Step by Step guide to building a database, assignment details are at the end.

Access is different from other Microsoft Office tools, if you open a Word document, you see the document. If you open an Access Database, you see the objects that can go in a database, the tables, forms, queries, and reports. You select which object you want to deal with, and often you have two different views... the normal view or the design view.

The following is sort of a step by step guide to building a database. Tables are below. Forms are on page 9. Relationships are on page 13. Queries are on page 16. Modifying queries are on page 18. Forms are on page 19.

We'll start with a Blank desktop database. Note: your screens may differ.



Unlike other Office products, you have to Save As FIRST. Browse to where you wish to save your file, then give it a meaningful name.



Blank desktop database

Should I create an Access app or an Access desktop database?

×



,OneDrive\sp2020\bcis1305\



Tables

The tendency of Access is to try and set things up for you, but databases need you to actually do a lot of the heavy lifting on occasion, as the default settings may not always work for different types of databases. The perfect example is simply starting a new table.

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While fine for other applications, the new table adds an ID field which we do not want, and we really should be in Design view, not the normal Datasheet view. Click the arrow below the View icon, and select Design View

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Databases want you to Save objects when the structures like objects are changed... Name the table: Address

Note, later when actually adding items to this table we will not need to save as we go, Databases *expect* you to add items. You only Save when changing an object's structure.

Here is the Design view.

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Design view. F6 = Switch panes. F1	= Hel	р.							Num Lock	

Notice that the default setting for the first field is to make it the primary key field, and to make the name of the field ID, and that the field is expecting the data type AutoNumber.

While fine for other applications, this is not what I want now.

Right click the key icon, and select Delete Rows

Gifts							
2	Field Na	ame	Data Type				
🕅 ID			AutoNumber				
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If challenged, tell Access you really want to delete.

Now we'll build this the way we want.

We are not looking at the table, but rather the Data Dictionary, were we describe what is going into the table. So all that we are doing now will modify the FIRST column of the table. Recall, in the final table columns are fields, and when we add records, those become the row. This will make more sense soon.

Select below the Field name in first row... for Field Name type FirstName, then press tab. For data type, select Short text.

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Now, **right click** in the box to the left of FirstName, and make this field the key field, the Primary key.

	Gifts
\angle	Field Na
	FirstName
1	Primary <u>K</u> ey

Recall, the primary key is the unique identifier. When I grew up, my Father's name was Robert Claude Collins. My Name was Robert Craig Collins. He went by Robert, I went by Craig, but on all paperwork forms I was Robert C Collins, and so was my father. We had the same address, the same phone number. So, how did the Government keep us separate? Our Social Security numbers were different and unique.

I do not want to assign ID numbers to my friends for this silly example, so I decided to make the first name the primary key, the key field.

There is a downside to choosing the first name as the primary key, and that is each person I add will have to have a different first name... so if I had two friends named John, I might have to adjust the other John when entering his name, maybe to Johnny.

Now it is time to add the other fields I want to capture in my address book, LastName, Address, City, State, Zip, and Phone.

Select the box under Field Name on second row, and type LastName, press tab and select Short Text. Our field name is pretty descriptive, so press tab twice to get to the third Field we need.

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Type in Address, and tab. You might be tempted to change this from Short Text to Number, but you don't do math on an address, leave it at Short Text. Follow the steps above to add City as Short Text. Next line will be State, and Short Text.

But now we will drop to the bottom of the page to start adding some validation.

We want to prevent bad information from getting into a database. You can create Rules to prevent you adding a negative number to a price for example, or use an input mask to allow only 10 numbers to be put in a phone number. But we'll start simply, we will limit the field size to 2. I'll be some of you might spell Connecticut or Massachusetts differently each time you tried... so we will try to avoid this issue by using only a 2 letter abbreviation.

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	Input Mask							
	Caption						_	
	Default Value							
	Validation Rule						The maximum number of chara	cters you can
	Validation Text	Ne					can set is 255. Press F1 for held	on field size.
	Allow Zero Length	Vec						
	Indexed	No					-	
	Unicode Compression	Yes					-	
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	IME Sentence Mode	None						
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Design view. F6 = Switch panes. F1 = He	lp.						Num Lock	

Change field size from 255 to 2.

Now we'll try in an input mask. Back to the top of the page, click the box under State, and add Zip. Again, you might be tempted to make this a number, but again, you don't do math on a zip code. Make it Short Text.

