

# Recap of Feb 13: SQL, Relational Calculi, Functional Dependencies

- SQL: multiple *group bys*, *having*, lots of examples
- Tuple Calculus
- Domain Calculus
- Functional Dependencies
  - $F^+$  = the closure of the set of FDs on a given relation

# Relational Database Design

- A major goal in designing a database is to have a schema that
  - makes queries simpler (easy to phrase)
  - avoids redundancies and update anomalies (*about which more later*)

# Schema and Query Simplicity (1)

Example Schema 1:           EMP(eno, ename, sal, dno)  
                          DEPT(dno, dname, floor, mgr)

Query 1: find all employees that make more than their manager

```
select e.ename from EMP e, EMP m, DEPT d  
where e.dno = m.dno and d.mgr=m.eno and e.sal>m.sal
```

Query 2: for each department, find the maximum salary

```
select d.dname, max(e.sal) from EMP e, DEPT d  
where e.dno = d.dno group by d.dno
```

Q1 requires two joins; Q2 requires a join and a group-by.