BUDT 703 Fall 2021 Homework #4 – SQL DML

Due by 11:59pm, Monday, October 25th, 2021

Note: The file name must be renamed to **HW4_YourLastName_YourFirstName.docx**.

Follow the following steps to answer user queries for the **Terps Enterprise, Inc.** database.

1. Download file **HW 4 – Enterprise.sql** (not what you submitted for Homework #3)
2. Execute DROP TABLE, CREATE TABLE, INSERT INTO, and ALTER TABLE statements to create six tables inserted with corresponding data.
3. Compose SQL SELECT FROM statements to answer user queries below.
4. Take screenshots on the result tables of up to the first eight rows with the status bar showing total number of rows on the lower-right corner. Do NOT attach the entire result table containing more than eight rows.
5. Copy and paste each of your SQL SELECT FROM statements (in plain text) and screenshots to the corresponding question below, and submit only this document.

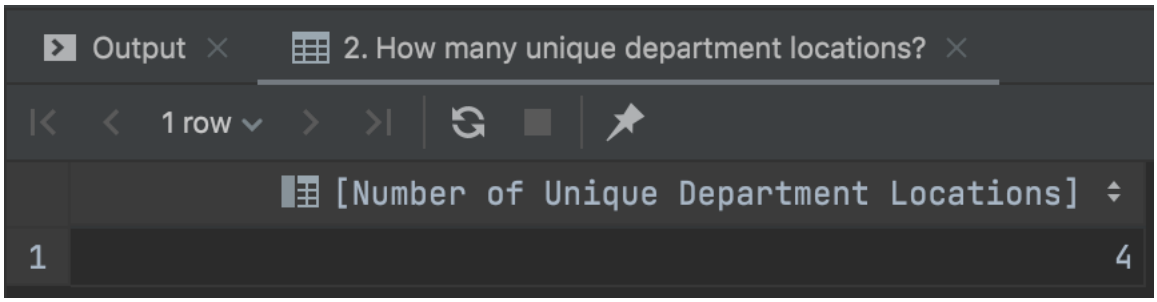
SQL queries:

1. What are the full details of all employees in the alphabetical order of last then first names within every department?

```
SELECT *
FROM [Enterprise.Employee] e
WHERE e.dptId IS NOT NULL
ORDER BY e.empLName, e.empFName
```

2. How many unique department locations?

```
SELECT COUNT(DISTINCT l.dptLoc) AS 'Number of Unique Department Locations'
FROM [Enterprise.DepartmentLocation] l
```



3. What are the managers' names and the corresponding department names, in the alphabetical order of last then first names?

```
SELECT m.empFName, m.empMInit, m.empLName, d.dptName
FROM [Enterprise.Employee] m, [Enterprise.Department] d
WHERE m.empSSN = d.mgrEmpSSN
ORDER BY m.empLName, m.empFName
```

Output | 3. What are the mana...ast then first names?

3 rows

	empFName	empMInit	empLName	dptName
1	James	E	Borg	Headquaters
2	Jennifer	S	Wallace	Administration
3	Franklin	T	Wong	Research

4. For each department name, how many employees in the department, in the order of department names?

```
SELECT d.dptName, COUNT(e.empSSN) AS 'Number of Employees in This Department'
FROM [Enterprise.Employee] e, [Enterprise.Department] d
WHERE d.dptId = e.dptId
GROUP BY d.dptName
ORDER BY d.dptName
```

Output | 4. For each departme... of department names?

3 rows

	dptName	[Number of Employees in This Department]
1	Administration	3
2	Headquaters	1
3	Research	4

5. For each department name, how many locations in the department, in the order of department names?

```
SELECT d.dptName, COUNT(l.dptLoc) AS 'Number of Locations in This Department'
FROM [Enterprise.Department] d, [Enterprise.DepartmentLocation] l
WHERE d.dptId = l.dptId
GROUP BY d.dptName
ORDER BY d.dptName
```

Output | 5. For each departme... of department names?

