



Software Application Training Tutorial

Microsoft Office XP Access 2002 Intermediate

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Microsoft Access 2002 Intermediate

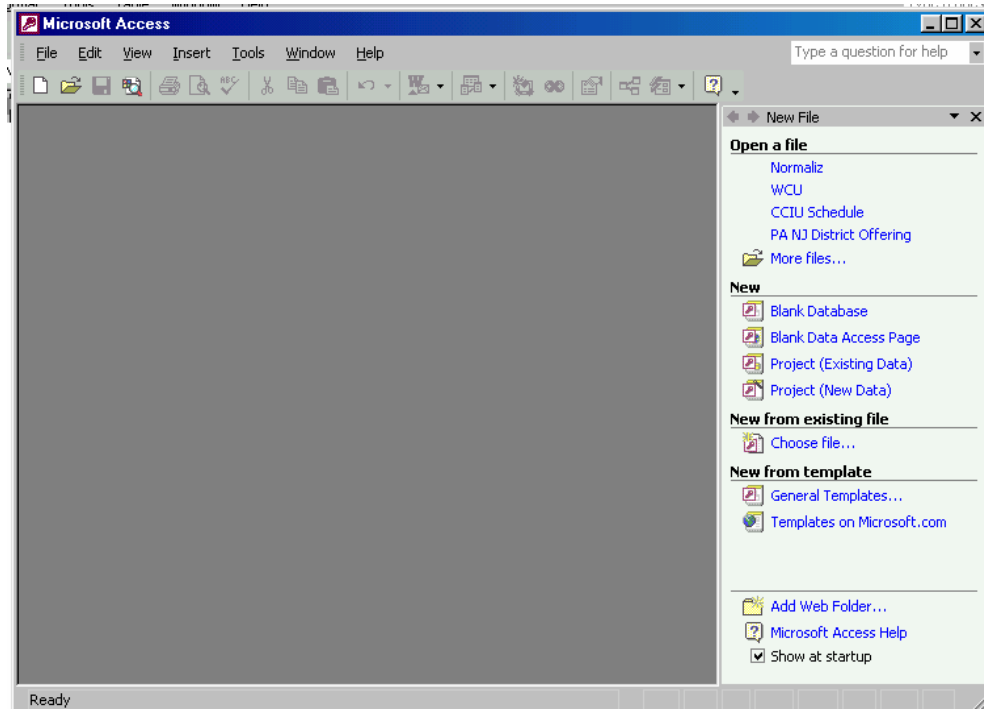
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Introduction

Microsoft Access is a relational database management system. It enables you to easily store, organize, and manipulate collections of information in an electronic format. Data can be organized in separate tables of related data, then linked together to form relationships.

This seminar is designed to help users with a basic knowledge of Access create a well designed database. The Introduction to Access seminar was based on Microsoft Access 97 through 2000, so we will begin by looking at some of the changes and enhancements found in Access 2002.



