Name: Apurba Koirala

Reg no: 22BCE3799

Subject Code: BCSE302P

Course Title: Database Systems

Lab Slot: L33 + L34

Guided by: Dr. Shashank Mouli Satapathy

QN.1

For the relational schema given as part of Assessment – 1, write the SQL queries to get the following information.

1) Find the employee who is getting highest salary in the department research

QUERIES:

```
SELECT * FROM employee WHERE DEPNO = 5

ORDER BY SALARY DESC FETCH FIRST ROW ONLY;
```

OUTPUT:

```
SQL>  SELECT * FROM employee WHERE DEPNO = 5
  2  ORDER BY SALARY DESC FETCH FIRST ROW ONLY;

FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                          S     SALARY SUPERSSN
---------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
--------------------------------------------------------------------------------
Joyce           P  AN              543216789 07-FEB-78
35 S 18 E, Salt Lake City, UT                        F      70000
         5
```

2) Find the employees who earn the same salary as the minimum salary for each Department

QUERIES:

```
SELECT e.*

FROM employee e

JOIN (

 SELECT DEPNO, MIN(SALARY) AS min_salary

 FROM employee

 GROUP BY DEPNO

) min_salaries ON e.DEPNO =

min_salaries.DEPNO AND e.SALARY =
```

min_salaries.min_salary;

OUTPUT:

```
FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                          S     SALARY SUPERSSN
---------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
--------------------------------------------------------------------------------
Doug            E  Gilbert         554433221 09-JUN-60
11 S 59 E, Salt Lake City, UT                        M      80000
         3



FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                          S     SALARY SUPERSSN
---------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
--------------------------------------------------------------------------------
Joyce           A  English         453453453 31-JUL-62
501 Rice, Houston, TX                                F      25000 333445555
         5



FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                          S     SALARY SUPERSSN
---------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
--------------------------------------------------------------------------------
James           E  Borg            888665555 10-NOV-27
450 Stone, Houston, TX                               M      55000 543216789
         1
```

```
FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                          S     SALARY SUPERSSN
---------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
--------------------------------------------------------------------------------
Alicia          J  Zelaya          987987777 19-JUL-58
3321 Castle, Spring, TX                              F      25000 987654321
         4



FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                          S     SALARY SUPERSSN
---------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
--------------------------------------------------------------------------------
Ahmad           V  Jabbar          987987987 29-MAR-59
980 Dallas, Houston, TX                              M      25000 987654321
         4
```

3) Find the employee whose salary is greater than average salary of department 2

QUERIES:

```
SELECT *
FROM employee
WHERE SALARY > (
SELECT AVG(SALARY)
FROM employee
WHERE DEPNO = 2
);
```

OUTPUT:

```
no rows selected
```

4) List out all the department names with their individual employees strength

QUERIES:

```
SELECT d.DNAME, COUNT(e.SSN) AS
employee_count
FROM dept d
LEFT JOIN employee e ON d.DEPNO =
e.DEPNO
GROUP BY d.DNAME;
```

OUTPUT:

DNAME	EMPLOYEE_COUNT
Headquarter	1
Research	5
Finance	3
Manufacture	2
Administration	0

5) Find out the department name having highest employee strength

QUERIES:

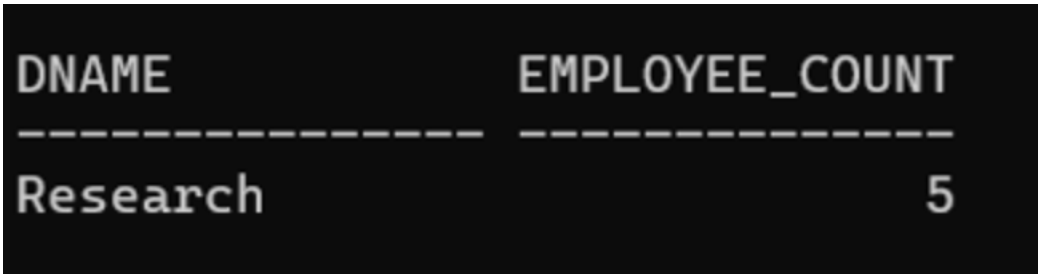
```
SELECT d.DNAME, COUNT(e.SSN) AS
employee_count
FROM dept d
LEFT JOIN employee e ON d.DEPNO =
e.DEPNO
```