Now, find the row below that says Input Mask, and click it. You should see [...] appear. The ellipsis means a dialog box will open to help us finish. Click the [...]

General Lookup			
Field Size	255		
Format			
Input Mask			
Caption			
Default Value			
Validation Rule			

We are about to change the structure, so Yes, Save now.

Select Zip Code, and then click Next.

Input Mask Wizard							
Which input mask matches how yo	Which input mask matches how you want data to look?						
To see how a selected mask works	s, use the Try It box.						
To change the Input Mask list, did	k the Edit List button.						
Input Mask:	Data Look:						
Phone Number	(206) 555-1212	~					
Social Security Number	831-86-7180						
Zip Code	98052-6399						
Extension	63215						
Password	******						
Long Time	1:12:00 PM	× .					
Try It:							
Edit List Cancel	<back next=""> Finish</back>						

You'll see the following:

Input Mask Wizard							
Do you want to change	the input mask?						
Input Mask Name:	Zip Code						
Input Mask:	00000-9999						
What placeholder chara	acter do you want the field to display?						
Placeholders are replac	ed as you enter data into the field.						
Placeholder character:							
Try It:							
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A 0 is required, 9 means it is optional. You probably know your 5 digit zip code, but maybe not the last 4, so this means you won't have to add the last 4. Click Next. I like the symbols, so I will select the top option:

Input Mask Wizard
How do you want to store the data?
O With the symbols in the mask, like this:
26431-6851
\bigcirc Without the symbols in the mask, like this:
744423152
Cancel < <u>B</u> ack <u>N</u> ext > <u>F</u> inish

Click Next, then click Finish.

Input Mask Wizard	That's all the information the wizard needs to create your input mask.
\bigwedge	
Canc	el < Back Mext > Einish

It adds some garbage, 00000\-9999;0;_ but we know what the Wizard just added for us, even if we don't quite understand how it is represented.

Back to the top of the page, and below Zip add Phone as Short Text.

Repeat the input process shown before, but select Phone Number instead of Zip Code. I like that the area code is optional.

Input Mask Wizard		
Do you want to chang	ge the input mask?	
Input Mask Name:	Phone Number	
Input Mask:	!(999) 000-0000	
What placeholder cha Placeholders are repla Placeholder character	racter do you want the field to display? aced as you enter data into the field. :	
Try It:		
Ca	ancel < Back Next > Einish	N

With the symbols is my choice.

Input Mask Wizard
How do you want to store the data?
With the symbols in the mask, like this:
(814) 287-2621
Without the symbols in the mask, like this:
0373242304
Cancel < <u>B</u> ack <u>N</u> ext > <u>F</u> inish

Next and Save.

Now, close the Address Table, by clicking the [x] on the Address row, to the right. Save the changes.

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			Field Properties	
	General Lookup			1
	Field Size	255		
	Format	11 (0007) 20001 0000-0		
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	Default Value			
	Validation Rule			
	Validation Text			A pattern for all data to be entered in this field
	Required	No		
	Allow Zero Length	Yes		
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	Text Align	General		
Design view. F6 = Switch panes. F1 = H	lelp.			Num Lock 🛅 🕍

Now you can repeat this whole process to make a new table, called Gifts.

Click the Create tab, and select Table Design.

Now add your fields. They will be FirstName field, set as Key field, Short Text for data type. Then add

Gift, Adjective, Room, Cost, and Store fields (Cost is currency, not short text for data type; the others will be Short Text)

All Access Obie		I∎	Gifts	
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seurch		8	FirstName	Short Text
lables	^		gift	Short Text
Address			adj	Short Text
Gifts			room	Short Text
			cost	Currency
			Store	Short Text

Close the Table.

Forms

Database administrators are paid a lot of money to design a database, thinking about a choices and how they relate to each other. Companies hire entry level people to add the records... and companies do not trust entry level people to mess with the table.

Just as you go to Amazon and fill out a form for them to capture you name, address, etc., you use a form in a database to add the row, or records, to the Table.

The form is another way to maintain data integrity, to keep garbage out, as you can't change the table structure from a form, just add to the table.

We'll create an input form with the Form Wizard called Address-form. And then we'll create an input form with the Form Wizard called Gifts-form.

Later, we'll add about 5 friends to the Address table, using the form, and then add one gift per addressee that you added in the Gifts table.

Note: You must use the EXACT same First Names in the Gifts table that you used in Address. We'll vary the cost range from below \$10 to above \$10, to way above \$10.