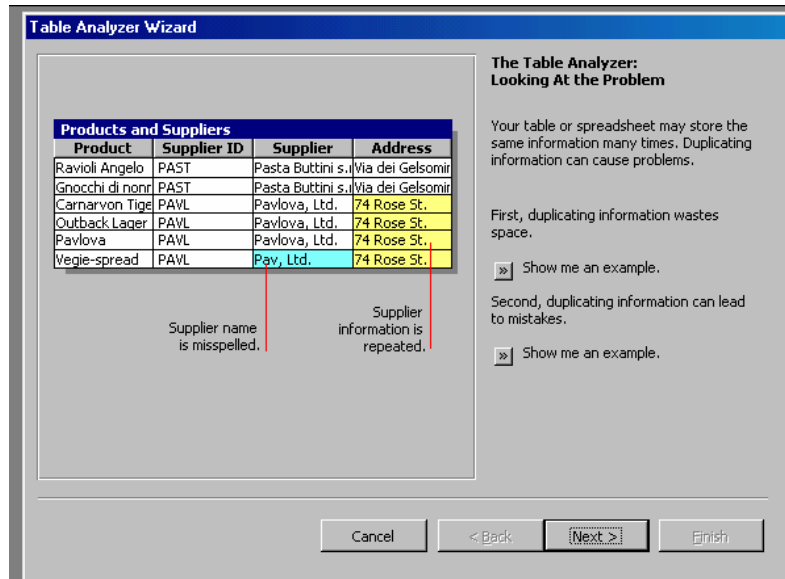
2002 Changes & Enhancements

Many new features have been added while some others have been enhanced. Access 2002 uses the same file system (although it does have a new optional 2002 XP file format), therefore existing databases created with 2000 are compatible with 2002. The following is a list of some of the new features included with Access 2002.

- When you open Access a Task Pane appears on the right of the main window (pictured on page three). The Task Pane contains recently opened files, links to create a new database, and more.
- Access 2002 has a crash recover feature. If power is lost the next time you open Access, a Recovery Pane will open to the left with a list of the recovered files. You can either recover or discard these files.
- Access 2002 now includes interactive tables and charts to view database objects called PivotTables and PivotCharts.
- Access 2002 has a new file format, but the 2000 file format is the default, so there is no need to convert an Access 2000 database used with 2002.
- Undo and redo multiple times is now available within most components in Access.
- Speech recognition is now included with Office XP and can be used with Access 2002.
- An error log table is created if there are errors when you convert from an older version of Access. This makes troubleshooting conversion errors much easier.
- Access database objects can now be saved as a web page. Web pages can be used to share information on the Internet and the users don't need to have Access on their local computer to view your objects. Web pages in Access are saved in HTML (Hypertext Markup Language) format.
- Access 2002 objects can be saved as XML (Extensible Markup Language) documents. XML documents can not only be viewed on the Internet, but also they can be converted into other non Microsoft applications.

Normalization

To manage your data effectively, you need to be able to reduce the size of databases and limit repetitive data entry. Instead of using large tables with many fields that contain identical entries, you should create separate tables and join them when necessary (database normalization). Access includes a **Table Analyzer** that can check for repetitive data and automatically separate a table into smaller tables.



In normalizing your data, you usually divide large tables into smaller, easier to maintain tables. To work with related information, you must then reconnect the data by defining the relationships between them or by joining tables in queries, forms, and reports.

The following should be accomplished when your data is completely normalized:

- Save typing repetitive data.
- Save storage space.
- Avoid frequent restructuring of tables to accommodate new data.
- Increase flexibility.

Normalization Rules

1. Each field should contain the smallest meaningful value.
2. Each table should have only one purpose.
3. A table should not contain repeating groups of fields.
4. Every non-key field should be a fact about the primary key field.

You can either manually scrutinize your database tables, or use the Access **Analyzer** to automate this task. In order to use the **Analyzer** perform the following steps:

1. Select **Tools|Analyze|Table** from the menu bar.
2. Click **Next >** to continue through the wizard.
3. Select the table you wish to analyze.



The table **Analyzer** is an interactive wizard. You will be given several options throughout the process. At the end, you will be given the chance to accept or decline the suggested changes to your database.

