# Table of Contents

Database Structure .................................................. 5
Database Terminology.................................................. 6
Naming Conventions.................................................... 6
Relationships ............................................................. 5
  One-to-many ......................................................... 12
  Many-to-many ......................................................... 13
  One-to-one ............................................................ 13
Create a New Database ............................................... 14
Create a Table in Design View ...................................... 14
Save a Table ............................................................. 14
Use Input Mask Wizard ............................................... 14
Insert Data Type: Yes/No .............................................. 14
Insert Data Type: Lookup Wizard ................................... 14
Insert Data Type: Yes/No .............................................. 14
Insert and Delete Field ................................................ 14
Primary Key .............................................................. 14
Objectives

At the end of this training session you should be able to:

1. Understand the three types of relationships: one-to-many, many-to-many and one-to-one;

2. Create a new database;

3. Create tables for data entry in design view;

4. Use, understand, and set data types: Text, Memo, Number, Currency, Date/Time, AutoNumber, Yes/No, Lookup wizard.

5. Create and delete a primary key;

6. Insert and delete a row.
Before a database is developed, plan the structure from the beginning to the end. Flow-charting or blueprinting in advance will eliminate restructuring and/or starting from scratch.

**Questions to Ask Before Designing a Database:**

1. What does the database need to do?
2. What functions need to be achieved?
3. Which objects (such as tables, forms) depend on each other?
4. What items are needed for the database?
5. Who will use the database?
6. How will the output data (report) be generated?
7. How will the database be organized?

**Access Database Terminology**

It is necessary to understand and be familiar with the basics of a database and its objects to create or generate information.

**Table**- The central framework of a database that stores data in fields (columns) and records (rows).

**Query**- Allows for table inquiries. A query can change, delete, add, arrange data in tables. Also aids gathering information for forms and reports.

**Form**- Displays and enters data in a fitted format. Forms can also contain other nested forms (subforms).

**Report**- Allows for the printing and print preview of information such as labels, lists, form letters, invoices, summaries, display charts, etc. The user can personalize reports by adding a logo or picture, organizing headers, details, footers, and sorting columns.

**Page**- Also known as Data Access Page. Allows the publication of a web page and web access to a database. A page can be viewed and edited, and the information can be altered.

**Macro**- Allows for automating simple and common tasks such as opening and closing a form, exporting data, printing data in a report, and saving data.

**Module**- Modules are a collection of Visual Basic declarations and procedures that allow for the automation and customization of Access, giving the user more explicit control over actions.
**Naming Conventions**

The Leszynski Naming Convention (LNC), originally created by Stan Leszynski and Greg Reddick, developed guidelines called tags to assist the user to open, edit, and troubleshoot without deciphering what is contained within the object itself.

File names can be more than one word; however, do not use underscores or spaces. Instead, capitalize the first letter of each word.

```
e.g. tblEmpInfo
```
When organizing and creating a database, the question, "How will the objects (tables) relate?" must be asked.

There are three types of relationships in Microsoft Access:
- One-to-many
- Many-to-many
- One-to-one

### One-to-many relationship
The most common type of relationship. A record from one table (Table 1) can have matching records in another table (Table 2); however, Table 2 has only one matching record in Table 1.

Let's look at the example.
1. One Department
2. has more than one Course,
3. yet each Course has one Department.

### Many-to-many relationship
Not recommended due to problems enforcing referential integrity. A record from one table (Table 1) can have many matching records in another table (Table 2) Also, a record in Table 2 can have many matching records in Table 1. This is possible through the use of a third table called a junction table. The junction table has a primary key that consists of two fields from Tables 1 and 2.

Let's look at the example.
1. Primary key from Inventory Details table (tblInventDetails)
2. Primary key from the equipment table (tblEquipment)
3. One department can have several types of equipment,
4. And each type of equipment can appear in several departments.
One-to-one relationship

Least common type of relationship. However, a one-to-one relationship is useful if there are records that must be kept confidential and secure. A record from one table (Table 1) can have one single matching record in another table (Table 2), and Table 2 can have only one single matching record in Table 1.

Let's look at the example.

1. All students’ have one matching record in students table (tblStudents)
2. The values are a subset of the social security field and the students’ table (tblStudents).
Create a New Database

Before creating tables and forms, creating a general database is recommended.

