

COMP1111

Week 1

What is a Database?

- A **database** is an organized collection of data.
- It usually contains tables, queries, reports, views, and other objects.
- Databases allow their users to **enter**, **access**, and **analyze** their data quickly and easily.
- They're such a useful tool that you see them all the time.
 - Stores, Doctor's Office, Video Games, etc
- The easiest way to understand a database is to think of it as a **collection of lists**.

What is a Database

- For example, the database of patient information at a doctor's office could look like this:
- There would be a list of patients' names. Then there's a list of past appointments, a list with medical history for each patient, a list of contact information, and so on.
- These lists would in one way or another relate to each other.
 - This is called a relational database
- This is true for simple or complex databases

Reasons to use Access

- It is cost-effective
 - Access is a desktop database and its place in the hierarchy — layered between Excel and SQL Server — determines its price.
 - Access costs the same as any other desktop application.
 - It does not require specific hardware or special licensing.
 - Access *is* a desktop application. That means that everyone who works on a customized database application needs Access installed on their local system.
 - All those copies of Access can be expensive.
 - One alternative is to invest the time and money it takes to turn your database into a runtime application.

- It's Easy
 - It's safe to say that most Access databases have one user and they live out their lives on one system.
 - The user generally creates the database in his or her spare time.
 - The casual user with no professional database or development skills can get data into an Access database and then manipulate that data pretty easily.

- Prototyping can be done quickly
 - Access is a great way to show fast results.
 - You can collect a little data and in just a few hours and create a few forms and.
 - You don't have to use Access to build the production database, but you can ease client concerns by showing that you understand their needs.
 - Access lets you get results fast and often with little to no code.

- Access is Flexible

- Access is flexible, and that's one of its best attributes.
- Even if you can put a custom database together in a matter of weeks, needs are likely to change.
- Almost immediately, the user or client will think of something they want to add or change.
- If you designed the database well in the first place, Access will handle enhancements and changes without complaint.

- It Talks to Office

- Access is part of the Microsoft Office suite, so it plays well with the other applications.
- Users can quickly and easily export data from or import data into Excel or publish reports to Word.
- In addition, it shares a similar interface with other Office apps, which helps new users feel more at home and diminishes the learning curve.

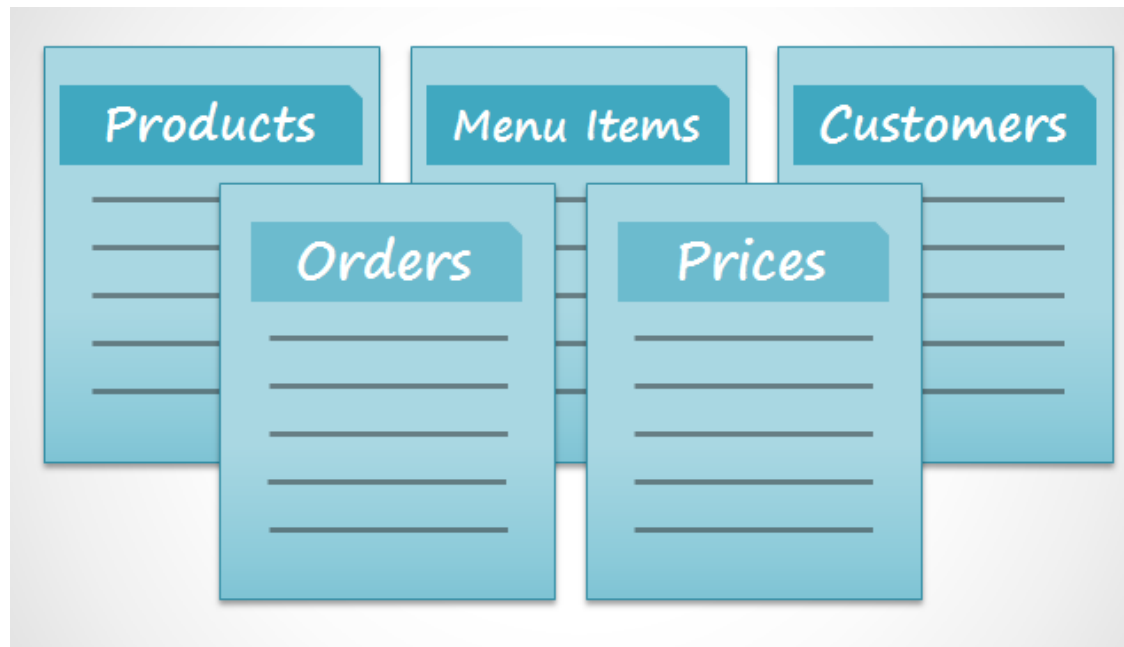
What is access

- Microsoft Access is a **database creation and management** program.
- Access is a relational database management system.
- A relational database is an electronic database comprising multiple files of related information.
- This information is usually stored in tables of rows (records) and columns (fields), and allowing a link to be established between separate files that have a matching field, such as a column of invoice numbers, so that the two files can be queried simultaneously by the user.

