CS540 Winter 2019

Assignment 1

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**1．Relational Model and SQL**

(a)

Q1(n):-Dept(d, n, b, m),Works(x, d, p)Emp(x, y, z, s), z<40

(b)

SELECT DISTINCT dname

FROM dept

WHERE dept.did IN (SELECT works.did

FROM works

WHERE works.eid IN (SELECT emp.eid

FROM emp

WHERE emp.age<40))

(c)

[SELECT](https://tools.engr.oregonstate.edu/phpMyAdmin/url.php?url=https://dev.mysql.com/doc/refman/5.5/en/select.html) DISTINCT ename

FROM emp,dept

WHERE emp.salary > dept.budget

(d)

SELECT dname,COUNT(emp.eid)

FROM emp,dept,works

WHERE emp.eid=works.eid AND

works.did = dept.did

GROUP BY dept.did

HAVING (SUM(emp.salary)/COUNT(emp.eid))<64000

**2. Schema Normalization**

(a) The Key of R is ACD, BCD, CDE:

For ACD: A->B

AC->BC->E

ACD->BCD->ED

For BCD: BC->E

BCD->ED->A

For CDE: ED->A->B

CED->CA->BC

(b) It is not BCNF, The condition of BCNF is For each non-trivial FD X->Y, X is a super-key of R.

R=(A,B,C.D.E)

R1=(A,B) BCNF

R2=(A,C,D,E) BCNF

R3=(A,D,E) violates BCNF

R4=(C,D,E) BCNF

(c) It is 3NF. because A,B.E all element in the key