

CS143: Database Systems
Homework #2
(Due: 2PM 02/03/03)

1. Assume the following databases for this problem:

```
Employee(person-name, age, street, city)
Work(person-name, company-name, salary)
Company(company-name, city)
Manage(person-name, manager-name)
```

A person may work for more than one company. A company may be located in more than one city. Each person's name is unique.

Write the following queries in SQL. You should use at least one subquery in each of your answers and write each query in two significantly different ways (e.g., using different sets of the operators `EXIST`, `IN`, and `SOME`)

- (a) Find the names of the employees whose salaries are higher than those of any employees living in Los Angeles.
- (b) Find the names of the companies which are located in all cities where ABC Co. is located.
- (c) Find the names of the managers whose salaries are higher than that of at least one employee that they manage.

2. Assume the following databases for this problem:

```
MovieStar(name, address, gender)
MovieExec(name, address, company, netWorth)
```

- (a) We want to find the names and addresses of all female movie stars (`gender = 'F'` in the `MovieStar` relation) who are also movie executives with a net worth over \$1,000,000 (`netWorth > 1000000` in the `MovieExec` relation).
 - i. Write the query using `INTERSECT` operator.
 - ii. Write the query without using `INTERSECT` operator.
- (b) We want to find the movie stars who are not movie executives.
 - i. Write the query using `EXCEPT` operator.
 - ii. Write the query without using `EXCEPT` operator.

3. Assume the following databases for this problem:

```
ComputerProduct(manufacturer, model, price)
Desktop(model, speed, ram, hdd)
Laptop(model, speed, ram, hdd, screen)
```

A computer product is either a desktop or a laptop.

- (a) Find the average speed of all desktop computers.
 - (b) Find the average price of all laptops with screen size above 14.
 - (c) Find the average price of PC's and laptops made by "Dell."
 - (d) For each different screen size, find the average price of a laptop.
 - (e) Find the manufacturers that make at least three different computer models.
4. Assume the computer-product database of the previous problem, and write the following database modifications.
- (a) Using two `INSERT` statements, insert a desktop computer manufactured by HP, with model number 1200, price \$1000, speed 1.2Ghz, 256MB RAM, and an 80GB hard drive.
 - (b) Using two `DELETE` statements, delete all desktops manufactured by IBM with price below \$1000. (*Comments: Be careful with the order of your two DELETE statements.*)
 - (c) For each laptop made by Gateway, add one inch to the screen size. (*Hint: The WHERE clause in a UPDATE statement may contain complex conditions, including subqueries.*)
5. Assume the schema `Student(id, gpa)` where `id` is the key. Are the following two queries always equivalent?

```
SELECT AVG(gpa) FROM Student
SELECT SUM(gpa)/COUNT(*) FROM Student
```

(Hint: Consider what may happen if there is a NULL value.)