GROUP BY d.DNAME

ORDER BY employee_count DESC

FETCH FIRST ROW ONLY;

OUTPUT:



DNAME	EMPLOYEE_COUNT
Research	5

6) List out all the departments and average salary drawn by their employees

QUERIES:

SELECT d.DNAME, AVG(e.SALARY) AS

average_salary

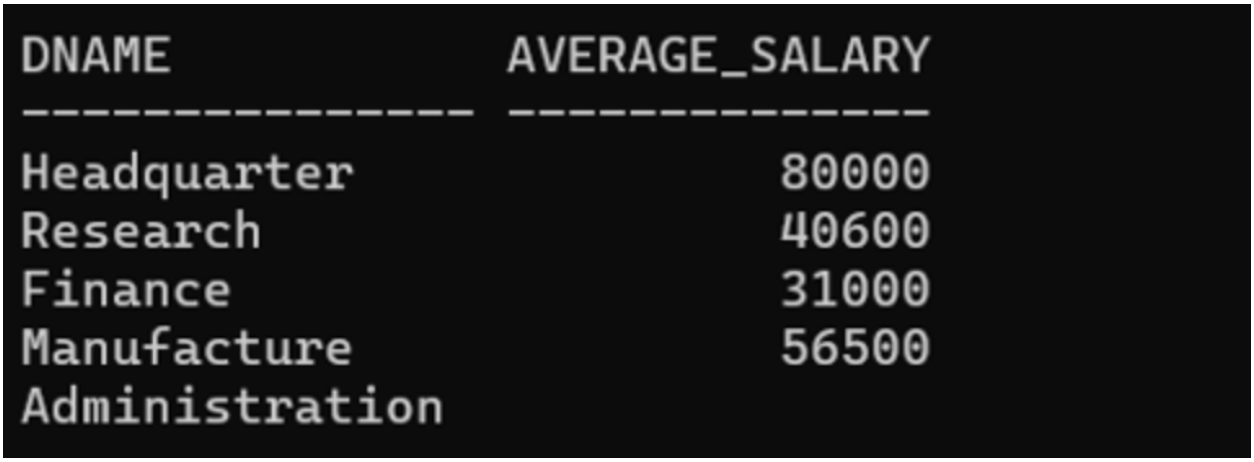
FROM dept d

LEFT JOIN employee e ON d.DEPNO =

e.DEPNO

GROUP BY d.DNAME;

OUTPUT:



DNAME	AVERAGE_SALARY
Headquarter	80000
Research	40600
Finance	31000
Manufacture	56500
Administration	

7) Find maximum average salary for each department.

QUERIES:

```
 SELECT department_avg_salaries.DNAME,
MAX(avg_salary)
AS max_avg_salary
FROM (
 SELECT d.DNAME, AVG(e.SALARY) AS avg_salary
 FROM dept d
 LEFT JOIN employee e ON d.DEPNO =
e.DEPNO
 GROUP BY d.DNAME
) department_avg_salaries
GROUP BY department_avg_salaries.DNAME;
```

OUTPUT:

DNAME	MAX_AVG_SALARY
Headquarter	80000
Research	40600
Finance	31000
Manufacture	56500
Administration	

8) Create a view to display the employee details who is working in Finance department.

QUERIES:

```
CREATE VIEW FIN_EMP AS
SELECT *
FROM employee
WHERE DEPNO = 4;
SELECT * FROM FIN_EMP;
```

OUTPUT:

```
FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                          S     SALARY SUPERSSN
---------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
--------------------------------------------------------------------------------
Jennifer        S  Wallace         987654321 20-JUN-31
291 Berry, Bellaire, TX                              F      43000 554433221
         4



FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                          S     SALARY SUPERSSN
---------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
--------------------------------------------------------------------------------
Alicia          J  Zelaya          987987777 19-JUL-58
3321 Castle, Spring, TX                              F      25000 987654321
         4



FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                          S     SALARY SUPERSSN
---------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
--------------------------------------------------------------------------------
Ahmad           V  Jabbar          987987987 29-MAR-59
980 Dallas, Houston, TX                              M      25000 987654321
         4
```

9) Create a logical table to store employee details who is getting salary more than 10000.