- For example, If you like to bake you might decide to keep a database containing the types of cookies you know how to make and the friends you give these cookies to. This is one of the simplest databases imaginable. It contains two lists (tables): a list of your friends, and a list of cookies.



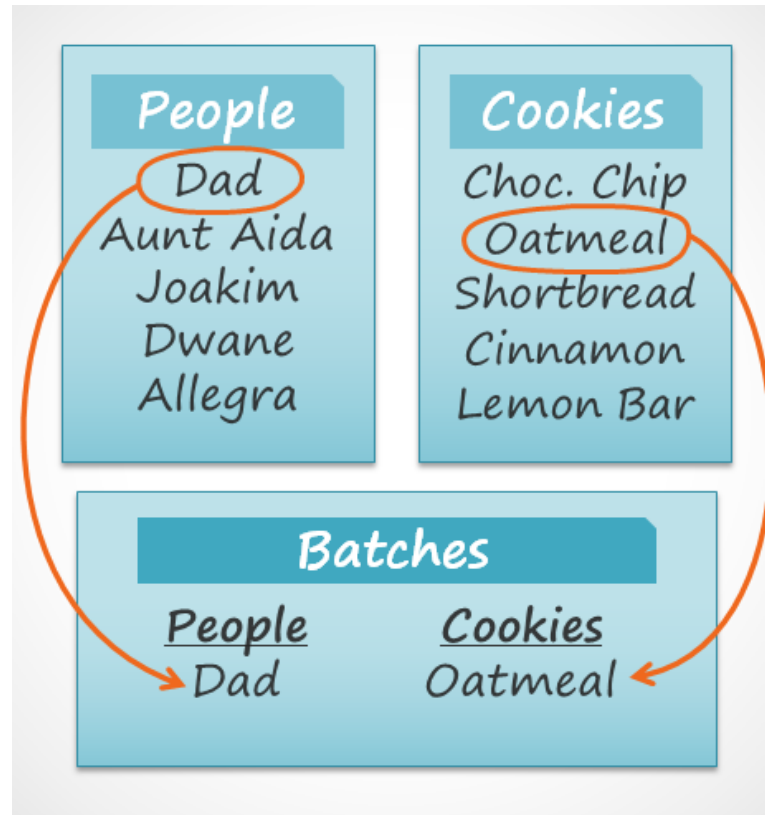
- However, if you were a professional baker, you would have many more lists to keep track of: a list of customers, a list of products sold, a list of prices, a list of orders, and so on. The more lists you add, the more **complex** the database will be.



- In the table below, the **People** list in the amateur baker's database has been expanded to include other relevant information on the baker's friends.

ID ▾	Name ▾	Cell Phone ▾	Birthday ▾	Nut Allergy?
1	Dad	555-0404	June 3	Yes
2	Aunt Aida	555-9890	July 8	No
3	Joakim	555-0462	September 19	No
4	Dwane	555-9975	January 5	No
5	Allegra	555-0099	January 14	Yes

- However, the thing that really sets databases apart from any other way of storing data is **connectivity**.
- We call a database like the ones you'll work with in Access a **relational database**.
- A relational database is able to understand how lists and the objects within them **relate** to one another.
- To explore this idea, let's go back to the simple database with two lists: names of your friends, and the types of cookies you know how to make.
- You decide to create a third list to keep track of the batches of cookies you make and who they're for. Because you're only making cookies you know the recipe for and you're only going to give them to your friends, this new list will get all of its information from the lists you made earlier.



- See how the third list uses words that appeared in the first two lists? A database is capable of understanding that the **Dad** and **Oatmeal** cookies in the **Batches** list are the same things as the **Dad** and **Oatmeal** cookies in the first two lists.
- This relationship seems obvious, and a person would understand it right away; however, an Excel workbook wouldn't.
- Simply put, relational databases can recognize what a human can: If the same words appear in multiple lists, they **refer** to the same thing.
- The fact that relational databases can handle information this way allows you to **enter**, **search for**, and **analyze** data in more than one table at a time. All of these things would be difficult to accomplish in Excel, but in Access even complicated tasks can be simplified and made fairly user friendly.

