Assignment 1 **CS 440, Winter 2018**

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1: Relational Model and SQL (8 points)

Consider the following relational schema:
emp (*eid*: integer, *ename*: string, *age*: integer, *salary*: real)
works (*eid*: integer, *did*: integer, *pc time*: integer)
dept (*did*: integer, *dname*: string, *budget*: real, *managerid*: integer)

The underlined attributes are keys for their relations. Note that a manager is an employee as well and their manager id and employee id are the same. An employee can work in more than one department. The pct time field of the Works relation shows the percentage of time that a given employee works in a given department. Write the following queries in SQL.

(a) Print the *did* and *dname* of the departments with at least one full-time (100%) employee. (1 point)

select dept.did, dept.dname

from dept dept, works works

where works.did=dept.did and works.pct_time=100 GROUP BY dept.dname ORDER by dept.did

(b) Print the names and ages of each employee who works in both the ”Hardware” department and the ”Software” department. (1 point)

select e1.ename, e1.age

from emp e1, works w1, dept d1

where e1.eid=w1.eid and w1.did=d1.did and d1.dname='hardware' and e1.eid in (select w2.eid from works w2,

dept d2 where w2.did=d2.did and d2.dname='software')

(c) Print the name of each employee whose salary does *not* exceed the budget of any department that he or she works in. (2 point)

SELECT e1.ename

FROM emp e1

where e1.eid Not IN

(SELECT emp.eid from emp emp,works w,dept d where d.did = w.did and emp.eid=w.eid and emp.salary > d.budget)

(d) If a manager manages more than one department, he or she controls the sum of all the budgets for those departments. Find the managerids of managers who control more than $5 million. (2 points)

```
select d.managerid
from dept d
group by d.managerid having sum(d.budget)>5000000;
```

(e) For each department with more than 4 full-time-equivalent employees (i.e., where the part-time and full-time employees add up to at least that many full-time employees), print the did together with the number of employees that work in that department. (2 points)

```
select w.did, count(w.eid) as count
from works w
group by w.did having 400<(select sum(w1.pct_time) from works w1 where w1.did=w.did)
```