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# Lab 12 – Databases (50 points)

Objectives:

* Use an Access 2016 database to apply database concepts
* Create and edit database objects

Note: For this lab, you must use Access 2016. If you have a PC, Access comes with Office 365 (provided by the college.) Office 365 for Mac does NOT include Access. So, if you have a Mac, you will need to do this lab on a PC (if you can go to the main campus, we have a computer lab in CALT 204 that is always open for students) or you can use the Citrix Receiver, which is remote access to the program through a browser. Ask your instructor to provide you instructions on how to set it up. The AACC Technical Call Center can assist you – 410-777-HELP.

##### Review and Definitions

A **database** is a collection of data that is stored in a computer system. Databases allow their users to enter, access, and analyze their data quickly and easily.

The **hierarchy** of data begins with a **character**, a collection of related characters is a **field**, a collection of related fields is a **record**, a collection of related records is a **file (or table)**, and a collection of related files (or tables) is a **database**. Example of fields used in a student database would be “Last Name”, “First Name”, “SSN”, “Major”, and “GPA”. A record in a student database would be all the fields for one student. A file would be a grouping of all the records for students in a course. A database would be a collection of all the files for all courses.

A **primary key** is a field that contains data unique to a record. Duplicate data cannot be entered into a field that is designated a primary key. Unique data such as social security numbers, student ID numbers, and part numbers are examples of fields that can be designated as primary keys.

A **foreign key** is a key field that can contains the primary key data of another table. This key is used to connect to the primary table. The foreign key can consist of duplicate data.

A **relationship** is an association between data that is stored in different record types. For example, a student would have information on the classes he is taking in the course file. There will be another file that contains personal information, such as address. Both files will use the student’s id number as the unique identifier or primary key. These two files can be related by using the student’s id number.

A **query** is 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.

##### Section 1 – Database Concepts and Access 2016 Overview

In this lab, you will go to <http://www.gcflearnfree.org/access2016/> and learn basic database concepts by going through several short tutorials that will show you how to use Access 2016. Each tutorial provides detailed step-by-step instructions with screenshots and one or two videos. The numbers beside the tutorial video title is the duration of the video. If there are two numbers, there are two videos so you will need to scroll down the page. The videos provide the same information as the text instructions and the screenshots.

In Tutorials 1-4 you will give you an overview of database concepts and introduce Access 2016. Then in Tutorials 5-11 and 14 (you will skip 12 and 13) you will be using a sample database to practice each concept that you learn. You will find the instructions for what you need to do at the end of each tutorial in each tutorial section of this document.

There is a link directly to each tutorial in this document, but you may also navigate to each tutorial directly on the site. The number in parenthesis next to each link is the duration of each of the videos. Note that some tutorials have two videos. The total time for all the videos combined is approximately one hour.

[Tutorial 1 – Introduction to Databases](http://www.gcflearnfree.org/access2016/introduction-to-databases/1/) (3:44)

[Tutorial 2 – Introduction to Objects](http://www.gcflearnfree.org/access2016/introduction-to-objects/1/) (4:55)

[Tutorial 3 – Getting Started in Access](http://www.gcflearnfree.org/access2016/getting-started-in-access/1/) (4:13)

[Tutorial 4 – Managing Databases and Objects](http://www.gcflearnfree.org/access2016/managing-databases-and-objects/1/) (2:37)

##### Section II – Access 2016 Hands-On Tutorials – 50 points

Open the **access1016\_sampledatabase.accdb** database file and use “Save As” and save the file as a new Access Database file named **LastName\_SongBird Bakery,** replacing LastName with YOUR last name. The file extension .accdb will be added to the filename. (You will get a warning “All open objects must be closed prior to continuing this operation.” Answer yes. When the file opens, you will have a security warning. Select “Enable Content”.)

You will notice that the Employee Database Navigation form opens with the database. Under the SongBird Bakery logo, you will see three tabs – Orders, Customers, and Menu. If you click on the Orders tab, observe at the bottom of the window that there is a total of 59 records. Click on the Customers and Menu tabs and you will see that there are 200 and 176 records respectively.

[Tutorial 5 – Working with Tables](http://www.gcflearnfree.org/access2016/working-with-tables/1/) (4:22 & 2:34) **– 5 points**

1. Open the Customers table.
2. Add a new record to the table using your first and last name. You can make up the remaining data. Be sure to enter data for every field.
3. Find the record with the name Sula Smart, and replace it with your instructor’s name.
4. Hide the ID field
5. Change the background, alternate, and gridline row colors. (Make sure they coordinate!)
6. Save the table as Customers Formatted (File – Save As – Save Object)

[Tutorial 6 – Working with Forms](http://www.gcflearnfree.org/access2016/working-with-forms/1/) (4:51) **– 5 points**

1. Open the Orders form.
2. Create a new record with the following data:

Customer: Eric Oglesby

Pickup date: February 14, 2017

Order items: Cakes: Coconut (1)

Notes: Write "Happy Valentine's Day!" with pink frosting.