QUERIES:

```
CREATE VIEW HighSalaryEmp AS

SELECT * FROM employee

WHERE SALARY > 10000;

SELECT * FROM HighSalaryEmp;
```

OUTPUT:

```
FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                          S     SALARY SUPERSSN
---------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
--------------------------------------------------------------------------------
Doug            E  Gilbert         554433221 09-JUN-60
11 S 59 E, Salt Lake City, UT                        M      80000
         3



FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                          S     SALARY SUPERSSN
---------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
--------------------------------------------------------------------------------
Joyce           P  AN              543216789 07-FEB-78
35 S 18 E, Salt Lake City, UT                        F      70000
         5



FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                          S     SALARY SUPERSSN
---------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
--------------------------------------------------------------------------------
Franklin        T  Wong            333445555 08-DEC-45
638 Voss, Houston, TX                                M      40000 554433221
         5
```

```
FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                           S     SALARY SUPERSSN
----------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
------------------------------------------------------------------------------
Jennifer        S  Wallace         987654321 20-JUN-31
291 Berry, Bellaire, TX                               F      43000 554433221
         4



FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                           S     SALARY SUPERSSN
----------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
------------------------------------------------------------------------------
John            B  Smith           123456789 09-JAN-55
731 Fondren, Houston, TX                              M      30000 333445555
         5



FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                           S     SALARY SUPERSSN
----------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
------------------------------------------------------------------------------
Ramesh          K  Narayan         666884444 15-SEP-52
975 Fire Oak, Humble, TX                              M      38000 333445555
         5
```

```
FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                           S     SALARY SUPERSSN
----------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
-------------------------------------------------------------------------------
Joyce           A  English         453453453 31-JUL-62
501 Rice, Houston, TX                                 F      25000 333445555
         5



FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                           S     SALARY SUPERSSN
----------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
-------------------------------------------------------------------------------
James           E  Borg            888665555 10-NOV-27
450 Stone, Houston, TX                                M      55000 543216789
         1



FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                           S     SALARY SUPERSSN
----------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
-------------------------------------------------------------------------------
Alicia          J  Zelaya          987987777 19-JUL-58
3321 Castle, Spring, TX                               F      25000 987654321
         4
```

```
FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                   S     SALARY SUPERSSN
--------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
--------------------------------------------------------------------------------
Ahmad           V  Jabbar          987987987 29-MAR-59
980 Dallas, Houston, TX                       M      25000 987654321
         4



FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                   S     SALARY SUPERSSN
--------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
--------------------------------------------------------------------------------
Robert          F  Scott           943775543 21-JUN-42
2365 Newcastle Rd, Bellaire, TX               M      58000 888665555
         1
```

10) Create a table to store the employees details based on the department no.

QUERIES:

```
CREATE TABLE DepartmentEmployees AS

SELECT *

FROM employee

ORDER BY DEPNO;

SELECT * FROM DepartmentEmployees;
```

OUTPUT:

```
FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                          S     SALARY SUPERSSN
---------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
--------------------------------------------------------------------------------
James           E  Borg            888665555 10-NOV-27
450 Stone, Houston, TX                               M      55000 543216789
         1



FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                          S     SALARY SUPERSSN
---------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
--------------------------------------------------------------------------------
Robert          F  Scott           943775543 21-JUN-42
2365 Newcastle Rd, Bellaire, TX                      M      58000 888665555
         1



FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                          S     SALARY SUPERSSN
---------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
--------------------------------------------------------------------------------
Doug            E  Gilbert         554433221 09-JUN-60
11 S 59 E, Salt Lake City, UT                        M      80000
         3
```

```
FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                          S     SALARY SUPERSSN
---------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
--------------------------------------------------------------------------------
Ahmad           V  Jabbar          987987987 29-MAR-59
980 Dallas, Houston, TX                              M      25000 987654321
         4



FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                          S     SALARY SUPERSSN
---------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
--------------------------------------------------------------------------------
Alicia          J  Zelaya          987987777 19-JUL-58
3321 Castle, Spring, TX                              F      25000 987654321
         4



FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                          S     SALARY SUPERSSN
---------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
--------------------------------------------------------------------------------
Jennifer        S  Wallace         987654321 20-JUN-31
291 Berry, Bellaire, TX                              F      43000 554433221
         4
```

```
FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                           S     SALARY SUPERSSN
----------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
-------------------------------------------------------------------------------
Joyce           A  English         453453453 31-JUL-62
501 Rice, Houston, TX                                 F      25000 333445555
         5



FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                           S     SALARY SUPERSSN
----------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
-------------------------------------------------------------------------------
John            B  Smith           123456789 09-JAN-55
731 Fondren, Houston, TX                              M      30000 333445555
         5



FNAME           MN LNAME           SSN       BDATE
--------------- -- --------------- --------- ---------
OLD_ADDRESS                                           S     SALARY SUPERSSN
----------------------------------------------------- - ---------- ---------
     DEPNO
----------
ADDRESS(DOORNO, STREET, CITY, STATE, CONTINENT)
-------------------------------------------------------------------------------
Franklin        T  Wong            333445555 08-DEC-45
638 Voss, Houston, TX                                 M      40000 554433221
         5
```