Start by going to the Create tab, and select Form Wizard

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Gifts										

You will need to select the Address table to begin with, by selecting the [V] arrow on the selector below Tables/Queries.



Then click the [>>] button to load all the fields in the Address table into the form,

Form Wizard	
	Which fields do you want on your form? You can choose from more than one table or query.
Tables/Queries	
Table: Address	~
<u>A</u> vailable Fields:	Selected Fields:
	 FirstName LastName Address City State Zip Phone
Ca	ancel < <u>Back N</u> ext > Einish

then select Next. For this first database, we will accept the option presented, Columnar,

Form Wizard What layout would you like for your form?	 ● <u>C</u>olumnar ○ <u>I</u>abular ○ <u>D</u>atasheet ○ <u>J</u>ustified
Cancel	< <u>B</u> ack <u>N</u> ext > <u>F</u> inish

then Next,

Form Wizard	
	What title do you want for your form? Address-form That's all the information the wizard needs to create your
	In the solution of the wight here is to clearly your form. Do you want to open the form or modify the form's design?
[Cancel < Back Mext > Finish

and change the name to Address-form, and Finish.

This will open the form, to let you add records indirectly to the table.

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Gifts	►		
Forms 🌣	FirstName	Ç	
	LastName		
	Address		
	City		
	State		
	Zip		
	Phone		
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Form View		Num Lock 📼	8 2

Type a name into FirstName, then press Tab.

Add a last name to LastName, then press tab.

Add a street address to Address, then press tab.

Add a City name to City, then press tab.

Now, try to spell Texas in the State field. It won't let you go beyond 2 characters. This is validation in action. Change State to TX and press tab.

Try typing abc in the Zip field. It won't let you type letters, it is expecting numbers. You can type 5 or 9 numbers... not less, not more. Again validation.

Type in a phone number for Phone.

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Gifts	1			
Forms Address-form	FirstName	Fred		
	LastName	Flintstone		
	Address	2600 S 1st		
	City	Bedrock		
	State	TX		
	Zip	76502-		
	Phone	(555) 555-1212		
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Form View		Normer	Jum Lock 📃	e M

If you were finished, you could close the form, but we need to add more records, 3 for now at least, if not more.

To add a new record, you can press Tab from the last field on the form

or

you can press the > on the bottom line, to the right of "1 of 1," to go to the next record,

	Record:	<	•	►I ►
Form View				

or

you can press the |> on the bottom line to the right of 1 of 1 to go to the end which would create a new record, or

you can press the >* on the bottom line to the right of 1 of 1 to create a new record.

To verify the table was updated, close the form and then double click the Address table.

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G	ifts		÷	*													(
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Close the table.

Repeat the steps to populate the Gifts table, by creating a Gifts-form, as above. You MUST use exactly the same name for FirstName for each record that you used earlier.

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Make sure you add enough records... but for every person in Address, they also need to be in Gifts, for this simple exercise.

Relationship

A relationship joins different tables together, to let you view information in more than one table at the same time. Since FirstName is in both tables, we have a common field that we can use.

Select Database Tools, then Relationships



Select Address from the tables tab, and chooser Add;

⊟					Relat	ionship Tools	yourname-lab9 : Database- C	:\Users\	collinsc058
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then select Gifts from the tables tab, and choose Add. Close the Show Table dialog box.

Address Gifts	
FirstName S FirstName	
LastName gift	
Address adj	
City room	
State cost	
Zip 😴 Store	

This is the fun part. Click on one of the FirstName fields and drag it on top of the other FirstName field.

You'll see the following, we'll accept this limited relationship for this simple model... meaning for each person in the Address table, there is the same person in the Gifts table... a one-to-one relationship.

Edit Relationships			? 🔀
Table/Query: Gifts	Related Table/Query: Address	\sim	Create
FirstName 🗸	FirstName	^	Join Type
Cascade Update	i al Integrity Related Fields Related Records		Create New
Relationship Type:	One-To-One		

Click create. A line joins the two fields. Try to drag one box around... they stay related. Close the Relationship window, and Save the changes.

There are three types of table relationships in Access.

A one-to-many relationship

Let's use an order tracking database that includes a Customers table and an Orders table as an example. A customer can place any number of orders. It follows that for any customer represented in the Customers table, there might be many orders represented in the Orders table. The relationship between the Customers table and the Orders table is a one-to-many relationship.

