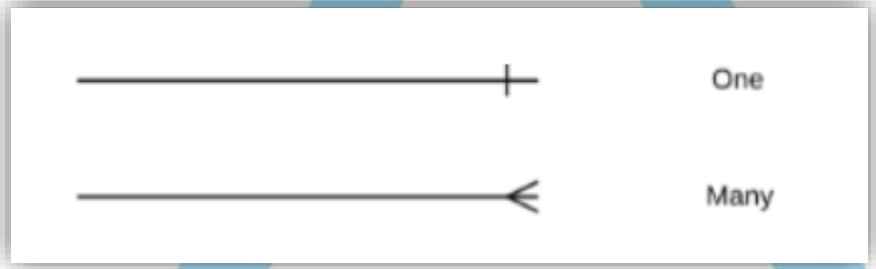
Module 2 Day 3

Table Relationships – Keys, Cardinality and Joins

Relationships and Cardinality

- A **Relationship** is an association between two tables using keys
- **Cardinality** is the number of occurrences in one entity which are associated to the number of occurrences in another.
  - 1:1
  - 1:many
  - many:many



- What are the relationship cardinalities in World?
- Entity Relationship Diagrams

Keys

- Used to create relationships between tables
- Made up of one or more columns
- **Primary Keys** uniquely identify each row within a table.
  - Cannot be duplicated within that table and cannot be null.
- **Foreign Keys** reference a primary key in the source table.
- A **composite key** is a key made up of multiple columns
- Natural or Surrogate
  - **Natural Keys** are formed from values in the real world (e.g. SSN, ISBN)
  - **Surrogate Keys** are artificially created by the application and identify a unique record.
- What keys do we see in the World database?

Many-to-many Relationships

- Cannot be modelled directly between the two tables
- Association table is used “between” the two primary tables
  - Association table holds foreign keys to each primary table
  - Often these are the only columns in the table

Joins

- Connect two tables together using keys
- Matches row by row, finding all the keys that match
- Produces a “super-row” containing all the columns from both tables

```
SELECT table1.cols, table2.cols, ...
FROM table1
JOIN table2 ON table1.fkcolumn = table2.pkcolumn
```

- You may need to use table name to identify the correct column
  - Here is where you can use a table ALIAS

Inner vs. Outer Joins

- INNER JOIN is default (when only JOIN is specified)
  - Only rows that match both tables
  - Display capital cities and the country of which it is the capital

```
SELECT c.name AS capital, ctry.name AS country
FROM country ctry JOIN city c ON ctry.capital = c.id
```

- LEFT OUTER JOIN / RIGHT OUTER JOIN
  - All rows from the Left (First) table, even if there is no match on the Right (Second) table
  - Display all cities and the country of which it is the capital, or NULL if it is not

```
SELECT c.name AS city, ctry.name  country
FROM city c LEFT OUTER JOIN country ctry ON c.id = ctry.capital
```

- CROSS JOIN (RARE)
  - Relates every row in one table to every row in the other table (Cartesian product)