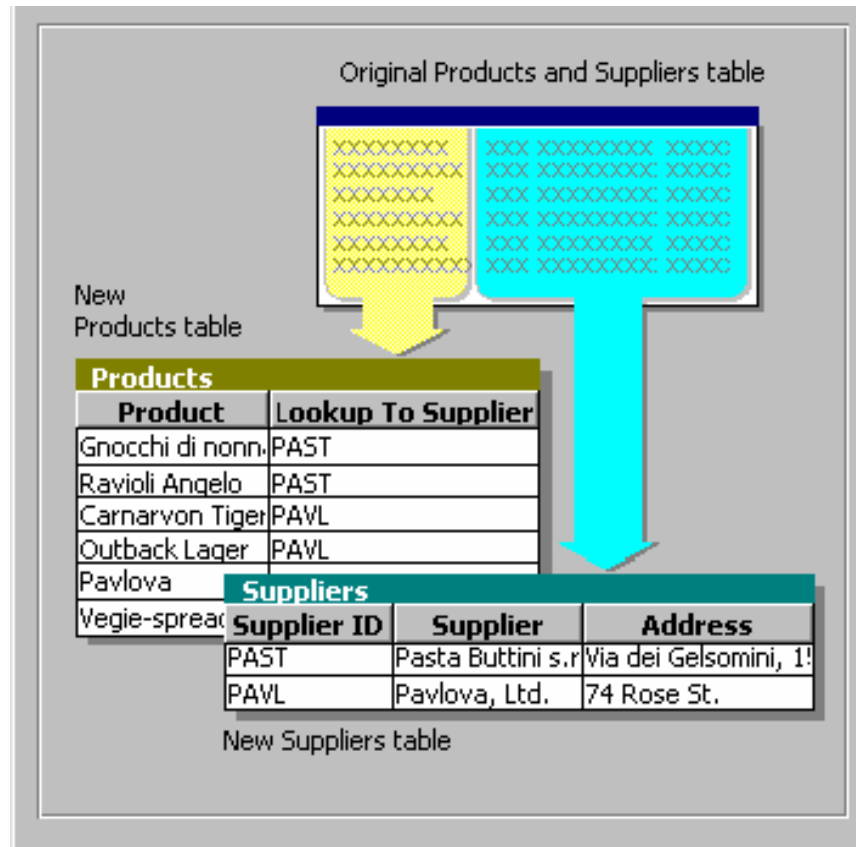
Exercise I – Table Analyzer

Analyze and repair a poorly designed database. Review the Normalization Rules, and analyze the following table:

Personal Data							
Emp ID	Name	Dept Code	Dept Name	Health	Hours	Pay Rate	Address
WCU-26	Daniel O'Brien	HR	Human Resources	Yes	40	\$25.00	158 Hampton Place
WCU-33	Amy Jones	HR	Human Resources	Yes	40	\$15.00	87 W. Tops Street
WCU-35	Steven Smith	AC	Academic Computing	No	20	\$13.25	32 E. Church Road
WCU-36	Elizabeth Johnson	AC	Academic Computing	No	20	\$25.00	1789 Forkly Road
WCU-38	Carol Hope	IS	Information Systems	Yes	40	\$15.20	22 Ridge Pike
WCU-40	Alexandra Thompson	IS	Information Systems	Yes	40	\$16.00	725 Church Street

1. Look for fields containing values that can be broken down into smaller meaningful parts.
2. Analyze the name field. Why is this a problem?
3. How could you correct this problem?
4. List the fields that could be added or removed.

5. Is this a single-purpose table?



6. Does all of the information relate to the Employee ID field?

7. How many tables should be created to hold this data correctly?

8. List the possible additional tables.

9. In your new tables, what fields should be the primary key?

10. How should your separate tables be related?

Improve Data Accuracy

It is important that data is stored in a consistent format. If not, then it may be difficult to sort or extract the data. There are several data format features in Access that can control how data is stored. You can even restrict the type of data allowed in a field. This is also useful to reduce errors imputing data.

Format Property

The Format Property allows you to control how data is displayed in a field. It does not change how data is stored. Controlling how data is displayed makes your object more uniformed and it is easier to add data to the database. The user can type raw information and the Format Property will automatically format that data.

There are also predefined formats for some data types. For example, the Date/Time data type has predefined formats for display, such as short date (1/1/2004) and long date (Thursday, January 1, 2004). You can select the predefined formats from a drop down list in the Format Property box.

You can use the following symbols in custom formats for any data type.