To represent a one-to-many relationship in your database design, take the primary key on the "one" side of the relationship and add it as an additional field or fields to the table on the "many" side of the relationship. In this case, for example, you add a new field — the ID field from the Customers table — to the Orders table and name it Customer ID. Access can then use the Customer ID number in the Orders table to locate the correct customer for each order.

A many-to-many relationship

Now let's look at the relationship between a Products table and an Orders table. A single order can include more than one product. On the other hand, a single product can appear on many orders. Therefore, for each record in the Orders table, there can be many records in the Products table. In addition, for each record in the Products table, there can be many records in the Orders table. This relationship is called a many-to-many relationship. Note that to detect existing many-to-many relationships between your tables, it is important that you consider both sides of the relationship.

To represent a many-to-many relationship, you must create a third table, often called a junction table, that breaks down the many-to-many relationship into two one-to-many relationships. You insert the primary key from each of the two tables into the third table. As a result, the third table records each occurrence, or instance, of the relationship. For example, the Orders table and the Products table have a many-to-many relationship that is defined by creating two oneto-many relationships to the Order Details table. One order can have many products, and each product can appear on many orders.

A one-to-one relationship

In a one-to-one relationship, each record in the first table can have only one matching record in the second table, and each record in the second table can have only one matching record in the first table. This relationship is not common because, most often, the information related in this way is stored in the same table. You might use a one-to-one relationship to divide a table with many fields, to isolate part of a table for security reasons, or to store information that applies only to a subset of the main table. When you do identify such a relationship, both tables must share a common field.

From https://support.office.com/en-us/article/guide-to-table-relationships-30446197-4fbe-457b-b992-2f6fb812b58f

Queries

A query is a way to ask the database a question, based on <, >, =, and a few more options to discuss later. Rather like a conditional format in Excel.

Our first query will be to see everything in both tables at once, so we will only use = to begin with.

We'll need to bring each field in to the query, but since FirstName is in both tables, we'll only select it once.

Start on the Create tab, and choose Query Wizard



We'll investigate other types of queries later, but we'll start with a Simple Query



Select the Table: Address, and bring over all the fields with >>

Simple Query Wizard		Simple Query Wizard	
	Which fields do you want in your query? You can choose from more than one table or query.	Which fields do you want in your query? You can choose from more than one table	or query.
Tables/Queries		Tables/Queries	
Table: Address	~	Table: Address	
<u>Available Fields:</u>	Selected Fields:	Available Fields: Selected Fields:	
FirstWame LastName Address City State Zip Phone	>>> <<	FirstName LastName Address City State Zip Phone	
	Cancel < Back: Next > Einish	Cancel < Back Next >	<u>F</u> inish

Now we need to get all but FirstName from the Table: Gifts, just select the first field below FirstName, and click > until all the fields but FirstName are moved over...

Simple Query Wizard	
	Which fields do you want in your query? You can choose from more than one table or query.
Tables/Queries	
Table: Gifts	~
<u>Available Fields:</u>	Selected Fields:
FirstName	> FirstName ^ gift adj ^ room cost
C	ancel < Back Next > Finish

Click Next. We want the details...

Simple Query Wizard	
1 aa 2 aa 3 cc 1 bb 2 dd 3 dd 	Would you like a detail or summary query?
[Cancel < Back Next > Finish

click Next.

Change the name to Join Query, and let it open the query... click Finish



You should see the query open, and all the items you have added should be there.

Modify a query

Now let's make a new query, based on the join query, that will only show us gifts more that \$10, that is criteria for the cost field will be >10

Make sure you are on the home tab, not Create. Change to Design view.

Note: you could also close the query, and double click the query in the Objects tab.



Locate the gifts field, and in the Criteria row, type >10.

Field:	FirstName	gift	
Table:	Address	Gifts	
Sort:			
Show:			\sim
Criteria:		>"10"	
or:			-

Then click the big ! Run button. You will only see the items that are >10.

To save this new query select File>Save As Name this query Nice Gifts query. but click on Save Object As

	yourname-lab9 : Database- C:	\Users\collinsc058\OneDrive\sp2020\bcis1305\yourname-lab9.accdb (Access 2007 - 2016 file format) - Access	? – 🗆 X
(\leftarrow)			Craig Collins
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		Save 'Join Query' to:	
		As	
		Query	
		OK Cancel	

Close all the Access windows, but leave Access running.

Reports

Access has very weak reporting tools; many people actually by other products, such as Crystal Reports to build better reports, but we need to complete the input-process-output cycle.

