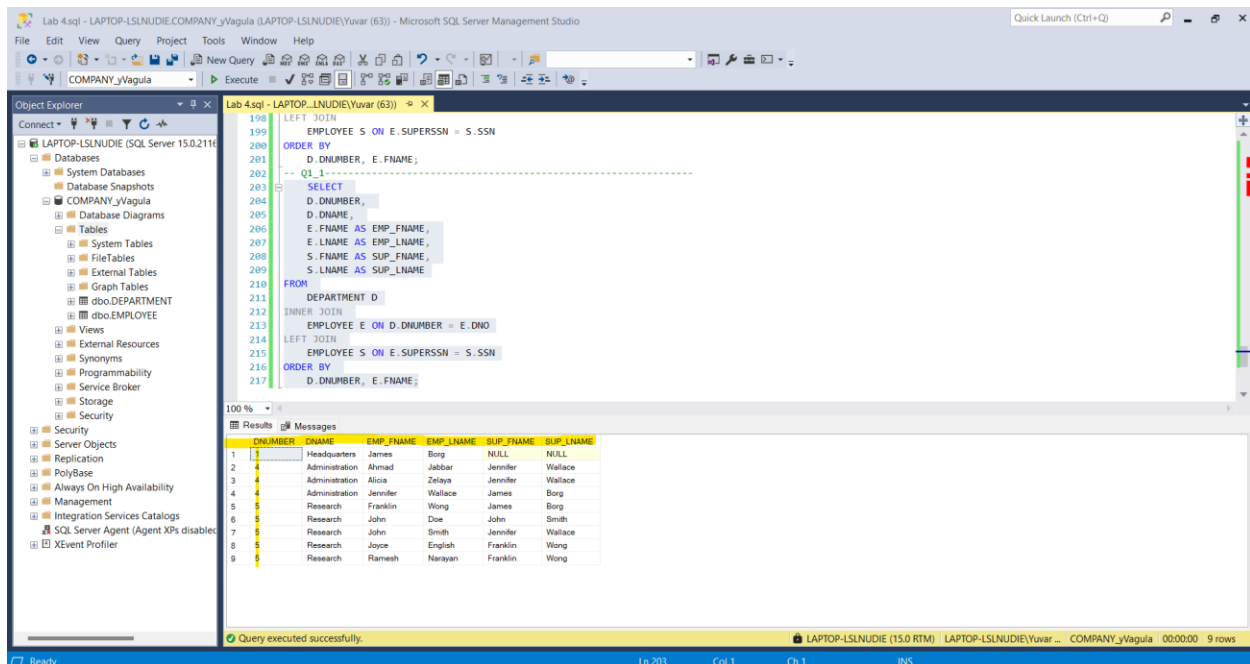
The status bar at the bottom indicates 'Query executed successfully.' and '10 rows'.

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 AS EMP_FNAME,
    E.LNAME AS EMP_LNAME,
    S.FNAME AS SUP_FNAME,
    S.LNAME AS SUP_LNAME
FROM
    DEPARTMENT D
INNER JOIN
    EMPLOYEE E ON D.DNUMBER = E.DNO
LEFT JOIN
    EMPLOYEE S ON E.SUPERSSN = S.SSN
ORDER BY
    D.DNUMBER, E.FNAME;

```



The screenshot shows the Microsoft SQL Server Management Studio interface. The query editor displays the following SQL code:

