Hand in a hardcopy of your answers (printed or handwritten). Include your name, and be sure to clearly identify which problems you are answering and which homework the problems are from since problems from multiple homeworks will be collected at the same time. These problems will be collected on Monday 9/14. (Only one collection for this homework.)

You may use the MySQL database to develop and test your queries, but be sure to still think through what each query is doing for yourself in order to practice and build your skills at reading and understanding SQL. Being able to reason through SQL is important for building up complex queries, and is essential for verifying that your queries are correct — they need to work in any case and not just for a particular instance of the database. (The example database provided is not guaranteed to be sufficient to catch all edge cases or reveal common logic bugs.) Instructions for accessing MySQL can be found on Canvas.

Use the following schema for these problems.

```
EMPLOYEE(fname,minit,lname,ssn,bdate,address,sex,salary,superssn,deptnum)
DEPARTMENT(deptname,deptnum,mgrssn,mgrstartdate)
DEPT_LOCATIONS(deptnum,deptloc)
PROJECT(projname,projnum,projloc,deptnum)
WORKS_ON(empssn,projnum,hours)
DEPENDENT(empssn,fname,sex,bdate,relationship)
```

Sample data is available in the `ex_company` database in MySQL.

For each of the following, give a brief English description of the result of the query. Describe the result rather than the working of the query. For example, "names and salaries of employees working in department 5" rather than "first find the rows of `EMPLOYEE` where the department number is 5, then get the first name, last name, and salary".

1. ```
   SELECT fname, lname, salary
   FROM EMPLOYEE
   WHERE salary * 1.08 > 60000 AND deptnum <> 8
   ```

2. ```
   SELECT fname, lname, deptnum
   FROM EMPLOYEE
   WHERE ( lname LIKE 'K%' OR lname LIKE 'B%' ) AND lname NOT LIKE '%y'
   ORDER BY deptnum ASC, lname ASC
   ```

3.
```
SELECT DISTINCT deptnum
FROM EMPLOYEE
WHERE superssn IS NULL
```

4.
```
SELECT empssn, projnum, hours, hours * 4 AS estimatedmonthlyhours
FROM WORKS_ON
WHERE hours >= 10 AND hours <= 40
ORDER BY estimatedmonthlyhours DESC
```

5.
```
SELECT DISTINCT deptnum, projloc
FROM PROJECT
ORDER BY deptnum, projloc
```

6.
```
SELECT empssn, fname, relationship
FROM DEPENDENT
WHERE fname LIKE '_____' AND relationship IS NOT NULL
```

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7. For each of the following queries, give the actual results (the table) that would be returned by the query (not an English description). Use the data given below for WORKS_ON.

empssn	projnum	hours
123456789	1	30.0
123456789	2	10.0
333445555	3	15.0
666884444	3	NULL
987654321	20	15.0
999887777	30	NULL

(a)
```
SELECT empssn
FROM WORKS_ON
WHERE hours > 15 OR projnum = 3
```

(b)
```
SELECT
FROM WORKS_ON
WHERE hours <> 15
```

(c)
```
SELECT empssn, projnum, hours, hours*4 AS monthlyhours
FROM WORKS_ON
WHERE projnum = 3
```

Write SQL for each of the following. Use only the constructs discussed in class on 9/4 (SQL basics) even if you could write the query another way.

8. List the name and location of every project whose project number is under 60, sorted from highest project number to lowest.
9. Find departments with locations in cities whose names don't end in "e", sorted numerically by department and then alphabetically by location with each department.
10. List the SSN of employees with a son whose first name is at least four letters long.
11. List the departments either without a manager or whose manager started before 1990. Include the department's name and the SSN and start date of the manager.
12. Assume that base pay for hourly employees is $20 per hour and that overtime pay is an additional $5 per hour for any hours they work beyond 40. For work assignments where employees work at least 40 hours per week, list the employee SSN, project number, base pay, overtime pay, and total pay (base + overtime).
13. List employees who would qualify for a "senior" pay bracket (defined as $55,000+) if given a 10% raise. Show their name, current salary, and projected salary, with the highest projected earners listed first.
14. List the departments where there are supervised employees (i.e. employees with a supervisor) earning at least $60,000, ordered by department number.
15. Find employees living in Houston, TX. List all available information about the employee, sorted first by department and then by decreasing order of salary within departments.