

HW3

Suppose that each of the following Update operations is applied directly to the database state shown in Figure 5.6. Discuss all integrity constraints violated by each operation, if any, and the different ways of enforcing these constraints.

Figure 5.6

One possible database state for the COMPANY relational database schema.

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

1. Insert <'Robert', 'F', 'Scott', '943775543', '1972-06-21', '2365 Newcastle Rd, Bellaire, TX', M, 58000, '888665555', 1> into EMPLOYEE.
 - a. Violations: NONE
 - i. 943775543 is not in EMPLOYEE, 888665555 is a valid supervisor, and Dno = 1 exists in DEPARTMENT.
2. Insert <'ProductA', 4, 'Bellaire', 2> into PROJECT.
 - a. Violations: Foreign key constraint violation
 - i. Dnum = 2 does not exist in DEPARTMENT.
3. Insert <'Production', 4, '943775543', '2007-10-01'> into DEPARTMENT.
 - a. Violations: Foreign key constraint violation
 - i. 943775543 does not exist in EMPLOYEE.
4. Insert <'677678989', NULL, '40.0'> into WORKS_ON.
 - a. Violations: Foreign key constraint violation & NULL value violation
 - i. Essn = 677678989 does not exist in EMPLOYEE.
 - ii. Pno cannot be NULL.
5. Insert <'453453453', 'John', 'M', '1990-12-12', 'spouse'> into DEPENDENT.
 - a. Violations: NONE
 - i. 453453453 exists in EMPLOYEE.
6. Delete the WORKS_ON tuples with Essn = '333445555'.
 - a. Violations: NONE
 - i. Deleting these tuples does not affect other tables.
7. Delete the EMPLOYEE tuple with Ssn = '987654321'.
 - a. Violations: Foreign key constraint violation
 - i. 987654321 is referenced as Super_ssn in EMPLOYEE.
 - ii. 987654321 is referenced as Mgr_ssn in DEPARTMENT.
8. Delete the PROJECT tuple with Pname = 'ProductX'.
 - a. Violations: Foreign key constraint violation
 - i. Pnumber = 1 is referenced in WORKS_ON.
9. Modify the Mgr_ssn and Mgr_start_date of the DEPARTMENT tuple with Dnumber = 5 to '123456789' and '2007-10-01', respectively.
 - a. Violations: NONE
 - i. 123456789 exists in EMPLOYEE.
10. Modify the Super_ssn attribute of the EMPLOYEE tuple with Ssn = '999887777' to '943775543'.
 - a. Violations: Foreign key constraint violation
 - i. 943775543 does not exist in EMPLOYEE.
11. k. Modify the Hours attribute of the WORKS_ON tuple with Essn = '999887777' and Pno = 10 to '5.0'.
 - a. Violations: NONE
 - i. Hours = 5.0 is a valid modification.