


Microsoft Access Understanding Relationships

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What is a *Relational* Database?

- A relational database is a collection of tables from which data can be accessed in many different ways without having to reorganize the database tables.
 - That is, the tables can “talk” to each other. We can link (*relate*) our tables to find:
 - Which doctors are seeing a patient
 - Which students are in which class
 - Which item is selling the most on Friday’s

What is a *Relational* Database?

- A relational database allows data structures, storage and retrieval operations, and integrity constraints.
 - Integrity constraints provide a way of ensuring that changes made to the database by authorized users do not result in a loss of data consistency

Review of the Basic Design Rules

- **Organizing Data**
 - Data is split between tables to prevent data duplication and entry repetition
- **No Derived Fields**
 - Only the linking fields, the primary keys, should be in more than one table. If any other field can be found in another table, it should not be repeated.
- **Data is broken down into Smallest Logical Parts**
 - Smallest "Sortable" parts. Remember it's much easier to pull fields together than it is to pull a field apart.

Review of the Basic Design Rules

- **Descriptive Field Names**
 - Name your fields (columns) as clear as possible in each table. Be Clear, Be Concise and Be Consistent.
- **Unique Field Names**
 - Keep fields unique across tables, and keep them as clear as possible in each table.
- **Unique Records**
 - Each of your tables should have unique records. We ensure this by setting one field to be a **Primary Key**.

Table of Yards

1 2 3 4



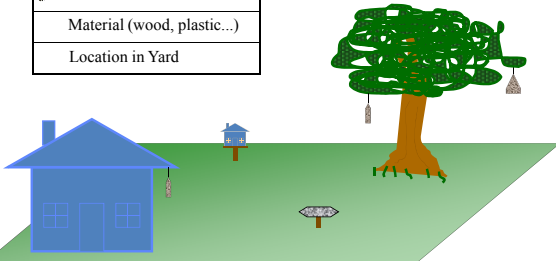


Yards	
	Yard Number
	Owner
	Address
	Phone Number

Table of Birdfeeders

Bird Feeders
 Bird Feeder Number
Material (wood, plastic...)
Location in Yard





Relating Yards and Birdfeeders

Bird Feeders	Yards
 Bird Feeder Number	 Yard Number
Material	Owner
Location in Yard	Address
	Phone Number

There must be one field in both tables that is the same, so that the database knows how the tables connect.
It's best to use the Primary key as the link.

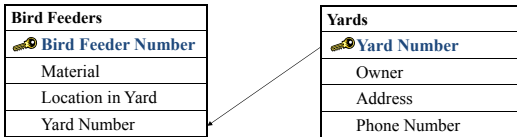
Relating Yards and Birdfeeders

Bird Feeders	Yards
 Bird Feeder Number	 Yard Number
Material	Owner
Location in Yard	Address
	Phone Number
	Bird Feeder 1
	Bird Feeder 2
	...

If we put the Birdfeeder in the Yard table, we will have to count each one. BF1, BF2...

Whenever you find yourself numbering the fields in this way, it's a sign you're on the wrong track

Relating Yards and Birdfeeders



But if we reverse the direction, the link (relationship) makes more sense.

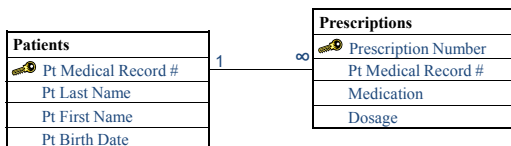
Each **Birdfeeder** can only be in one **Yard**, but each **Yard** can have many **Birdfeeders**. This is called a one to many (1 - ∞) Relationship.

One to Many Relationships

- One to Many relationships are the most common relationships.
 - One Birdfeeder *is visited by* Many Birds
 - One Yard *contains* Many Birdfeeders
 - One Patient *has* Many Prescriptions
 - One Insurance *has* Many Patients
 - One Student *attends* Many Classes
- One to Many includes **One to None**.
- A record *MUST* be in the **One** (primary) table in order to appear in the **Many** table.

One to Many Relationships

Primary Key linked to Non Primary Key

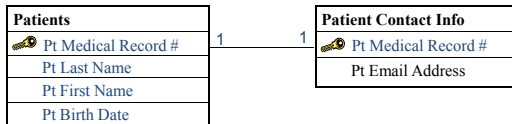


One to One Relationships

- One to One relationships can often combine the data into one table.
 - One Birdfeeder *is located in* One place in the Yard
 - One Yard *has* One Address
 - One Patient *has* One Home Phone Number
 - One Insurance *has* One Contact Person
 - One Student *has* One Gatorlink ID
- Access determines the “primary” table based on the direction you create your relationship.

One to One Relationships

Primary Key linked to Primary Key



One to One Relationships

Reasons you may use a One to One...

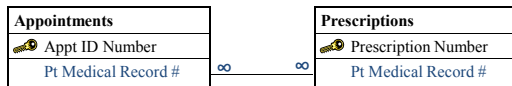
- You have more than 255 fields
 - the maximum number of columns (fields)
- You have a large set of related data that doesn't need to be accessed every time you look up that item
 - medical history, map of the location, transcript from previous school

Many to Many Relationships

- Many to Many relationships are very common.
 - Many Students *are taught by* Many Teachers
 - Many Patients *see* Many Doctors
 - Many Medications *are taken by* Many Patients
 - Many Customers *buy* Many Products
- You cannot create a “true” relationship between these tables because there can be no uniqueness in either side of the relationship.

