The assignment will be graded out of 100 points.

Due Date: Thursday, September 27, 2018 by 11:59:59 PM

Submission Guidelines:

- The assignment should be submitted via Blackboard.
- The answers must be typed as a document.
- Make sure your name and your student ID are listed in your document.
- Name files as assignment4_<net-id>.<format>
- Accepted document formats are (.pdf, .doc or .docx). If you are using OpenOffice or LibreOffice, make sure to save as .pdf or .doc
- Please do not submit .txt files.
- If there are multiple files in your submission, zip them together as assignment4_<net-id>.zip and submit the .zip file.
- The maximum points one can get in this assignment is 100.
- You may resubmit the assignment at any time. Late submissions will be accepted at a penalty of 10 points per day. Maximum latency is 5 days beyond which a grade of zero will be assigned. This penalty will apply regardless of whether you have other excuses.

NOTE: This folder contains company.sql database. You can import the database in **MySQL**, it is recommended to use **phpMyAdmin**. You can use this database to answer questions from 1 to 3, answers to these questions will be checked against this database.

Consider the Company relational database below:

EMPLOYEE

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno
John	B	Smith	123456789	1965-01-09	731 Fondren, Houston, TX	M	30000	333445555	5
Franklin	T	Wong	333445555	1955-12-08	638 Voss, Houston, TX	M	40000	888665555	5
Alicia	J	Zelaya	999887777	1968-01-19	3321 Castle, Spring, TX	F	25000	987654321	4
Jennifer	S	Wallace	987654321	1941-06-20	291 Berry, Bellaire, TX	F	43000	888665555	4
Ramesh	K	Narayan	666884444	1962-09-15	975 Fire Oak, Humble, TX	M	38000	333445555	5
Joyce	A	English	453453453	1972-07-31	5631 Rice, Houston, TX	F	25000	333445555	5
Ahmad	V	Jabbar	987987987	1969-03-29	980 Dallas, Houston, TX	M	25000	987654321	4
James	E	Borg	888665555	1937-11-10	450 Stone, Houston, TX	M	55000	NULL	1

DEPARTMENT

Dname	Dnumber	Mgr_ssn	Mgr_start_date
Research	5	333445555	1988-05-22
Administration	4	987654321	1995-01-01
Headquarters	1	888665555	1981-06-19

DEPT_LOCATIONS

Dnumber	Dlocation
1	Houston
4	Stafford
5	Bellaire
5	Sugarland
5	Houston

WORKS_ON

Essn	Pno	Hours
123456789	1	32.5
123456789	2	7.5
666884444	3	40.0
453453453	1	20.0
453453453	2	20.0
333445555	2	10.0
333445555	3	10.0
333445555	10	10.0
333445555	20	10.0
999887777	30	30.0
999887777	10	10.0
987987987	10	35.0
987987987	30	5.0
987654321	30	20.0
987654321	20	15.0
888665555	20	NULL

PROJECT

Pname	Pnumber	Plocation	Dnum
ProductX	1	Bellaire	5
ProductY	2	Sugarland	5
ProductZ	3	Houston	5
Computerization	10	Stafford	4
Reorganization	20	Houston	1
Newbenefits	30	Stafford	4

DEPENDENT

Essn	Dependent_name	Sex	Bdate	Relationship
333445555	Alice	F	1986-04-05	Daughter
333445555	Theodore	M	1983-10-25	Son
333445555	Joy	F	1958-05-03	Spouse
987654321	Abner	M	1942-02-28	Spouse
123456789	Michael	M	1988-01-04	Son
123456789	Alice	F	1988-12-30	Daughter
123456789	Elizabeth	F	1967-05-05	Spouse

1. Specify the following queries based on the Nested Queries concepts on the database above in SQL. Show the query results. (**40 pts.**)

   a. For each department whose average employee salary is more than $30,000, retrieve the department name and the number of employees working for that department. (**8 pts**).

   b. Suppose we want the number of male employees in each department rather than all employees. Can we specify this query in SQL? Why or why not? Show the query results if applied to the database. (**8 pts.**)

   c. Retrieve the names of all employees who work in the department that has the employee with the highest salary among all employees. (**8 pts.**)

   d. Retrieve the names of all employees whose supervisor's supervisor has '888665555' for Ssn. (**8 pts.**)

   e. Retrieve the names of employees who make at least $10,000 more than the employee who is paid the least in the company. (**8 pts.**)

2. Specify the following views in SQL on the COMPANY database schema shown in the Figure above. (**30 pts.**)

   a. A view that has the department name, manager name, and manager salary for every department. (**7 pts.**)

   b. A view that has the employee name, supervisor name, and employee salary for each employee who works in the 'Research' department. (**7 pts.**)

   c. A view that has the project name, controlling department name, number of employees, and total hours worked per week on the project for each project. (**8 pts.**)

   d. A view that has the project name, controlling department name, number of employees, and total hours worked per week on the project for each project with more than one employee working on it. (**8 pts.**)

3. Consider the following view, DEPT_SUMMARY, defined on the COMPANY database:

```
CREATE VIEW DEPT_SUMMARY (D, C, Total_s, Average_s)
AS SELECT Dno, COUNT (*), SUM (Salary), AVG (Salary)
FROM EMPLOYEE
GROUP BY Dno;
```

   State which of the following queries and updates would be allowed on the View and give its result. (**15 pts.**)

a. SELECT *
FROM DEPT_SUMMARY;

b. SELECT D, C
FROM DEPT_SUMMARY
WHERE TOTAL_S > 100000;

c. SELECT D, AVERAGE_S
FROM DEPT_SUMMARY
WHERE C > (SELECT C FROM DEPT_SUMMARY WHERE D=4);

d. UPDATE DEPT_SUMMARY
SET D=3
WHERE D=4;

e. DELETE FROM DEPT_SUMMARY
WHERE C > 4;

4. Specify the following queries in SQL on the (University) database schema in Figure below (**10 pts**)

STUDENT

Name	Student_number	Class	Major

COURSE

Course_name	Course_number	Credit_hours	Department

PREREQUISITE

Course_number	Prerequisite_number

SECTION

Section_identifier	Course_number	Semester	Year	Instructor

GRADE_REPORT

Student_number	Section_identifier	Grade

a. Retrieve the names and major departments of all straight-A students. (students who have a grade of A in all their courses)

b. Retrieve the names and major departments of all students who do not have a grade of A in any of their courses.

5. What are Triggers? Give an example of situation where triggers can be used? (**5 pts.**)