```

198 LEFT JOIN
199     EMPLOYEE S ON E.SUPERSSN = S.SSN
200 ORDER BY
201     D.DNUMBER, E.FNAME;
202 -- Q1_1
203 SELECT
204     D.DNUMBER,
205     D.DNAME,
206     E.FNAME AS EMP_FNAME,
207     E.LNAME AS EMP_LNAME,
208     S.FNAME AS SUP_FNAME,
209     S.LNAME AS SUP_LNAME
210 FROM
211     DEPARTMENT D
212 INNER JOIN
213     EMPLOYEE E ON D.DNUMBER = E.DNO
214 LEFT JOIN
215     EMPLOYEE S ON E.SUPERSSN = S.SSN
216 ORDER BY
217     D.DNUMBER, E.FNAME;

```

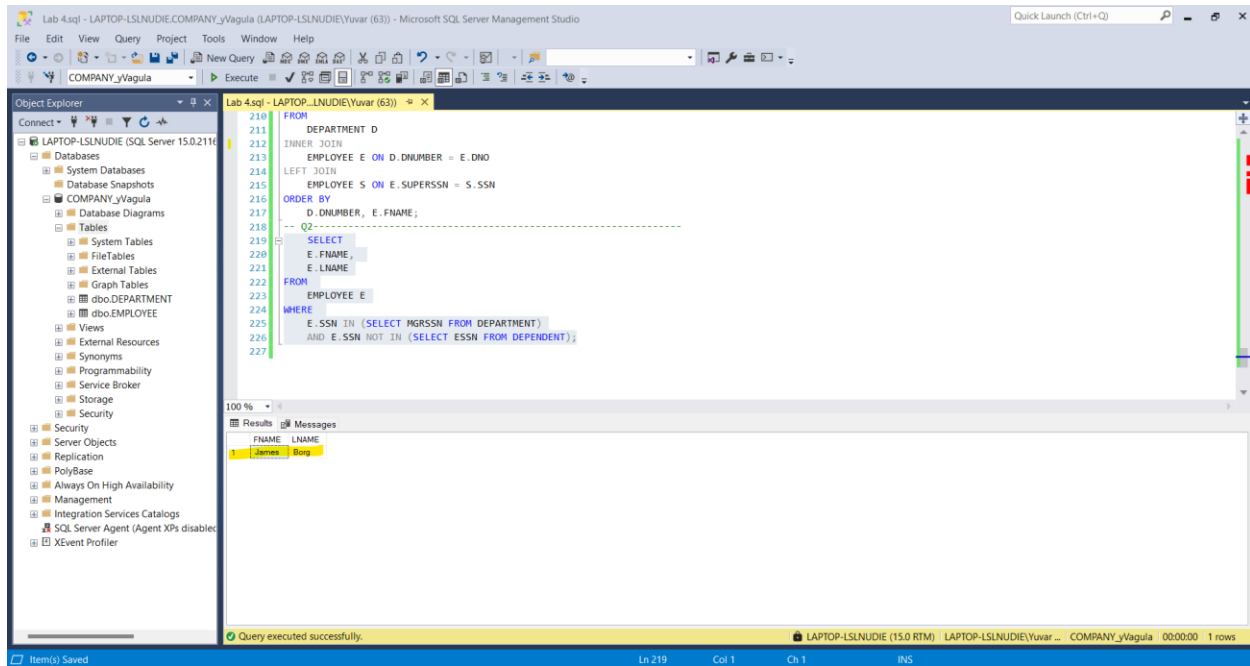
The Results pane shows the following data:

EMPLOYEE	DNAME	EMP_FNAME	EMP_LNAME	SUP_FNAME	SUP_LNAME
1	Headquarters	James	Borg	NULL	NULL
2	Administration	Almad	Jalbar	Jennifer	Wallace
3	Administration	Alicia	Zelaya	Jennifer	Wallace
4	Administration	Jennifer	Wallace	James	Borg
5	Research	Franklin	Wong	James	Borg
6	Research	John	Doe	John	Smith
7	Research	John	Smith	Jennifer	Wallace
8	Research	Joyce	Franklin	Franklin	Wong
9	Research	Ramesh	Narayan	Franklin	Wong

The status bar at the bottom indicates: Query executed successfully. LAPTOP-LSLNUDIE (15.0 RTM) | LAPTOP-LSLNUDIE\Yuv... COMPANY_yVagula 00:00:00 9 rows

Q2) List the name of managers who have no dependents.