Many to Many Relationships

Non Primary Key linked
to Non Primary Key

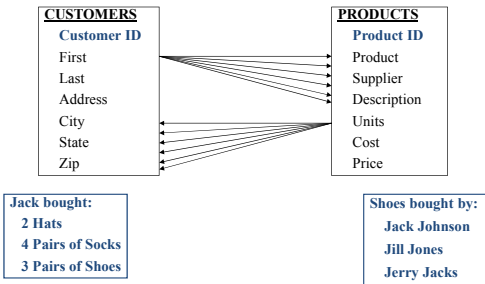


Access sees this as an Indeterminate relationship
You cannot Enforce Referential Integrity

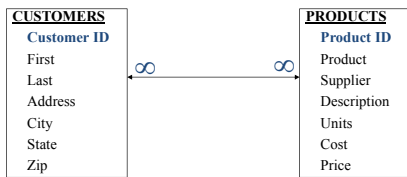
Many to Many Relationships (indeterminate)

- Indeterminate relationships are often found when we are linking tables, because Linked Tables cannot have a primary key.
- If you have imported or created a table, it's very rare to have a *need* for an indeterminate Relationship.
- These relationships show Access that the data saved in the field from the first table is the same kind of data saved in the second table, but there *can be no data integrity rules applied* on indeterminate relationships.

Many to Many Relationships Example

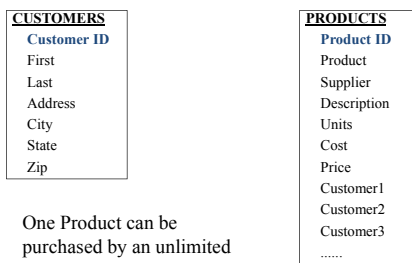


Many to Many Relationships Example



Many to Many Relationship

Many to Many Relationships Example



Many to Many Relationships Example

<u>CUSTOMERS</u>
Customer ID
First
Last
Address
City
State
Zip
Product1
Product2
Product3
.....

<u>PRODUCTS</u>
Product ID
Product
Supplier
Description
Units
Cost
Price

One Customer can purchase an unlimited number of Products.

Many to Many Relationships Example

Main Table

<u>CUSTOMERS</u>
Customer ID
First
Last
Address
City
State
Zip

Main Table

<u>PRODUCTS</u>
Product ID
Product
Supplier
Description
Units
Cost
Price

Junction Table

<u>SALES</u>
Sales ID
Customer ID
Product ID
Date
Quantity

Many to Many Relationships Example

<u>CUSTOMERS</u>
Customer ID
First
Last
Address
City
State
Zip

<u>PRODUCTS</u>
Product ID
Product
Supplier
Description
Units
Cost
Price

<u>SALES</u>
Sales ID
Customer ID
Product ID
Date
Quantity

One Customer can have many sales

One Product can be sold many times

Many to Many Relationships Example

Products by Customer

First _____ Last _____
Address _____
City _____ State ____ Zip Code _____

Product	Date	Qty
↓		

Many to Many Relationships Example

Customers by Products

Product _____
Supplier _____
Description _____
Units _____ Cost _____ Price _____

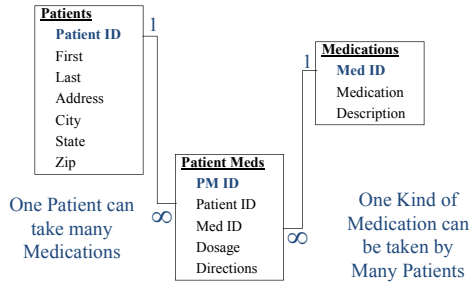
Customer	Date	Qty
↓		

Relationship?

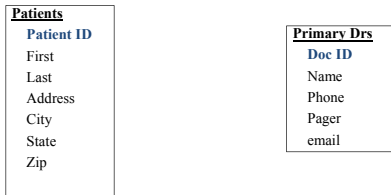
Patients
Patient ID
First
Last
Address
City
State
Zip

Medications
Med ID
Medication
Description

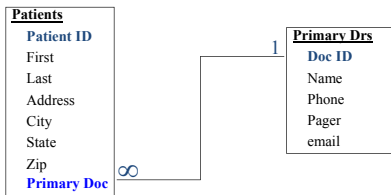
Relationships – Many to Many



Relationship?



Relationship – One to Many



One Patient will have only ONE primary Doctor.
One Primary Doctor can have MANY patients.

Relationship?

<u>Patients</u>
Patient ID
First
Last
Address
City
State
Zip

<u>Med History</u>
Patient ID
Health Q1
Health Q2
Health Q3
Health Q4

Relationship – One to One

<u>Patients</u>
Patient ID
First
Last
Address
City
State
Zip



<u>Med History</u>
Patient ID
Health Q1
Health Q2
Health Q3
Health Q4

One Patient will have only ONE Medical History.
Each Medical History will belong to only ONE patient.

Let's Practice...
