ENSF 608: SQL

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Fall 2021

Textbook: Fundamentals of Database Systems, 7th Ed., Elmasri & Navathe

INSERT, DELETE, and UPDATE Statements in SQL

- Three commands used to modify the database:
  - `INSERT`, `DELETE`, and `UPDATE`
- `INSERT` typically inserts a tuple (row) in a relation (table)
- `UPDATE` may update a number of tuples (rows) in a relation (table) that satisfy the condition
- `DELETE` may also update a number of tuples (rows) in a relation (table) that satisfy the condition

INSERT

- In its simplest form, it is used to add one or more tuples to a relation
- Attribute values should be listed in the same order as the attributes were specified in the **CREATE TABLE** command
- Constraints on data types are observed automatically
- Any integrity constraints as a part of the DDL specification are enforced

The INSERT Command

- Specify the relation name and a list of values for the tuple. All values including nulls are supplied.

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

- The variation below inserts multiple tuples where a new table is loaded values from the result of a query.

```
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;
```

Bulk Loading of Tables

- Another variation of **INSERT** is used for bulk-loading of several tuples into tables
- A new table TNEW can be created with the same attributes as T and using LIKE and DATA in the syntax, it can be loaded with entire data.
- EXAMPLE:

```
CREATE TABLE D5EMPS  LIKE  EMPLOYEE
                    (SELECT  E.*
                     FROM     EMPLOYEE AS E
                    WHERE    E.Dno=5)
WITH DATA;
```

DELETE

- Removes tuples from a relation
  - Includes a WHERE-clause to select the tuples to be deleted
  - Referential integrity should be enforced
  - Tuples are deleted from only **one table** at a time (unless CASCADE is specified on a referential integrity constraint)
  - A missing WHERE-clause specifies that **all tuples** in the relation are to be deleted; the table then becomes an empty table
  - The number of tuples deleted depends on the number of tuples in the relation that satisfy the WHERE-clause

The DELETE Command

- Removes tuples from a relation
  - Includes a `WHERE` clause to select the tuples to be deleted. The number of tuples deleted will vary.

```
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;
```

UPDATE (1 of 3)

- Used to modify attribute values of one or more selected tuples
- A WHERE-clause selects the tuples to be modified
- An additional SET-clause specifies the attributes to be modified and their new values
- Each command modifies tuples **in the same relation**
- Referential integrity specified as part of DDL specification is enforced

UPDATE (2 of 3)

- Example: Change the location and controlling department number of project number 10 to ‘Bellaire’ and 5, respectively

```
U5:     UPDATE    PROJECT
        SET       Plocation = 'Bellaire', Dnum = 5
        WHERE     Pnumber = 10;
```

UPDATE (3 of 3)

- Example: Give all employees in the ‘Research’ department a 10% raise in salary.

```
U6: UPDATE    EMPLOYEE
    SET       SALARY = SALARY *1.1
    WHERE     DNO  IN (SELECT    DNUMBER
                  FROM       DEPARTMENT
                  WHERE      DNAME='Research')
```

- In this request, the modified SALARY value depends on the original SALARY value in each tuple
  - The reference to the SALARY attribute on the right of = refers to the old SALARY value before modification
  - The reference to the SALARY attribute on the left of = refers to the new SALARY value after modification