Pre Order: Yes

Paid: Yes

1. Open the form named Customers Form.
2. Find the record for customer Dwight Parker and make the following changes:

Street Address: 190 Cook Street

City: Chapel Hill

Zip Code: 27514

Email: dwightp@email.com

[Tutorial 7 – Sorting and Filtering Records](http://www.gcflearnfree.org/access2016/sorting-and-filtering-records/1/) (4:03) **– 5 points**

1. Open the Cakes and Pies Sold query.
2. Apply a filter to the Product Types field that shows only Cakes.
3. In the Sum of Quantity field, apply a number filter that only shows numbers greater than or equal to five.
4. Apply an ascending sort to the Sum of Quantity field.
5. Save the query

[Tutorial 8 – Designing a Simple Query](http://www.gcflearnfree.org/access2016/designing-a-simple-query/1/) (5:01) **– 5 points**

1. Create a new query using Query Design (on the Create tab in the Queries group).
2. Select the Customers table to include in your query.
3. Add the following fields from the Customers table to your query:

First Name

Last Name

City

Zip Code

1. Set the following criteria:

In the City field, type "Durham" to return only records with Durham in the City field.

In the Zip Code field, type "27514" in the or: row to return records that are either in Durham or zip code 27514.

1. Run the query. If you entered the query correctly, your results will include 15 records of customers who live in Durham OR in zip code 27514.
2. Save the query with the name Customers who live in Durham.

[Tutorial 9 – Designing a Multi-Table Query](http://www.gcflearnfree.org/access2016/designing-a-multitable-query/1/) (5:24) **- 5 points**

1. Create a new query using Query Design. (on the Create tab in the Queries group)
2. Select the Customers and Orders tables to include in your query.
3. Change the join direction to right to left.
4. Add the First Name, Last Name, and Zip Code fields from the Customers table to your query.
5. Add the Paid field from the Orders Table to your query.
6. Set the following criteria:
   1. In the Zip Code field, type 27609 to return only records with a zip code of 27609.
   2. In the Paid field, type Yes to return only customers who have paid.
7. Run the query. If you entered the query correctly, your results will include 20 records of customers who live in the zip code 27609 and have paid for an order. If not, click the View drop-down arrow on the Ribbon to return to Design view and check your work.
8. Save the query with the name Paying Customers in 27609.

[Tutorial 10 – More Query Design Options](http://www.gcflearnfree.org/access2016/more-query-design-options/1/) (2:27 & 2:29) **– 5 points**

1. Open the Customers Who've Ordered from Nearby Towns query, and switch to Design view.
2. Add a Totals row to the query.
3. Set the Totals row in the Orders Table ID field to Count. This will let us count how many orders each customer has placed.
4. In the Customers table in the Object Relationship pane, double-click the word City to add another City field to the design grid below.
5. Click and drag the City field you just added so it is to the left of the First Name field. It should now be the leftmost field in the design grid.
6. Apply the following multilevel sort:
   1. In the leftmost City field, apply an ascending sort.
   2. In the Last Name field, apply an ascending sort.
   3. Hide the leftmost City field.
7. Run the query. If you did it correctly, there should be 14 records in the query results. The first record should look like this:

First Record

1. Save the query.

[Tutorial 11 – Creating Reports](http://www.gcflearnfree.org/access2016/creating-reports/1/) (2:56 & 2:55) **– 10 points**

1. Open the Customers Who’ve Ordered from Nearby Towns query, and use it to create a report. This will automatically switch the view to Layout so you can edit the layout of the report.
2. Resize the fields so all the information is on the left side of the page break. Make sure the columns still have enough width to display all the text.
3. Delete the CountOfID and Phone Number columns. (Hint: right-click the column and select “Delete Column”)
4. Move the page number so it is to the left of the page break under the Zip Code column. (You may have to increase the row height to be able to see the text.)
5. Move the date and time so it appears on the left side of the page break.
6. Expand the title so you can see all the text. Make sure that it the title is centered over the table below. This might require that you resize the fields in the table. Make sure that all the rows are the same height
7. Save the report as “Customers Who’ve Ordered from Nearby Towns” (use File – Save As – Save Object As)
8. Click View on the Design tab of the Report Layout Tools and select “Print Preview” to be sure your report layout has everything on one page and all text is in view.
9. Click on the External Data tab and Export the report as a PDF with the filename Customer Orders Nearby.

[Tutorial 14 – Creating Forms](http://www.gcflearnfree.org/access2016/creating-forms/1/) (4:12 & 3:29) **– 10 points**

1. Create a form from the Customers table.
2. Delete the subform, and the City field. (You will be adding a combo box to the blank left by deleting this.)
3. Create a combo box in the blank space left by the City field. Add the following choices to the combo box:

Raleigh

Durham

Hillsborough

Cary

Chapel Hill

Garner

Charlotte

1. Store the value in the City field, and label the combo box NC City List. Click Finish when you are done with the Combo Box Wizard.
2. Switch to Form view, and click the drop-down arrow in the combo box you created. You should see a list of cities.
3. Return to Layout view and click on the Property Sheet in the Tools group of the Design tab of the Form Layout Tools tab.
4. Select the ID field and hide it.
5. Preview the form in Form view.
6. Save the form object as Customers Form Custom.
7. Open the Orders form and change the view to Layout.
8. Open the Property Sheet and format the Pickup Date field to autofill with the current date.
9. Save the Orders form.
10. Return to Form view and click on New Order, then click in the Pickup Date to verify that it displays the current date.

##### **Submission Instructions**

1. Submit the following two files to the Lab 12 dropbox by the due date.

* LastName\_SongBird Bakery.accdb
* Customer Orders Nearby.pdf