QN.2

For the relational schema given as part of Assessment – 1, write the SQL queries using joins to get the following information.

1) Retrieve the names of all employees in department 5 who work more than 10 hours per week on ProductX project.

QUERIES:

```
SELECT e.FNAME, e.LNAME

FROM employee e

JOIN works_on w ON e.SSN = w.ESSN

JOIN project p ON w.PNUMBER = p.PNUMBER

WHERE e.DEPNO = 5

AND w.HOURS > 10

AND p.PNAME = 'ProjectX';
```

OUTPUT:

```
SQL> SELECT e.FNAME, e.LNAME
  2  FROM employee e
  3  JOIN works_on w ON e.SSN = w.ESSN
  4  JOIN project p ON w.PNUMBER = p.PNUMBER
  5  WHERE e.DEPNO = 5
  6   AND w.HOURS > 10
  7   AND p.PNAME = 'ProjectX';

no rows selected
```

2) List the names of all employees who have a dependent with the same first name as themselves.

QUERIES:

```
SELECT e.FNAME, e.LNAME

FROM employee e

JOIN dependent d ON e.SSN = d.ESSN
```

WHERE d.DEPENDENTNAME = e.FNAME;

OUTPUT:

```
SQL> SELECT e.FNAME, e.LNAME
  2  FROM employee e
  3  JOIN dependent d ON e.SSN = d.ESSN
  4  WHERE d.DEPENDENTNAME = e.FNAME;
```

3) Find the names of all the employees who are directly supervised by 'Franklin Wong'.

QUERIES:

SELECT e.FNAME, e.LNAME

FROM employee e

JOIN employee s ON e.SUPERSSN = s.SSN

WHERE s.FNAME = 'Franklin' AND s.LNAME = 'Wong';

OUTPUT:

```
FNAME           LNAME
--------------- ---------------
John            Smith
Ramesh          Narayan
Joyce           English
```

4) Retrieve the names of all who do not work on any project.

QUERIES:

SELECT FNAME, LNAME

FROM employee

WHERE SSN NOT IN (SELECT ESSN FROM works_on);

OUTPUT:

FNAME	LNAME
James	Borg
Franklin	Wong
Joyce	AN
Alicia	Zelaya
Robert	Scott

5) Find the names and addresses of all employees who work on at least one project located in Houston but whose department has no location in Houston.

QUERIES:

```
SELECT e.FNAME, e.LNAME, e.OLD_ADDRESS
FROM employee e
JOIN works_on w ON e.SSN = w.ESSN
JOIN project p ON w.PNUMBER = p.PNUMBER
JOIN dept_locations d ON e.DEPNO = d.DEPNO
WHERE p.PLOCATION = 'Houston' AND d.DLOCATION <> 'Houston';
```

OUTPUT:

```
SQL> SELECT e.FNAME, e.LNAME, e.OLD_ADDRESS
  2  FROM employee e
  3  JOIN works_on w ON e.SSN = w.ESSN
  4  JOIN project p ON w.PNUMBER = p.PNUMBER
  5  JOIN dept_locations d ON e.DEPNO = d.DEPNO
  6  WHERE p.PLOCATION = 'Houston' AND d.DLOCATION <> 'Houston';
```

6) List the names of all managers who have no dependents.

QUERIES:

```
SELECT e.FNAME, e.LNAME
FROM employee e
JOIN dept d ON e.SSN = d.MGRSSN
WHERE NOT EXISTS (
 SELECT 1
 FROM dependent dep
 WHERE dep.ESSN = d.MGRSSN
)
```

OUTPUT:

FNAME	LNAME
Doug	Gilbert
Joyce	AN
James	Borg

7) List the employee's names and the department names if they happen to manage a department.

