

### Practice questions on Distribution Transparency for Read-Only Application

Open the lecture of previous class. Solve the following two questions.

1. Consider the following global, fragmentation, and allocation schemata:

Global Schema:  $STUDENT(NUMBER, NAME, DEPT)$

Fragmentation Schema:

$$STUDENT_1 = SL_{DEPT="EEE"} STUDENT$$
$$STUDENT_2 = SL_{DEPT="CSE"} STUDENT$$

Allocation Schema:

$$STUDENT_1 \text{ at sites } 1, 2$$
$$STUDENT_2 \text{ at sites } 3, 4$$

Assume that "EEE" and "CSE" are the only possible values for DEPT attribute.

Write an application that moves a student whose number and department are given at the terminal, to the other department, at level 3 of distribution transparency.

2. Consider the following global, fragmentation, and allocation schemata:

Global Schema:  $STUDENT(SNUM, SNAME, DEPT, SEM)$

$TEACHER(TNUM, TNAME, DEPT)$

$COURSE(CNUM, TNUM, DEPT, CREDIT)$

Fragmentation Schema:

$$STUDENT_1 = SL_{DEPT="CSE"} STUDENT$$
$$STUDENT_2 = SL_{DEPT="EEE"} STUDENT$$
$$COURSE_1 = COURSE \Join_{COURSE.DEPT=STUDENT_1.DEPT} STUDENT_1$$
$$COURSE_2 = COURSE \Join_{COURSE.DEPT=STUDENT_2.DEPT} STUDENT_2$$
$$TEACHER_1 = TEACHER \Join_{TEACHER.DEPT=COURSE_1.DEPT} COURSE_1$$
$$TEACHER_2 = TEACHER \Join_{TEACHER.DEPT=COURSE_2.DEPT} COURSE_2$$

Allocation Schema:

$$STUDENT_1 \text{ at sites } 1, 2$$
$$STUDENT_2 \text{ at site } 3$$
$$COURSE_1 \text{ at sites } 1, 2$$
$$COURSE_2 \text{ at site } 3$$
$$TEACHER_1 \text{ at sites } 1, 2$$
$$TEACHER_2 \text{ at sites } 1, 2$$

$$APP_1 = \text{update } COURSE \text{ set } TNUM = 41, CREDIT = \frac{CREDIT}{2} \text{ where } CNUM = \$cnum \text{ and } DEPT = 'CSE';$$

At which levels of distribution transparency (**k**), the individual applications APP1 will perform properly? Determine this **k** for each of the application. Rewrite the application for level (**k+1**) distribution transparency.

3. Consider the global relational schema:

**Hospital (HNAME, HID, CITY, MGRID, CAPACITY, CHARGE, RATINGS)**

Given the following fragmentation schema:

$Hospital_1 = PJ_{HNAME, HID, CITY, MGRID} (Hospital)$

$Hospital_2 = SL_{CAPACITY < 500} PJ_{HID, CAPACITY, CHARGE, RATINGS} (Hospital)$

$Hospital_3 = SL_{RATINGS < 10} SL_{CAPACITY \geq 500} PJ_{HID, CAPACITY, CHARGE, RATINGS} (Hospital)$

$Hospital_4 = SL_{RATINGS \geq 10} SL_{CAPACITY \geq 500} PJ_{HID, CAPACITY, CHARGE, RATINGS} (Hospital)$

Suppose the hospital having **HID = 15**, has done some new construction. Its capacity is improved from **450** to **600**. Write an application that does the necessary updates at Level - 2 of distribution transparency.

4. Consider the following global, fragmentation, and allocation schemata:

Global Schema:  $EMP(EMPNUM, NAME, SAL, TAX, MGRNUM, DEPTNUM)$

Fragmentation Schema:

$EMP_1 = PJ_{EMPNUM, NAME, SAL, TAX} SL_{DEPTNUM \leq 10} EMP$

$EMP_2 = PJ_{EMPNUM, MGRNUM, DEPTNUM} SL_{DEPTNUM \leq 10} EMP$

$EMP_3 = PJ_{EMPNUM, NAME, DEPTNUM} SL_{DEPTNUM > 10} EMP$

$EMP_4 = PJ_{EMPNUM, SAL, TAX, MGRNUM} SL_{DEPTNUM > 10} EMP$

Suppose the employee having **EMPNUM = 100**, wants to change the department. So the company changed his **DEPTNUM** from **9** to **3**. Write an application that does the necessary updates at Level - 2 of distribution transparency.