3 rows

	dptName	[Number of Locations in This Department]
1	Administration	1
2	Headquaters	1
3	Research	3

6. What are employee names, in the alphabetical order of their last then first names, who work on projects organized by the research department?

```
SELECT e.empFName, e.empMInit, e.empLName
FROM [Enterprise.Employee] e
WHERE e.empSSN IN(
   SELECT w.empSSN
   FROM [Enterprise.Work] w, [Enterprise.Project] p, [Enterprise.Department] d
   WHERE w.prjId = p.prjId
    AND p.dptId = d.dptId
    AND d.dptName LIKE '%Research%')
ORDER BY e.empLName, e.empFName
```

Output | 6. What are employee... research department?

4 rows

	empFName	empMInit	empLName
1	Joyce	A	English
2	Ramesh	K	Narayan
3	John	B	Smith
4	Franklin	T	Wong

7. What are employee names, in the alphabetical order of their last then first names, and numbers of worked projects, where the employee worked on at least two projects?

```
SELECT e.empFName, e.empMInit, e.empLName, COUNT(w.prjId) AS 'Numbers of Worked
Projects'
FROM [Enterprise.Employee] e LEFT OUTER JOIN [Enterprise.Work] w
ON e.empSSN = w.empSSN
GROUP BY e.empFName,e.empMInit, e.empLName
```

```
HAVING COUNT(w.prjId) >= 2
ORDER BY e.empLName, e.empFName
```

Output | 7. What are employee...t least two projects?

6 rows

	empFName	empMInit	empLName	[Numbers of Worked Projects]
1	Joyce	A	English	2
2	Ahmad	V	Jabbar	2
3	John	B	Smith	2
4	Jennifer	S	Wallace	2
5	Franklin	T	Wong	4
6	Alicia	J	Zelaya	2

8. What are all details of a department, which organizes more than one project?

```
SELECT *
FROM [Enterprise.Department] d
WHERE d.dptId IN (
  SELECT p.dptId
  FROM [Enterprise.Project] p
  GROUP BY p.dptId
  HAVING COUNT(p.prjId) > 1
  )
```

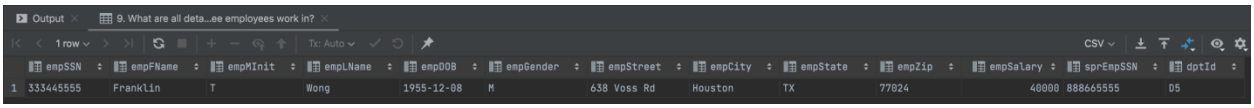
Output | 8. What are all deta...ore than one project?

2 rows | Tx: Auto

	dptId	dptName	mgrEmpSSN	mgrStartDate
1	D4	Administration	987654321	1995-01-01
2	D5	Research	333445555	1988-05-22

9. What are all details of managers in the departments, for which more than three employees work in?

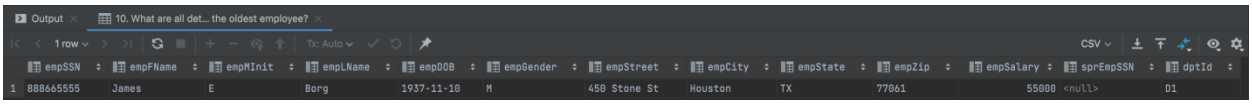
```
SELECT *
FROM [Enterprise.Employee] m
WHERE m.empSSN IN(
  SELECT d.mgrEmpSSN
  FROM [Enterprise.Employee] e LEFT OUTER JOIN [Enterprise.Department] d
  ON e.dptId = d.dptId
  GROUP BY d.mgrEmpSSN
  HAVING COUNT(e.empSSN) > 3
)
```



	empSSN	empFName	empMInit	empLName	empDOB	empGender	empStreet	empCity	empState	empZip	empSalary	sprEmpSSN	dptId
1	333445555	Franklin	T	Wong	1955-12-08	M	638 Voss Rd	Houston	TX	77024	40000	888665555	D5