QUERIES:

```
SELECT e.FNAME, e.LNAME, d.DNAME
FROM employee e
JOIN dept d ON e.SSN = d.MGRSSN;
```

OUTPUT:

FNAME	LNAME	DNAME
Doug	Gilbert	Headquarter
Joyce	AN	Administration
Jennifer	Wallace	Finance
John	Smith	Research
James	Borg	Manufacture

8) For each project retrieve the project number, project name and the number of employees who work on that project.

QUERIES:

```
SELECT p.PNUMBER, p.PNAME, COUNT(w.ESSN)

AS num_employees

FROM project p

LEFT JOIN works_on w ON p.PNUMBER = w.PNUMBER

GROUP BY p.PNUMBER, p.PNAME;
```

OUTPUT:

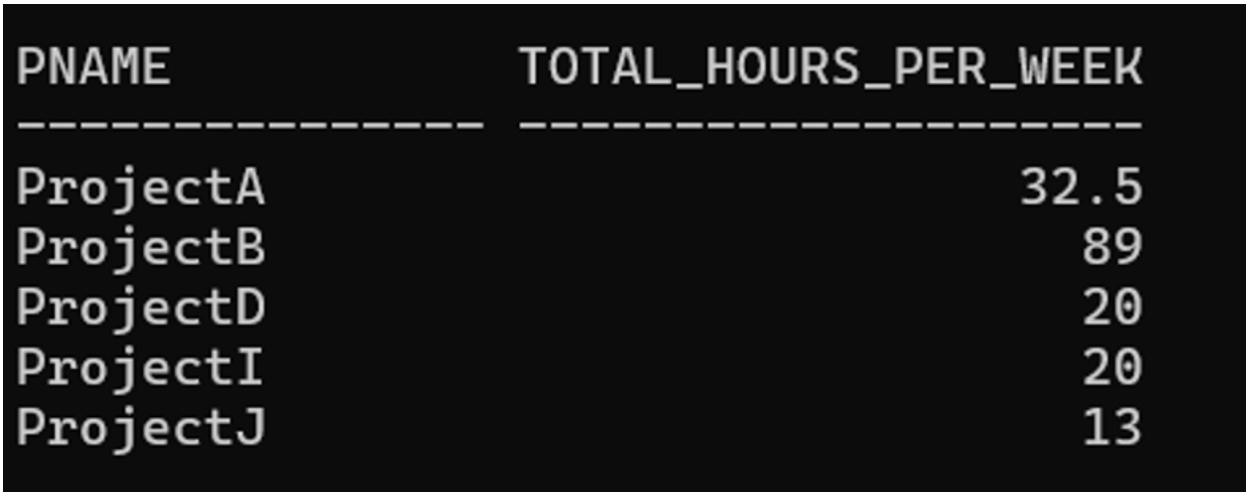
PNUMBER	PNAME	NUM_EMPLOYEES
1945	ProjectB	4
3388	ProjectA	1
3445	ProjectI	1
2423	ProjectD	1
2212	ProjectJ	1
1234	ProjectG	0
1564	ProjectF	0
6688	ProjectC	0
4765	ProjectE	0
3467	ProjectH	0

9) For each project, list the project name and the total hours per week (by all employees) spent on that project.

QUERIES:

```
SELECT p.PNAME, SUM(w.HOURS) AS total_hours_per_week
FROM project p
JOIN works_on w ON p.PNUMBER = w.PNUMBER
GROUP BY p.PNAME;
```

OUTPUT:



PNAME	TOTAL_HOURS_PER_WEEK
ProjectA	32.5
ProjectB	89
ProjectD	20
ProjectI	20
ProjectJ	13

10) Retrieve the names of the employees who have 2 or more dependents.

QUERIES:

```
SELECT e.FNAME, e.LNAME
FROM employee e
JOIN (
  SELECT ESSN, COUNT(*) AS num_dependents
  FROM dependent
  GROUP BY ESSN
  HAVING COUNT(*) >= 2
) d ON e.SSN = d.ESSN;
```

OUTPUT:

FNAME	LNAME
Franklin	Wong
Jennifer	Wallace