```
SELECT
  E.FNAME,
  E.LNAME
FROM
  EMPLOYEE E
WHERE
  E.SSN IN (SELECT MGRSSN FROM DEPARTMENT)
  AND E.SSN NOT IN (SELECT ESSN FROM DEPENDENT);
```



Q2_1) 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.SEX = 'F'
    AND E.SSN IN (SELECT ESSN FROM DEPENDENT WHERE RELATIONSHIP = 'Spouse')
    AND (SELECT COUNT(*) FROM WORKS_ON W WHERE W.ESSN = E.SSN) >= 3;

```

The screenshot shows the Microsoft SQL Server Management Studio interface. The query editor displays the following SQL query:

```

221  E.SSN,
222  E.LNAME
223  FROM
224  EMPLOYEE E
225  WHERE
226  E.SSN IN (SELECT ESSN FROM DEPENDENT WHERE RELATIONSHIP = 'Spouse')
227  AND (SELECT COUNT(*) FROM WORKS_ON W WHERE W.ESSN = E.SSN) >= 3;
228
229  SELECT
230  E.SSN,
231  E.LNAME
232  FROM
233  EMPLOYEE E
234  WHERE
235  E.SEX = 'F'
236  AND E.SSN IN (SELECT ESSN FROM DEPENDENT WHERE RELATIONSHIP = 'Spouse')
237  AND (SELECT COUNT(*) FROM WORKS_ON W WHERE W.ESSN = E.SSN) >= 3;
238

```

The query was executed successfully, and the results are shown in the Results pane. The results table has two columns: SSN and LNAME. The first row shows the SSN 987654321 and the last name 'VAGULA'.

SSN	LNAME
987654321	VAGULA

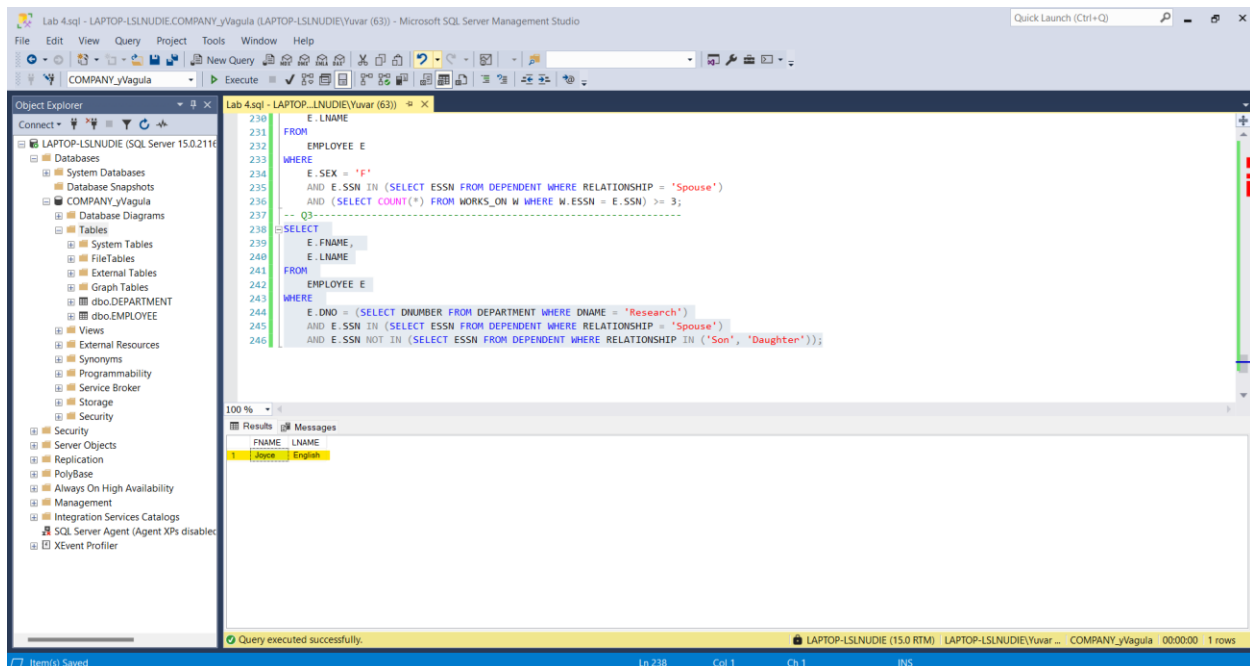
The status bar at the bottom indicates that the query was executed successfully and returned 1 row.

