Basic SQL

Part 4

INSERT, DELETE, and UPDATE Statements in SQL

The INSERT Command

- In its simplest form, `INSERT` is used to add a single tuple to a relation.
- We must specify the relation name and a list of values for the tuple.
- The values should be listed *in the same order* in which the corresponding attributes were specified in the `CREATE TABLE` command.

- U1:
```
INSERT INTO EMPLOYEE
VALUES ('Richard', 'K', 'Marini',
        '653298653', '1962-12-30',
        '98 Oak Forest, Katy, TX', 'M',
        37000, '653298653', 4 );
```

- A second form of the `INSERT` statement allows the user to specify explicit attribute names that correspond to the values provided in the `INSERT` command.

- U1A:

```
INSERT INTO EMPLOYEE (Fname, Lname,
                      Dno, Ssn)
VALUES ('Richard', 'Marini', 4,
        '653298653');
```

- A DBMS that fully implements SQL should support and enforce all the integrity constraints that can be specified in the DDL.

- U2:
```
INSERT INTO EMPLOYEE (Fname, Lname, Ssn,
                      Dno)
VALUES                ('Robert', 'Hatcher',
                      '980760540', 2);
```
(U2 is rejected if referential integrity checking is provided by DBMS.)

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

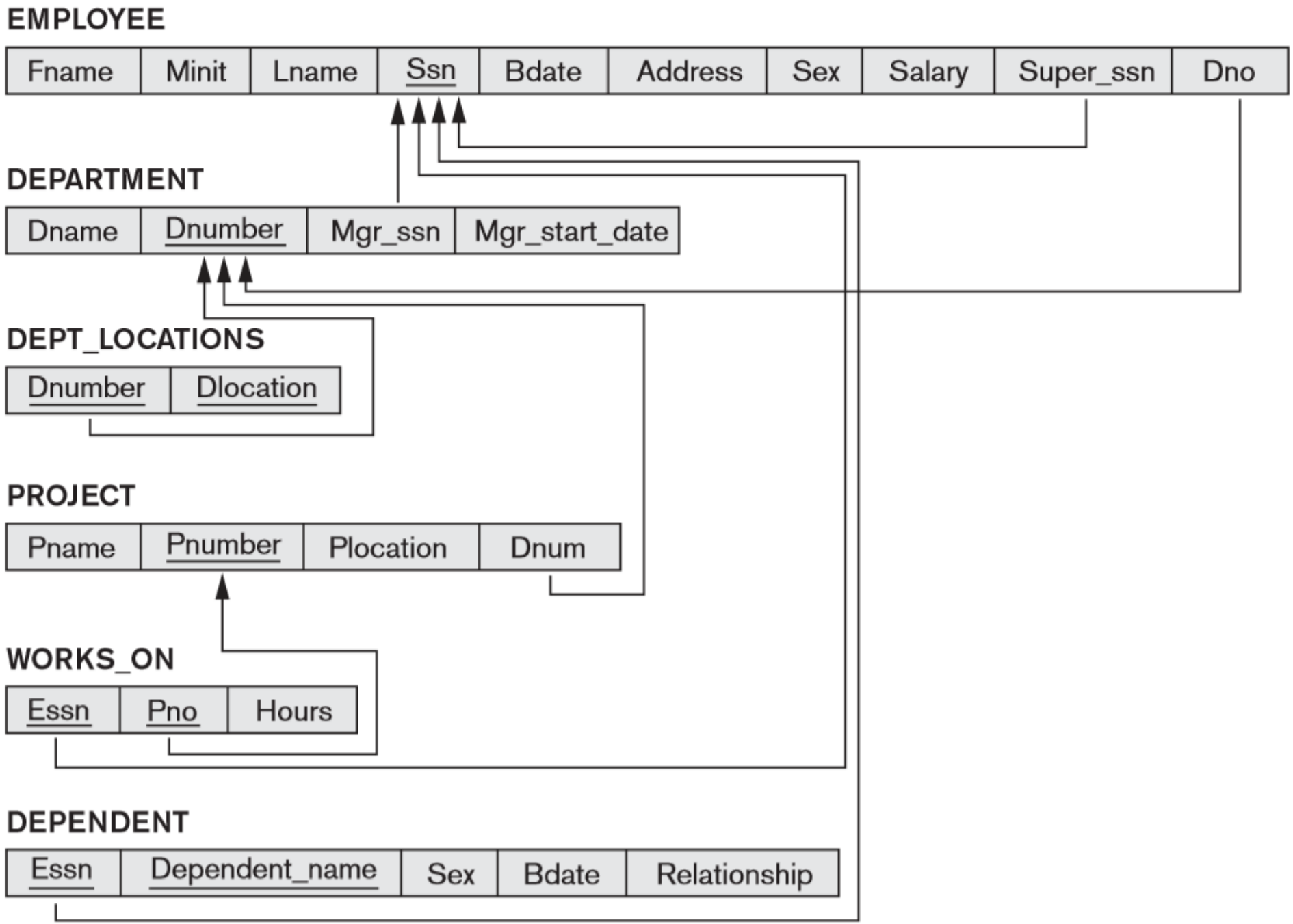
DEPENDENT

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

- U2A:

```
INSERT INTO EMPLOYEE (Fname, Lname,
                      Dno)
VALUES                ('Robert',
                      'Hatcher', 5);
```

(U2A is rejected if NOT NULL checking is provided by DBMS.)


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

- A variation of the `INSERT` command inserts multiple tuples into a relation in conjunction with creating the relation and loading it with the *result of a query*.

- U3A:

```
CREATE TABLE WORKS_ON_INFO (
  Emp_name VARCHAR(15),
  Proj_name VARCHAR(15),
  Hours_per_week DECIMAL(3,1));
```

- U3B:

```
INSERT INTO WORKS_ON_INFO (Emp_name,
  Proj_name, Hours_per_week )
SELECT E.Lname, P.Pname, W.Hours
FROM   PROJECT P, WORKS_ON W, EMPLOYEE E
WHERE  P.Pnumber=W.Pno AND W.Essn=E.Ssn;
```

- Notice that the WORKS_ON_INFO table may not be up-to-date; that is, if we update any of the PROJECT, WORKS_ON, or EMPLOYEE relations after issuing U3B,the information in WORKS_ON_INFO may become outdated.
- We have to create a view to keep such a table up-to-date.

The DELETE Command

- U4A:
```
DELETE FROM EMPLOYEE
WHERE  Lname='Brown';
```
- U4B:
```
DELETE FROM EMPLOYEE
WHERE  Ssn='123456789';
```
- U4C:
```
DELETE FROM EMPLOYEE
WHERE  Dno=5;
```
- U4D:
```
DELETE FROM EMPLOYEE;
```

The UPDATE Command

- U5:
```
UPDATE  PROJECT
SET     Plocation = 'Bellaire', Dnum = 5
WHERE   Pnumber=10;
```
- U6:
```
UPDATE  EMPLOYEE
SET     Salary = Salary * 1.1
WHERE   Dno = 5;
```