1. Under the Getting Started task pane, click on Create a new file link.
2. Click on Blank Database from the menu bar.
3. After the Fill New Database appears, type the file name of the database.
   e.g. HCC_Employee_Data
4. Click Create or press Enter on your keyboard.
Create a Table Using Design View

Creating a table in Design View gives the user freedom to construct a table with specifications for data collection.

1. Under **Objects**, click on **Tables**.
2. Click on **Create table in Design view**.
3. Type in the **Field Name**.  
   e.g. **LastName**

   When entering field names, do not use spaces or punctuation.

4. Under **Data Type**, click on the down arrow and select **Text**.

   Look at page 9 for **Data Type** descriptions or hit **F1** on your keyboard for more details and help on data types.

5. Locate the **General** tab and type 20 for the **Field Size**.

   Typing in 20 for the field size indicates that the last name can be no more than 20 characters long.

6. Type a label for the **Caption**.  
   e.g. **Last Name**:

   Spaces and punctuation can be used for captions. Whatever is typed in the caption will appear in both forms and reports. If no caption is entered, the field name will appear instead.

**Activity**

Add the following fields to the table, **FirstName**, **MI** (middle initial), **Street**, **City**, **State**, **Zip**, **Exempt** (Yes/No) and **Campus** (Lookup Wizard). Also add the Field Size and Caption for each field name.
Save a Table

Saving a table with a specific title will help when organizing information, creating queries, forms, and pages, and connecting to other tables.

In this example, we are saving the table, tblEmployeeInfo.

1. Click on File>Save As. A Save As dialog box appears.
2. Type the name of the table. e.g. tblEmployeeInfo
3. Click on OK.
4. A dialog box appears stating that no primary key is defined. In this example, select No.

Primary keys are not required; however, select a primary key when you need to create relationships between tables in a database. Primary keys cannot be duplicated; therefore, never use a last name, address, or a field where information is likely to be repeated. Ideal primary keys are employee numbers, social security numbers, product numbers, etc.
Data Types

It is important to assign data types to a field since they specifies what type of data can be entered into a field.

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text</td>
<td>Add text entries and number entries that do not require calculations such as addresses, social security numbers, dates, and phone numbers. Maximum number of characters, including spaces, is 255 characters.</td>
</tr>
<tr>
<td>Memo</td>
<td>Add long text or number entries. Maximum number of characters is 64,000. Use when more than 255 characters are necessary.</td>
</tr>
<tr>
<td>Number</td>
<td>Add positive/negative numbers for calculations. Not appropriate for currency or items that require exact calculations. 15 digit maximum.</td>
</tr>
<tr>
<td>Currency</td>
<td>Use for calculations that do not need to be rounded. 15 digit maximum.</td>
</tr>
<tr>
<td>Date/Time</td>
<td>Add date and time. 8 character default.</td>
</tr>
<tr>
<td>AutoNumber</td>
<td>Use when sequential, random, or replication ID numbers are needed. 9 digit maximum.</td>
</tr>
<tr>
<td>Yes/No</td>
<td>Use when Yes/No, True/False, or On/Off are necessary.</td>
</tr>
<tr>
<td>OLE Object</td>
<td>Add objects such as Excel workbooks or Word documents that are linked or embedded. 1 gigabyte character limit.</td>
</tr>
<tr>
<td>Hyperlink</td>
<td>Link to files, objects, or web links. 2,048 character maximum.</td>
</tr>
<tr>
<td>Lookup Wizard</td>
<td>Use when choosing data such as tables or a list of values.</td>
</tr>
</tbody>
</table>
Insert Input Mask Wizard

The Input Mask Wizard allows the designer to define the format for entering data.

In this example, a format is set for entering a zip code.

To use the input mask wizard the table must be in Design View.

1. Type Zip under the Field Name.
2. Select Text for Data Type.
3. Type Zip: for the Caption.
4. Click in the Input Mask field.
5. Click on the build button.
   An Input Mask Wizard box appears. In this example, the Zip Code format is selected.
7. Select a placeholder and click on Next.
   The underscore _ is the default placeholder character.
8. Click on Next.
Create a Custom Input Mask

Creating a customized Input Mask ensures formatting for entering data. If the information is not entered appropriately, the data will not be accepted.

In this example, a zip code input mask is created.

To create a custom input mask, the table must be in design view.