10. What are all details about the oldest employee?

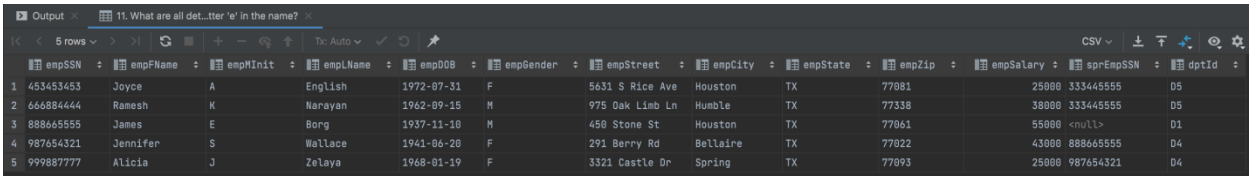
```
SELECT *
FROM [Enterprise.Employee] e
WHERE e.empDOB IN(
  SELECT MIN(empDOB) FROM [Enterprise.Employee]
  )
```



	empSSN	empFName	empMInit	empLName	empDOB	empGender	empStreet	empCity	empState	empZip	empSalary	sprEmpSSN	dptId
1	888665555	James	E	Borg	1937-11-10	M	450 Stone St	Houston	TX	77061	55000	<null>	D1

11. What are all details about employees, who have letter 'e' in the name?

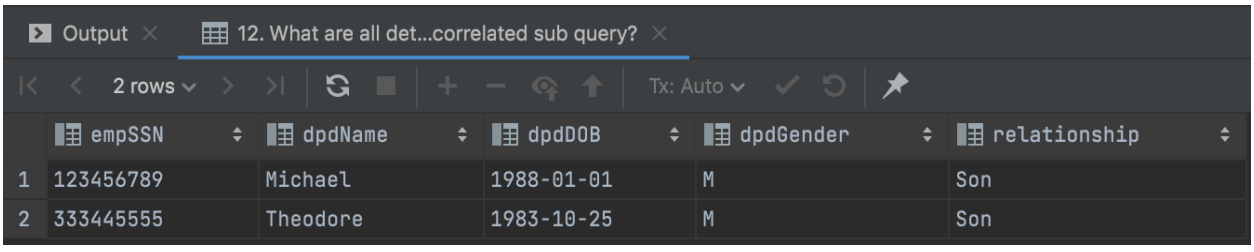
```
SELECT *
FROM [Enterprise.Employee] e
WHERE e.empFName+e.empMInit+e.empLName LIKE '%e%'
```



	empSSN	empFName	empMInit	empLName	empDOB	empGender	empStreet	empCity	empState	empZip	empSalary	sprEmpSSN	dptId
1	453453453	Joyce	A	English	1972-07-31	F	5631 S Rice Ave	Houston	TX	77081	25000	333445555	D5
2	666884444	Ramesh	K	Narayan	1962-09-15	M	975 Oak Limb Ln	Humble	TX	77338	38000	333445555	D5
3	888665555	James	E	Borg	1937-11-10	M	450 Stone St	Houston	TX	77061	55000	<null>	D1
4	987654321	Jennifer	S	Wallace	1941-06-20	F	291 Berry Rd	Bellaire	TX	77022	43000	888665555	D4
5	999887777	Alicia	J	Zelaya	1968-01-19	F	3321 Castle Dr	Spring	TX	77093	25000	987654321	D4

12. What are all details of a dependent, who has the same gender as the corresponding employee, using correlated subquery?

