

Action Statements

```
INSERT
DELETE
UPDATE
```

Insert

Individual Insert

```
INSERT INTO student
VALUES ( 'Patel', 'Deepa', 14662, null,
        'GRD', 'COMP-SCI', 'Evanston', 2003 );
```

Multiple Insert

```
INSERT INTO student
SELECT * FROM ...
```

```
INSERT INTO student
SELECT * FROM mschaefer.student;
```

Insert Partial Record

```
INSERT INTO student(LastName, FirstName, SID)
VALUES ( 'Patel', 'Deepa', 14662);
```

Effects:

- not null constraints
- default values

Insert Partial Full Record

Even if all values are present:

```
INSERT INTO student(LastName, FirstName,  
                    SID, SSN, Career, Program,  
                    City, Started)  
VALUES ( 'Patel', 'Deepa', 14662, null,  
        'GRD', 'COMP-SCI', 'Evanston', 2003 );
```

Why ?

Delete

Selective deletion

```
DELETE FROM table  
WHERE condition;
```

Delete all records in table

```
DELETE FROM table;
```

Update

```
UPDATE table  
SET attribute = value, attribute = value ...  
WHERE condition
```

Example:

```
UPDATE employee  
SET salary = salary * (1.05)  
WHERE type = 'manager'
```

Integrity Violations?

What if we insert a record with a duplicate p.k.?

What else can we do wrong with

INSERT, DELETE, UPDATE ?

Referential Triggered Action I

We can specify actions if referential integrity of a foreign key is violated

SET NULL
SET DEFAULT
CASCADE

Specified as

ON DELETE/UPDATE
SET NULL/CASCADE/DEFAULT

Warning: Oracle supports green options directly

Referential Triggered Action II

Example (CASCADE)

```
CREATE TABLE dependent (...  
FOREIGN KEY (essn)  
REFERENCES employee(ssn)  
ON DELETE CASCADE, ...)
```

Example (SET NULL)

```
CREATE TABLE studentgroup (...  
FOREIGN KEY (PresidentID)  
REFERENCES student(SID)  
ON DELETE SET NULL)
```

Example (SET DEFAULT)

```
CREATE TABLE employee (...  
dno INT NOT NULL DEFAULT 1, ...  
FOREIGN KEY (dno)  
REFERENCES department(dnumber)  
ON DELETE SET DEFAULT ...)
```

Referential Triggered Action III

Find further examples for

ON UPDATE CASCADE
ON DELETE CASCADE
ON DELETE SET NULL
ON DELETE SET DEFAULT

Foreign keys in student database ?