Tables

- In Access, all data is stored in **tables**, which puts tables at the heart of any database.
- You might already know that tables are organized into vertical **columns** and horizontal **rows**.

Customers						
	ID	First Name	Last Name	Street Address	City	State
+	1	Tracey	Beckham	7 East Walker Dr.	Raleigh	NC
+	2	Lucinda	George	789 Brewer St.	Cary	NC
+	3	Jerrold	Smith	211 St. George Ave.	Raleigh	NC
+	4	Brett	Newkirk	47 Hillsborough St.	Raleigh	NC
+	5	Chloe	Jones	23 Solo Ln.	Raleigh	NC
+	6	Quinton	Boyd	4 Cypress Cr.	Durham	NC
+	7	Alex	Hinton	1011 Hodge Ln.	Cary	NC
+	8	Nisha	Hall	123 Huntington St.	Raleigh	NC
+	9	Hillary	Clayton	2516 Newman	Raleigh	NC
+	10	Kiara	Williams	9014 Miller Ln.	Durham	NC
+	11	Katy	Jones	456 Denver Rd.	Cary	NC
+	12	Beatrix	Joslin	85 North West St.	Raleigh	NC
+	13	Mariah	Allen	12 Jupe	Raleigh	NC
+	14	Jennifer	Hill	2100 Field Ave.	Raleigh	NC
+	15	Jaleel	Smith	123 Hill Top Drive	Garner	NC

- In Access, rows and columns are referred to as **records** and **fields**.
- A **field** is more than just a column; it's a way of organizing information by the **type** of data it is.
- Every piece of information within a field is of the same **type**.
- For example, every entry in a field called **First Name** would be a name, and every entry in field called **Street Address** would be an address.
- Likewise, a **record** is more than just a row; it's a unit of information. Every cell in a given row is part of that row's record.

- Notice how each record spans several fields.
- Even though the information in each record is organized into fields, it belongs with the other information in that record.
- See the **number** at the left of each row? It's the **ID number** that identifies each record. The ID number for a record refers to every piece of information contained on that row.

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- Tables are good for storing **closely related information**. Let's say you own a bakery and have a database that includes a table with your customers' names and information, like their phone numbers, home addresses, and email addresses.
- Because these pieces of information are all details on your customers, you'd include them all in the same **table**. Each customer would be represented by a unique **record**, and each type of information about these customers would be stored in its own field.
- If you decided to add any more information—say, a customer's birthday—you would simply create a new field within the same table.

Forms, queries, and reports

- Although tables store all of your data, the other three objects—**forms**, **queries**, and **reports**—offer you ways to work with it. Each of these objects interacts with the **records** stored in your database's tables.

Forms

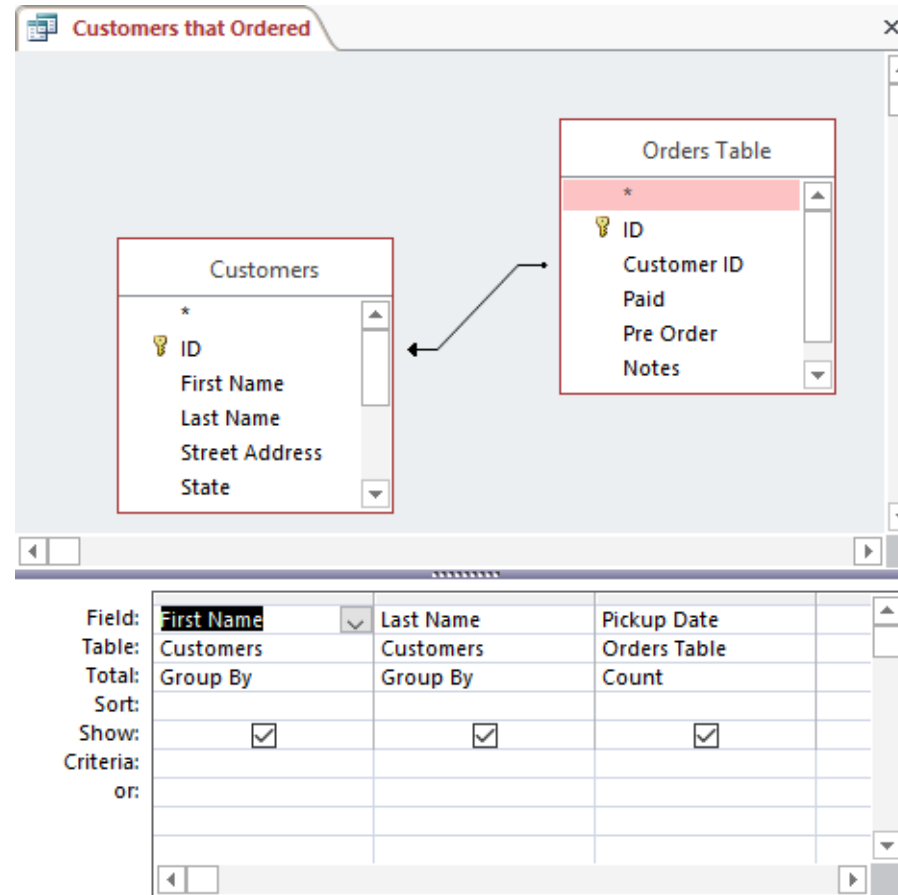
- **Forms** are used for **entering**, **modifying**, and **viewing** records. You likely have had to fill out forms on many occasions, like when visiting a doctor's office, applying for a job, or registering for school.
- The reason forms are used so often is that they're an easy way to guide people toward entering data correctly.
- When you enter information into a form in Access, the data goes exactly where the database designer wants it to go: in one or more related tables.

