

## Assignment 2

- 1) A)  $\Pi_{id, person\_name}(\sigma_{company\_name="Walmart"}(works))$   
 B)  $\Pi_{id, person\_name, city}(employee \bowtie_{employee\_id=works.id}(\sigma_{company\_name="Walmart"}(works)))$   
 C)  $\Pi_{id, person\_name, city}=(\sigma_{(company\_name="Walmart" \wedge salary > 10000)}(works \bowtie_{employee.id=works.id.employee} ))$   
 D)  $\Pi_{id, person\_name}=(\sigma_{employee.city=company.city}(employee \bowtie_{employee.id=works.id} works \bowtie_{works.company.name=company.name} company))$

2)

A) To find employees who don't work for Walmart we first find those who do work for Walmart. Those are exactly the employees not part of desired result. We then use set difference to find the set of all employees subtract those employees that shouldn't be in the result.

$$\Pi_{id, person\_name}(employee) - \Pi_{id, person\_name}(employee \bowtie_{employee.id=works.id}(\sigma_{company\_name="Walmart"}(works)))$$

B) We use the same approach part, but for this time for highest salary.

$$\Pi_{id, person\_name}(employee) - \Pi_{A.id, A, person\_name}(P_A(employee) \bowtie_{A.salary < B.salary} P_B(employee))$$

- 3) Inserting a tuple (2022, Weisen, Politics, 45000)

employee(ID, person\_name, street, city)

works(ID, company\_name, salary)

company(company\_name, city)

Into the instructor table, where the department table doesn't have the department Politics, would violate the foreign-key constraint.

Deleting the tuple

From the department table, (Biology, Watson, 9000)

Where at least one student or instructor table has dept\_name as Biology, would violate the foreign-key constraint.

- 4) Appropriate primary key is ID