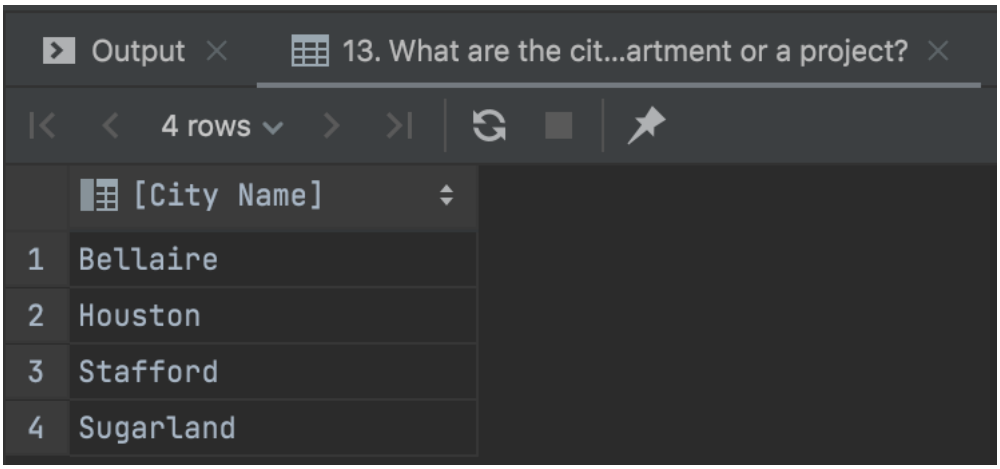
```
SELECT *
FROM [Enterprise.Dependent] d
WHERE EXISTS(
  SELECT *
  FROM [Enterprise.Employee] e
  WHERE e.empSSN = d.empSSN
   AND e.empGender = d.dpdGender)
```



	empSSN	dpdName	dpdDOB	dpdGender	relationship
1	123456789	Michael	1988-01-01	M	Son
2	333445555	Theodore	1983-10-25	M	Son

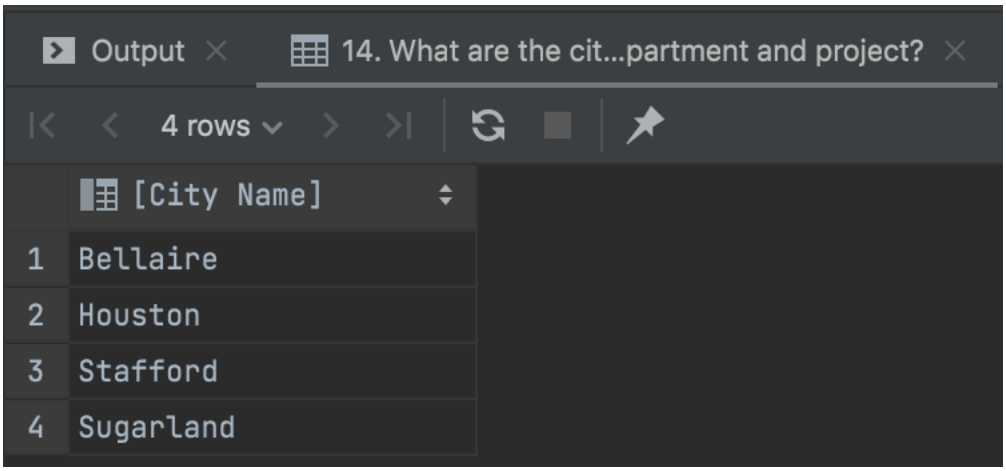
13. What are the cities, where there is either a department or a project?

```
SELECT l.dptLoc AS 'City Name'
FROM [Enterprise.DepartmentLocation] l
UNION
SELECT p.prjLoc
FROM [Enterprise.Project] p
```