- Forms make entering data easier.
- Working with extensive tables can be confusing, and when you have connected tables you might need to work with more than one at a time to enter a set of data.
- However, with forms it's possible to enter data into multiple tables at once, all in one place. Database designers can even set restrictions on individual form components to ensure all of the needed data is entered in the correct format.
- All in all, forms help keep data consistent and organized, which is essential for an accurate and powerful database.

Queries

- Queries are a way of **searching** for and **compiling** data from one or more tables.
- Running a query is like asking a detailed **question** of your database. When you build a query in Access, you are **defining specific search conditions** to find exactly the data you want.
- Queries are far more powerful than the simple searches you might carry out within a table.
- While a **search** would be able to help you find the name of one customer at your business, you could run a **query** to find the name and phone number of every customer who's made a purchase within the past week.
- A well-designed query can give information you might not be able to find just by looking through the data in your tables.



Query Example



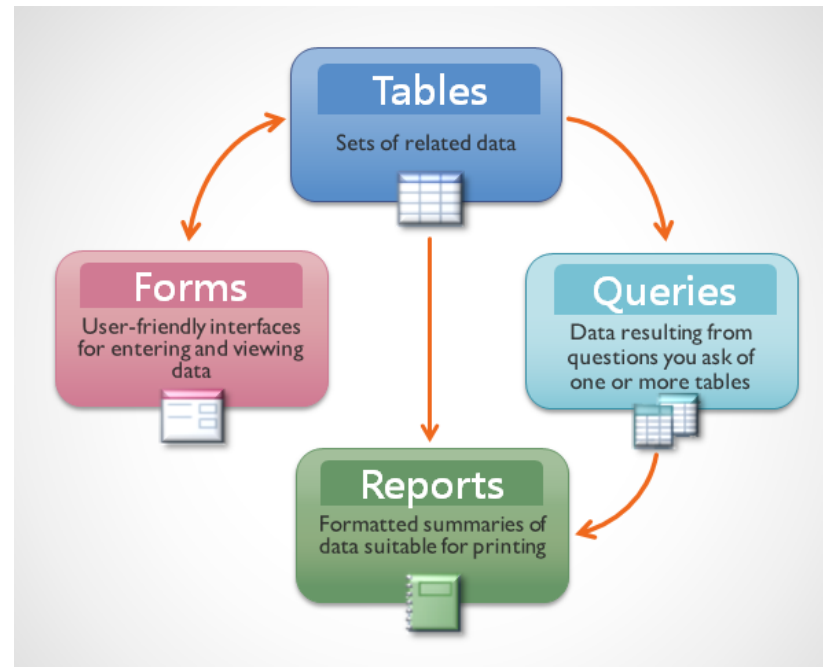
Reports

- **Reports** offer you the ability to **present** your data **in print**.
- If you've ever received a computer printout of a class schedule or a printed invoice of a purchase, you've seen a database report.
- Reports are useful because they allow you to present components of your database in an easy-to-read format.
- You can even customize a report's appearance to make it visually appealing. Access offers you the ability to create a report from any **table** or **query**.

