What Are Relational Databases

- A relational database allows us to tie together (or relate) the tables within our database allowing us to create queries, reports and forms from multiple tables.
- Relational databases store data in a format that reduces redundancy.
- Access is an example of a relational database

Why reduce redundancy?

- We want to reduce redundancy because it affects the integrity of a database.
- EXAMPLE: If a person's address is stored in 3 or 4 tables and the person moves, there is an integrity problem if not all tables are updated.
  - In relational databases, the address is stored once and related to other tables, so changes need to be updated in only one place

Types of Relationships

- One-to-one
  - For one entity, there is only one possible piece of data for a given attribute
    - Person to first name
    - Book to title
  - Usually defined in one table
- One-to-many
  - For one entity, there are more than one possible pieces of data for a given attribute
    - Student to courses
    - Book title to copies in library
  - Usually define in separate tables

One-to-one

<table>
<thead>
<tr>
<th>Students Table Layout</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student ID</td>
</tr>
</tbody>
</table>

- For each student there is only one possible data for each of these fields
  - Student ID
  - First Name
  - Last Name
  - Home Phone
  - Birthdate
  - Street Address
  - City
  - State
  - Zip
  - Financial aid status

One-to-Many

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- For each student defined in the Student record there are any number of Courses Completed records and Student work records
- One student may have 0, 1, 2,... 100 or more courses
- One student may have any number of student work hours.
How Do Relationships Work?

- Use of key fields
  - Primary keys are defined within the primary table – uniquely identifying an entity
    - Student ID in the student table is the primary key
  - Secondary keys are within secondary tables
    - Student ID in the courses completed table is a secondary ID.

More on how relationships work

- All tables containing the key can be related
  - For one table the key is primary and a unique key is assigned to each record.
  - For other tables the key is secondary and is used as a link to the table where the key is primary.
  - Table with secondary keys may also have a primary key that uniquely identifies that table’s record.
  - Sometimes a table is created to establish links between two tables (linking table).

Reports & Forms

- Reports and forms can pull information from various tables that are related.
- Information looks like it is all one record even though it is stored in separate records.
- Information can be pulled from various tables to meet different applications or uses of the database.
- Queries can also have multiple tables and can assist with creation of reports and forms.

Relationships in Access

- Primary table must have primary key defined.
  - Define key by selecting field then click on the key icon.
- In the secondary table the related key field should be defined exactly the same as in the primary table except that it should not be designated as a primary key.
  - Don’t click on the key icon.
- Establish relationships from menu: Tools - Relationships. Add tables then drag key field from primary table to key in secondary table. Enforce referential integrity.

Library Book Example
In this video we will be using the myaddressbook.accdb database file created in the last lesson. Files for importing data:
- address.xlsx
- family.xlsx

Follow along with the video.
When you are finished, submit it in Laulima: Tasks, tests & surveys.

Additional Practice