Recall input is done with a form Process is done with a query Output is done with a report.

Of course, we are going to the Create tab, and use the Report Wizard

File	Home Creat	e Exter	nal Data Data	abase Tools	♀ Tell me	what you want to	do			
Application Parts *	Table Table Design	SharePoint Lists *	Query Query Wizard Design	Form Form Desig	n Blank In Form	Rorm Wizard Navigation ▼ More Forms ▼	Report Report Design	Blank Report	Report Wizard	Macro & Module
All Acc Search Tables Addre Gifts Queries Nice O Forms Addre	ss ss ss ss ss ss ss ss ss ss ss ss ss	× *	Queries		Forms			Kepor	Report Wizard Show the Report 1 helps you to creat customized report	Wizard which e simple, is,

Make sure the selection is set to Query: Join Query. Select all the fields with >> We will not do any grouping or sorting, and well lay it out in the default Tabular. Name the report Join Report, and Finish. Not a great form, but enough for this database.

A bit more detail, and a preview of additional Database topics covered in other classes

Logical operators < + > like, such as the criteria for Cost >10 will show only records that are greater than \$10 Cost<20 will show only records that are less than \$20

Criteria for State ="TX" will show only records where the State is TX State="N*" will show only records where the State name begins with N, such as NM

A parameter query might be for State the criteria is done by typing

[Which State are you looking for?]

in the State field criteria box...

and you would be prompted to provide a State name when you run the query

A Calculated Field is a field that can be added to a query to compute data in other fields.

- Step 1 Place your insertion point in the first open column,
- Step 2 right click, and choose Zoom.

• Step 3 Type in what you want to call this new field, followed by a colon (;), and then the math to be performed Item 4: If using a field for one of the values, place that field name in brackets, spelled exactly as the field name Example: to take the value in that record for Cost, and adding 1 to it would be NewFieldName:[Cost]+1

Image: Source in the second	-		<u>^</u>				
newfieldname:[Cost]+1 OK Cancel Eont Field: Cost Gifts Gifts Sort: Sifts Show: Image: Sort: Sort: Image: Sort: Show: Image: Sort: Sort: Image: Sort: Sort: Image: Sort: Sort: Image: Sort: Sort: Image: Sort:	EB Zoo	om				X	
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Assignment

Option 1 Thoroughly describe setting up the above database, include creating tables, using the data dictionary, setting the primary key, adding records with a form, creating the relationship, creating the first query, and modifying the query.

Option 2 Create & submit an Address Book/Gift register, call it yourname-lab9.accdb, and save it in a folder called lab 9

Be sure to include the following:

A table called Address created in Design mode (5%)
First_Name field, set as Key field (5%) Short Text for data type
Last_Name (5%) Short Text for data type

Address (5%) Short Text for data type

City (5%) Short Text for data type

State, two character max (5%) Short Text for data type

☑ Zip, text field with mask (5%) Short Text for data type

Dependence Phone Number, text field with mask (5%) Short Text for data type

© Create an input form called Address-form w/Wizard (5%)

Add at least 5 records, no duplicate names (5%)

Preview of quiz question:

Unique identifier

- a collection of tables
- a way to output, or print
- Input, or view and maintain data

Rows in a table

easily view the fields and data types

Question to process

data is presented in rows and columns

Create second table called Gifts (5%)

□ First_Name field, set as Key field (5%) Short Text for data type

include Gift, Adjective, Room, Cost, and Store fields
(5%) (Cost is currency, not text; the rest will be Short Text for data type)

© Create a input form w/ Wizard called Gifts-form *based on the Gifts table* and add at least one gift per addressee that you added in the other table. *You must use the EXACT same First Names used in Address* Vary the cost range from below \$10 to above \$10, to way above \$10 (5%)

Relate your two tables on First Name (5%)

© Create a query based on both tables, one of each field, named join-query

D Modify join-query to merge all records where gift was more or less than 10 ie > 10 (5%)

☑ Save Query as Nice-Gifts-query or Cheap-Giftsquery(5%) (File\Save As\Save Object as... and save query with the new name

© Create a report based on the join-query called joinreport (5%).

© Create a report based on the Nice_Gifts-query called Nice_Gifts-report (5%)

2 Appropriately submit (MUST be zipped) (5%)

1. Primary Key, the key field

- 2. Query
- 3. Form
- 4. Report
- 5. Record
- 6. Relational Database
- 7. Datasheet View
- 8. Design view