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

```

SELECT
    E.FNAME,
    E.LNAME
FROM
    EMPLOYEE E
WHERE
    E.DNO = (SELECT DNUMBER FROM DEPARTMENT WHERE DNAME = 'Research')
    AND E.SSN IN (SELECT ESSN FROM DEPENDENT WHERE RELATIONSHIP = 'Spouse')
    AND E.SSN NOT IN (SELECT ESSN FROM DEPENDENT WHERE RELATIONSHIP IN ('Son',
'Daughter')));

```

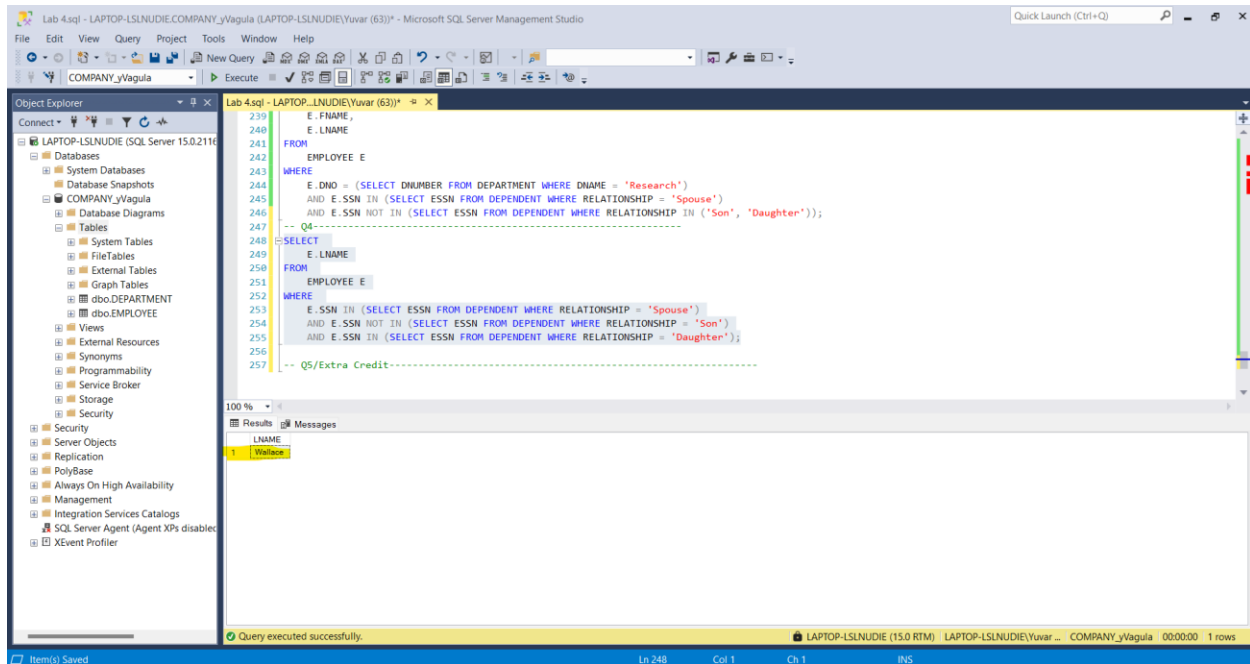


Q4) Get the last name of married employees who only have daughters.

```

SELECT
    E.LNAME
FROM
    EMPLOYEE E
WHERE
    E.SSN IN (SELECT ESSN FROM DEPENDENT WHERE RELATIONSHIP = 'Spouse')
    AND E.SSN NOT IN (SELECT ESSN FROM DEPENDENT WHERE RELATIONSHIP = 'Son')
    AND E.SSN IN (SELECT ESSN FROM DEPENDENT WHERE RELATIONSHIP = 'Daughter');

