# CSE 370 – Database Systems

## Theory Section 8 / 9 | Assignment 02

## Summer 2024

Marks

___ / 20

**Full Name (in Block Letter): _____    ID: _____**

## Question 1 [CO1] : 20 Points

Suppose that each of the following Update operations (a-j) is applied directly to the database state shown in Figure A2_1. **Consider each operation independent of each other. Each operation will be performed in the same state of Figure A2_1.** Discuss all integrity constraints violated by each operation (check Figure A2_2 for Referential integrity constraints on the database of Figure A2_1), if any, and the different ways of enforcing these constraints.

**EMPLOYEE**

| Fname | Minit | Lname | Ssn | Bdate | Address | Sex | Salary | Super_ssn | Dno |
|---|---|---|---|---|---|---|---|---|---|
| John | B | Smith | 123456789 | 1965-01-09 | 731 Fondren, Houston, TX | M | 30000 | 333445555 | 5 |
| Franklin | T | Wong | 333445555 | 1955-12-08 | 638 Voss, Houston, TX | M | 40000 | 888665555 | 5 |
| Alicia | J | Zelaya | 999887777 | 1968-01-19 | 3321 Castle, Spring, TX | F | 25000 | 987654321 | 4 |
| Jennifer | S | Wallace | 987654321 | 1941-06-20 | 291 Berry, Bellaire, TX | F | 43000 | 888665555 | 4 |
| Ramesh | K | Narayan | 666884444 | 1962-09-15 | 975 Fire Oak, Humble, TX | M | 38000 | 333445555 | 5 |
| Joyce | A | English | 453453453 | 1972-07-31 | 5631 Rice, Houston, TX | F | 25000 | 333445555 | 5 |
| Ahmad | V | Jabbar | 987987987 | 1969-03-29 | 980 Dallas, Houston, TX | M | 25000 | 987654321 | 4 |
| James | E | Borg | 888665555 | 1937-11-10 | 450 Stone, Houston, TX | M | 55000 | NULL | 1 |

**DEPARTMENT**

| Dname | Dnumber | Mgr_ssn | Mgr_start_date |
|---|---|---|---|
| Research | 5 | 333445555 | 1988-05-22 |
| Administration | 4 | 987654321 | 1995-01-01 |
| Headquarters | 1 | 888665555 | 1981-06-19 |

**DEPT_LOCATIONS**

| Dnumber | Dlocation |
|---|---|
| 1 | Houston |
| 4 | Stafford |
| 5 | Bellaire |
| 5 | Sugarland |
| 5 | Houston |

**WORKS_ON**

| Essn | Pno | Hours |
|---|---|---|
| 123456789 | 1 | 32.5 |
| 123456789 | 2 | 7.5 |
| 666884444 | 3 | 40.0 |
| 453453453 | 1 | 20.0 |
| 453453453 | 2 | 20.0 |
| 333445555 | 2 | 10.0 |
| 333445555 | 3 | 10.0 |
| 333445555 | 10 | 10.0 |
| 333445555 | 20 | 10.0 |
| 999887777 | 30 | 30.0 |
| 999887777 | 10 | 10.0 |
| 987987987 | 10 | 35.0 |
| 987987987 | 30 | 5.0 |
| 987654321 | 30 | 20.0 |
| 987654321 | 20 | 15.0 |
| 888665555 | 20 | NULL |

**PROJECT**

| Pname | Pnumber | Plocation | Dnum |
|---|---|---|---|
| ProductX | 1 | Bellaire | 5 |
| ProductY | 2 | Sugarland | 5 |
| ProductZ | 3 | Houston | 5 |
| Computerization | 10 | Stafford | 4 |
| Reorganization | 20 | Houston | 1 |
| Newbenefits | 30 | Stafford | 4 |

**DEPENDENT**

| Essn | Dependent_name | Sex | Bdate | Relationship |
|---|---|---|---|---|
| 333445555 | Alice | F | 1986-04-05 | Daughter |
| 333445555 | Theodore | M | 1983-10-25 | Son |
| 333445555 | Joy | F | 1958-05-03 | Spouse |
| 987654321 | Abner | M | 1942-02-28 | Spouse |
| 123456789 | Michael | M | 1988-01-04 | Son |
| 123456789 | Alice | F | 1988-12-30 | Daughter |
| 123456789 | Elizabeth | F | 1967-05-05 | Spouse |

Figure A2_1 : COMPANY database.

**EMPLOYEE**

| Fname | Minit | Lname | Ssn | Bdate | Address | Sex | Salary | Super_ssn | Dno |
|-------|-------|-------|-----|-------|---------|-----|--------|-----------|-----|

**DEPARTMENT**

| Dname | Dnumber | Mgr_ssn | Mgr_start_date |
|-------|---------|---------|----------------|

**DEPT_LOCATIONS**

| Dnumber | Dlocation |
|---------|-----------|

**PROJECT**

| Pname | Pnumber | Plocation | Dnum |
|-------|---------|-----------|------|

**WORKS_ON**

| Essn | Pno | Hours |
|------|-----|-------|

**DEPENDENT**

| Essn | Dependent_name | Sex | Bdate | Relationship |
|------|----------------|-----|-------|--------------|

Figure A2_2 : Referential integrity constraints on the COMPANY database of Figure A2_1.

**a.** Modify the HOURS attribute of the WORKS_ON tuple with ESSN= '999887777' and PNO= 10 to '5.0'.

**Answer:**

**b.** Insert <'ProductA', 4, 'Bellaire', 2> into PROJECT.

**Answer:**

**c.** Insert <'Production', 5, '987987989', '2007-10-01'> into DEPARTMENT.

**Answer:**

**d.** Insert <'677678989', NULL, '40.0'> into WORKS_ON.

**Answer:**

**e.** Insert <'453453453', 'John', 'M', '1990-12-12', 'Spouse'> into DEPENDENT.

**Answer:**

**f.** Delete the EMPLOYEE tuple with Ssn = '333445555'.

**Answer:**

**g.** Delete the WORKS_ON tuples with Essn = '333445555'.

**Answer:**

**h.** Modify the Super_ssn attribute of the EMPLOYEE tuple with Ssn = '999887777' to '987987988'.

**Answer:**

**i.** Delete the PROJECT tuple with Pname = 'ProductX'.

**Answer:**

**j.** Modify the Mgr_ssn and Mgr_start_date of the DEPARTMENT tuple with Dnumber = 5 to '123456789' and '2007-10-01', respectively.

**Answer:**