1. Select the Field Name to create the Input Mask. In this example, use Zip.

2. Under Field Properties, click in the Input Mask field. A build button appears to the right of the Input Mask field.

3. Click on the build button.

4. After the Input Mask Wizard dialog box appears, click on Edit List.

5. Enter the Description, Input Mask, Placeholder, Sample Data, and select Text/Unbound for Mask Type.

6. Afterwards, click on the Close button to save the Zip Code input mask.
9. Click on the **With the symbols in mask** radio button.

Here the data can be stored with symbols or without symbols in the table. Storing with symbols allows for easy viewing of the data.

10. Click on **Next**.

11. Click on **Finish**.

Notice that the Zip Code Input Mask is added under the **Field Properties**>**Input Mask**> **0000-9999;;**.

To see the formatting in the table, click on the **Datasheet View** button.
**Data Type: Yes/No**

As mentioned on page 9, data types are used to specify what type of data can be entered and stored into a field.

In this example, the Yes/No data type is used for Exempt field name. Using the Yes/No format is helpful for simple, clear-cut answers.

To use the data type **Yes/No** the table must be in **design view**.

1. Type in **Field Name**.
   - e.g. **Exempt**

2. Under **Data Type**, click on the down arrow and select **Yes/No**.

   **Yes** is represented by a check and **No** is not checked in the **Datasheet View**.

   Yes/No also represents the following: True/False, 1/0, and On/Off.
Data Type: Lookup Wizard

The purpose of the Lookup Wizard is to connect one field from one table to another table or a list of values. Using the Lookup Wizard is useful when choices need to be limited or the same.

For instance, Hillsborough Community College has the campus location of District Administrative Offices. If members of the HCC community were to type District Administrative Offices in a table, they could type GK, DAO, District Administrative Offices, or some other spelling or mispelling. Therefore, restricting the location to DAO ensures the same information is entered.

In this example, a drop-down menu is created by using the Lookup Wizard, which will connect to tblCampus.

To use the Lookup Wizard the table must be in design view.

1. Type in the Field Name.
   e.g. Campus
2. Under Data Type, click on the down arrow and select Lookup Wizard.
3. A Lookup Wizard dialog box appears. Click on the I want the lookup column radio button.
4. Click on Next.
5. Select the table for the lookup.
   e.g. Table:tblCampus
6. Click on Next.
7. Select the available field to include by clicking on the single-headed **next** arrow. 
   e.g. Campus
8. Click on **Next**.
9. Set sort order as needed and click on **Next**.
10. Adjust the width of column and click on **Next**.
11. After entering the label name for the lookup column, click on **Finish**. 
   e.g. Campus
12. Click **Yes** to save table and create relationships.

To view the down-drop menu for the different campuses, click on the **Datasheet View** button.

To manually add a drop down menu, click on the **Lookup** tab under **Field Properties**. 
Next set the **Display Control** to **Combo Box** and the **Row Source** to the required table or query. In this example, use **tblCampus**.

---

**Activity**

Use the **Lookup Wizard** to connect the field name **State** to the table **tblState**.

Or challenge yourself and manually add a lookup.
Insert Field to a Table in Datasheet View

After a table is created, additional Field Names may be needed.

In this example, we are adding an EmployeeID (employee number) field.

To insert the field the table must be in design view.

1. Click on the row below where the field is to appear.
   In this example, click on the field name LastName.

2. Click on Insert>Insert Row or the Insert Row on the toolbar.

3. Type in Field Name and Data Type
   e.g. Field Name: EmployeeID
       Data Type:  Text

   Remember to enter the Field Properties details under the General Tab. Field Size: 7 and Caption: Employee ID:

   The data type is set to Text because this data doesn’t require any calculation.

   To delete a Field Name, select the Field Name row selector (small boxes located to the left of Field Names) and press the Delete key or the Delete Row on the toolbar or Edit>Delete or Delete.

Activity

Insert a Field Name named AutoNum with a Data Type of AutoNumber. Enter the Caption as Entry Number:
Set a Primary Key

A primary key or primary keys uniquely identify each record in a table. An advantage of a primary key is that it does not allow duplication of information. Access does not require that a primary key, and multiple primary keys can be set.

In this example, a primary key is set for the Field Name: EmployeeID.

To set a primary key, the table must be in design view.

1. Click on the row selector for the field to be set as a primary key.
   e.g. EmployeeID.

2. Click on the Primary Key button.

   If there is more than one primary key, press and hold down the Ctrl key, and click on the row selector for other fields.

   To remove a primary key, click on the row selector of the field set as a primary key and click on the primary key button.

Activity

Set a primary key for AutoNum and remove the primary key for Employee ID.