We know:

- To describe the problem in terms of entities and relationships between them
- To convert this description into a set of empty tables
- To define referential integrity constraints between these tables
- To define value constraints on column values (called the domain of an attribute)

Next we want to

- Populate tables with data

Data Manipulation Language for changing DB content

DML

Database Modifications

- A modification command changes the database in some way.

- There are three kinds of modifications:
  1. *Insert* a tuple or tuples.
  2. *Delete* a tuple or tuples.
  3. *Update* the value(s) of an existing tuple or tuples.

Insertion

- To insert a single tuple:

```
INSERT INTO <relation>
VALUES ( <list of values> );
```

Example

- Consider **MovieExec** (name, address, cert#, netWorth)

```
INSERT INTO MovieExec
VALUES('Melanie Griffith', '34 Boston Blvd', 700, 300000);
```

Specifying Attributes in INSERT

- We may add to the relation name a list of attributes.

```
INSERT INTO MovieExec (name, address, cert, netWorth)
VALUES('Melanie Griffith', NULL, 700, 3000000);
```

- There are two reasons to do so:
  1. We forget the standard order of attributes for the relation.
  2. We don’t have values for all attributes.

Deletion

- To delete tuples satisfying a condition from some relation:

```
DELETE FROM <relation>
WHERE <condition>;
```

Example

- Delete from the **Movie** table the Disney's movies:

```
DELETE FROM Movie
WHERE studioName ='Disney';
```

Example: Delete all Tuples

- Make the relation Movie empty:

```
DELETE FROM Movie;
```

- No WHERE clause needed here.

Updates

- To change certain attributes in certain tuples of a relation:

```
UPDATE <relation>
SET <list of attribute assignments>
WHERE <condition on tuples>;
```

Example

- Change the length of 'Godzilla' to 200.

```
UPDATE Movie
SET length = 200
WHERE title = 'Godzilla';
```

Another example of update

- Suppose that MGM's movies have approximately 20 min of info before starting.
- So, let's take that 20 min off.

```
UPDATE Movie
SET length = length - 20
WHERE studio = 'MGM'
```