Report Example

 December Orders			
 Orders Query			
First Name	Last Name	Phone Number	Pickup Date
Nathan	Albee	919-555-7010	1/4/13
Esther	Yaron	919-555-3000	1/18/13
Brigit	Sigrudsdatter	919-555-0089	3/2/13
Derek	MacDonald	919-555-7025	3/2/13
Alex	Yuen	919-555-8080	3/3/13
Jacek	Slobodowski	919-555-3021	3/4/13
Katharine	Kellerman	919-555-4526	3/10/13
Regina	Olivera	919-555-7070	3/11/13

- Even if you have a good idea of how each object can be used, it can initially be difficult to understand how they all work together. It helps to remember that they all work with the same data. Every piece of data a **query**, **form**, or **report** uses is stored in one of your database **tables**.



- Forms allow you to both **add** data to tables and **view** data that already exists.
- Reports **present** data from tables and also from queries, which then **search for** and **analyze** data within these same tables.

Database Terminology

- Database
 - A file that consists of one or more tables and the supporting objects used to get data into and out of the fields
- Table
 - A collection of records
- Record
 - A complete set of all of the data about one person, place, event, or idea
- Field
 - A basic entity, data element, or category, such as a book title or telephone number

Database Terminology

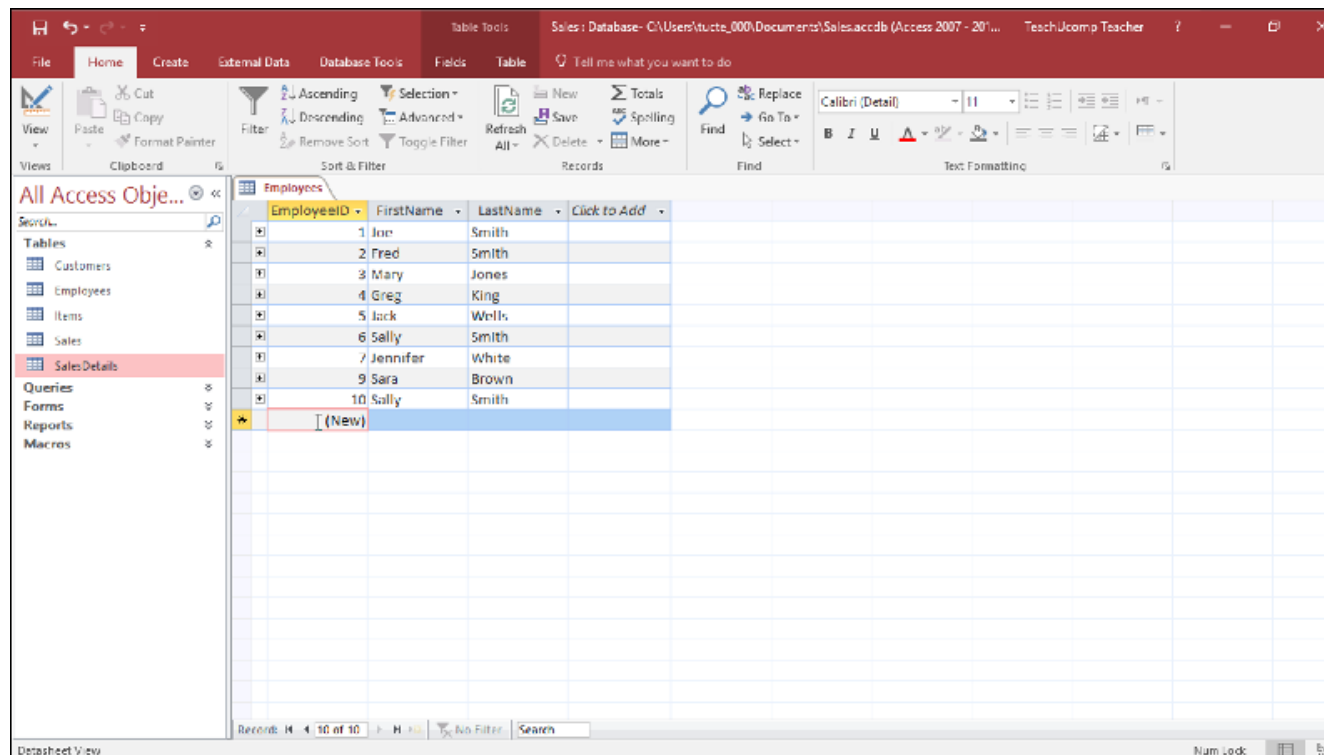
- Column
 - The data field that you assign to group data vertically into columns
- Row
 - The source field that you assign to group data horizontally
- Primary Key
 - The field that makes each record in a table unique
- Foreign Key
 - A field in one table that also is stored in a different table as a primary key
- Cascades
 - Permit data changes to travel from one table to another