```



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

```

SELECT
    DISTINCT E.LNAME,
    E.SSN
FROM
    EMPLOYEE E
WHERE
    E.SSN IN (
        SELECT W.ESSN
        FROM WORKS_ON W
        JOIN PROJECT P ON W.PNO = P.PNUMBER
        WHERE (
            SELECT COUNT(DISTINCT E2.SSN)
            FROM WORKS_ON W2
            JOIN EMPLOYEE E2 ON W2.ESSN = E2.SSN
            WHERE W2.PNO = P.PNUMBER AND E2.SEX = 'F'
        ) > (
            SELECT COUNT(DISTINCT E2.SSN)
            FROM WORKS_ON W2
            JOIN EMPLOYEE E2 ON W2.ESSN = E2.SSN
            WHERE W2.PNO = P.PNUMBER AND E2.SEX = 'M'
        )
    );

```

The screenshot shows the Microsoft SQL Server Enterprise Manager interface. The left pane displays the Object Explorer with the database structure of 'COMPANY_yVagula'. The right pane shows a query window with the following SQL code:

```

-- Q5/Extra Credit
SELECT
    DISTINCT E.LNAME,
    E.SSN
FROM
    EMPLOYEE E
WHERE
    E.SSN IN (
        SELECT W.ESSN
        FROM WORKS_ON W
        JOIN PROJECT P ON W.PNO = P.PNUMBER
        WHERE (
            SELECT COUNT(DISTINCT E2.SSN)
            FROM WORKS_ON W2
            JOIN EMPLOYEE E2 ON W2.ESSN = E2.SSN
            WHERE W2.PNO = P.PNUMBER AND E2.SEX = 'F'
        ) > (
            SELECT COUNT(DISTINCT E2.SSN)
            FROM WORKS_ON W2
            JOIN EMPLOYEE E2 ON W2.ESSN = E2.SSN
            WHERE W2.PNO = P.PNUMBER AND E2.SEX = 'M'
        )
    );

```

Below the query window, the 'Results' pane shows the output of the query:

	LNAME	SSN
1	Wallace	967854321
2	Jabbar	967867890
3	Zelays	999987777

The status bar at the bottom indicates 'Query executed successfully.' and '3 rows'.

PROOF OF PATH AND FILENAME

The screenshot displays the Microsoft SQL Server Management Studio interface. The title bar indicates the connection is to 'Lab 4.sql - LAPTOP-LSLNUDIE\COMPANY_yVagula (LAPTOP-LSLNUDIE\Yuvav (63)) - Microsoft SQL Server Management Studio'. The Object Explorer on the left shows the database structure for 'LAPTOP-LSLNUDIE (SQL Server 15.0.2160.1)'.

The main query editor contains the following T-SQL script:

```
-- Q5/Ext.r
257 SELECT
258     DISTINCT E.LNAME,
259     E.SSN
260 FROM
261     EMPLOYEE E
262 WHERE
263     E.SSN IN (
264         SELECT W.ESSN
265         FROM WORKS_ON W
266         JOIN PROJECT P ON W.PNO = P.PNUMBER
267         WHERE (
268             SELECT COUNT(DISTINCT E2.SSN)
269             FROM WORKS_ON W2
270             JOIN EMPLOYEE E2 ON W2.ESSN = E2.SSN
271             WHERE W2.PNO = P.PNUMBER AND E2.SEX = 'F'
272         ) > 1
273     )
274     SELECT COUNT(DISTINCT E2.SSN)
275     FROM WORKS_ON W2
276     JOIN EMPLOYEE E2 ON W2.ESSN = E2.SSN
277     WHERE W2.PNO = P.PNUMBER AND E2.SEX = 'H'
278 )
279 )
```

The Results pane at the bottom shows the output of the query, which consists of three rows:

	LNAME	SSN
1	Wallace	987654321
2	Jabbar	987657897
3	Zelma	999887777

The status bar at the bottom indicates 'Query executed successfully.' and 'LAPTOP-LSLNUDIE (15.0 RTM) LAPTOP-LSLNUDIE\Yuvav ... COMPANY_yVagula 00:00:00 3 rows'.