14. What are the cities, where there is both department and project?

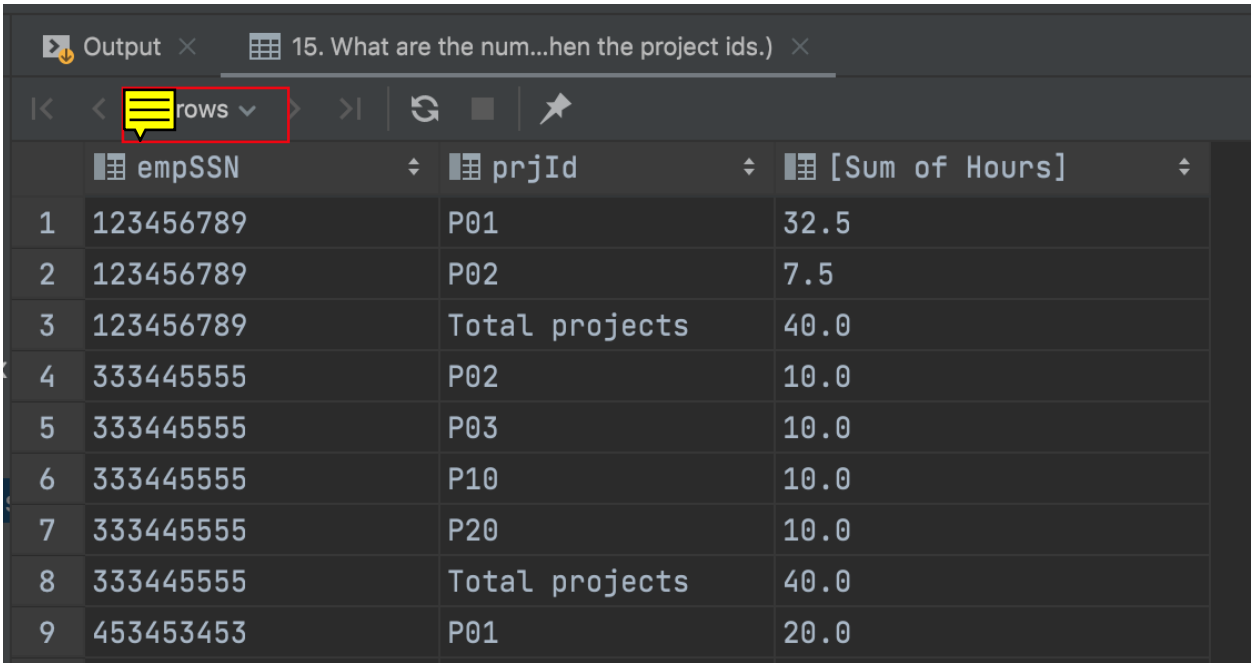
```
SELECT l.dptLoc AS 'City Name'
FROM [Enterprise.DepartmentLocation] l
INTERSECT
SELECT p.prjLoc
FROM [Enterprise.Project] p
```



15. What are the numbers of work hours for all possible combinations of employees and then projects? (Hints: This is an OLAP query using GROUP BY CUBE. Work hours canNOT be NULL. The results should be sorted by the employee SSNs then the project ids.)

```
SELECT CASE WHEN (GROUPING(empSSN) = 1) THEN 'Total employees'
        ELSE ISNULL(empSSN, 'UNKNOWN')
```

```
    END AS empSSN,
    CASE WHEN (GROUPING(prjID) = 1) THEN 'Total projects'
        ELSE ISNULL(prjID, 'UNKNOWN')
    END AS prjId,
    ISNULL(CONVERT(VARCHAR(10), SUM(hours)), 'UNKNOWN') AS 'Sum of Hours'
FROM [Enterprise.Work]
GROUP BY CUBE (empSSN, prjId)
ORDER BY empSSN, prjId
```



	empSSN	prjId	[Sum of Hours]
1	123456789	P01	32.5
2	123456789	P02	7.5
3	123456789	Total projects	40.0
4	333445555	P02	10.0
5	333445555	P03	10.0
6	333445555	P10	10.0
7	333445555	P20	10.0
8	333445555	Total projects	40.0
9	453453453	P01	20.0

In this question, I use the single Work table because it stores all meaningful combinations of employees and projects (it can also be a full combination here using all 3 table for constuction, but newly created ones have no meaning, since the employees were actually not in those projects.) Then I changed NULL in hours to be 'UNKNOWN', because it's not NULL but just no records. Also, I use SUM(hours), then NULL in grouping in empSSN and prjId gets a meaningful value as Total Hours of each employee, or each project, or all.

For 'Total projects' and 'Total employees', their lengths are over the limit. However, in DataGrip it's able to compile, as long as they're still Char. That's the reason why I didn't do CONVERT there.

Note: I use IDE called DataGrip, which is able to run in local environment with more powerful built-in features, to write SQL files (it's capable to compile almost all kinds of SQL languages). It can alto-generate table name from comments, and can modify row names or sort rows in result table, and these make my screenshots look slightly different. I promise **I haven't changed any result manually,** and hope you can understand the situation.