Database Terminology

- Cascade Delete
 - Searches the database and deletes all of the related records
- Cascade Update
 - Connects a primary key change to the tables in which it is a foreign key
- Query
 - A database object that enables you to ask questions about the data stored in a database and returns the answers in the order from the records that match your instructions
- Form
 - An interface that enables you to enter or modify record data
- Report
 - A printed document that displays information professionally from a database

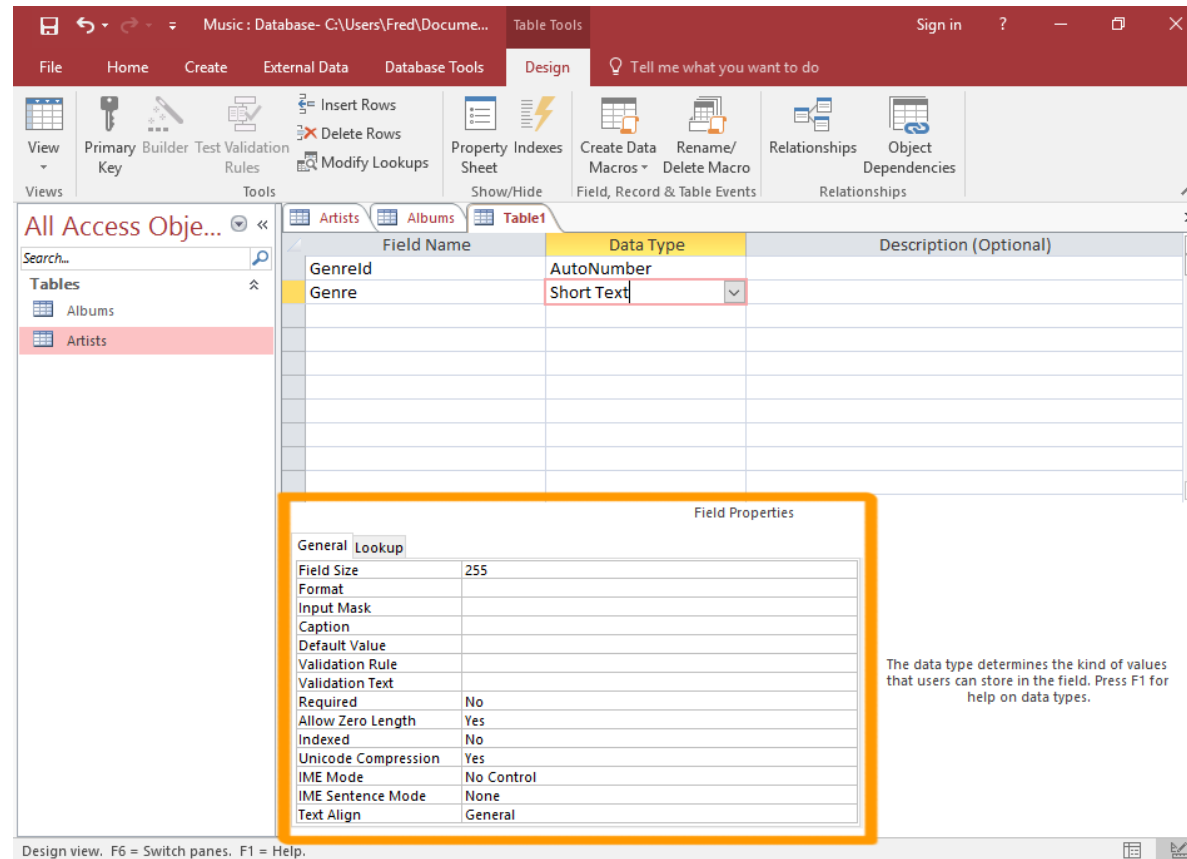
Database Terminology

- Datasheet View
 - A grid containing columns and rows where you add, edit, and delete records in a database table



Database Terminology

- Design View
 - Displays the infrastructure of a table, form, or report without displaying the data



Database Terminology

- Query Design View