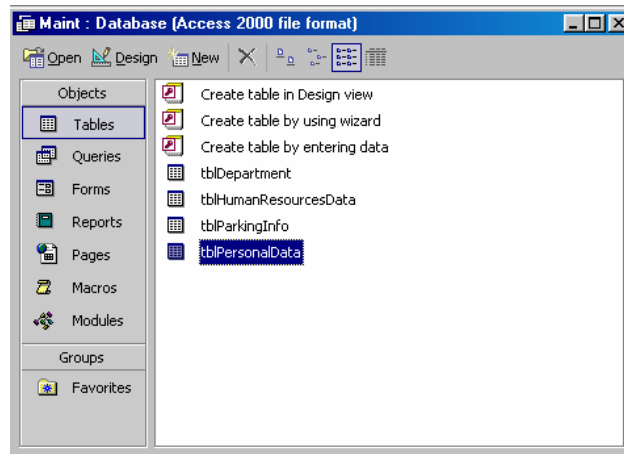
Symbol	Meaning
(space)	Display spaces as literal characters.
"ABC"	Display anything inside quotation marks as literal characters.
!	Force left alignment instead of right alignment.
*	Fill available space with the next character.
\	Display the next character as a literal character. You can also display literal characters by placing quotation marks around them.
[color]	Display the formatted data in the color specified between the brackets. Available colors: Black, Blue, Green, Cyan, Red, Magenta, Yellow, White.

It is not a good idea to use both an Input Mask and set a Format Property for the same field. The Input Mask will be ignored, but the Format Property will control how the information is displayed in the field. The Input Mask can not only control how data is displayed, but can also force the data to be stored in the same format. Therefore you should select the type of format you want for your field with deliberation.

Exercise II – Format Property

1. Launch Access. Click File, Open to open an existing file.
2. Use the Look In box to locate the Intermediate.mbd file located in the *My Documents* folder.

3. Click the Tables object button. Select the Personal Data table and then click the open button to view the data. Notice the Last Name field is a mixture of upper case and lower case letters, and the Date Hired field is displayed in the month/day/year format.



4. Click the view button on the toolbar to switch to Design view.
5. Click anywhere in the Last Name field to select it.
6. Click in the Format property box in the Field Properties section.
7. Type the greater than symbol (>) as the Format property.
8. Switch to Datasheet view to view the results.
9. Click the view button to switch back to Design view and then click anywhere in the Date Hired field.
10. Select the Format property box, and then click the drop-down arrow. Select the **Medium Date** format and Switch to Datasheet view to view the result.

As you have learned, Access provides features to improve data accuracy. By changing the text and number formatting in table design, the formatting carries over to new forms and reports. All of the following features help improve accuracy in forms, tables, and reports:

- Consistent data formats
- Conditional formats
- Input masks
- Validation criteria
- Required fields
- Prevention of duplication

Conditional Formats

More complex procedures are available to format fields than those shown in Exercise II. These require a succession of components containing instructions separated by semicolons. Each component represents a specific data format for a certain condition.

Conditional formats are especially useful for dates and numbers. A conditional format can be set up to display positive numbers with black text, negative numbers in red, and zeros when no data is entered.

When formatting numeric fields the various components are separated by semicolons. The first component is the format for positive numbers, the second component formats negative numbers, and the third component is for null values. The following is an example:
\$#,##0.00;#,#0.00[Red];#

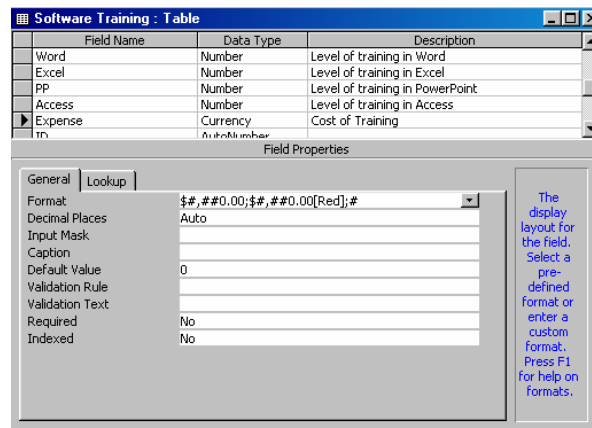
The **first component** (\$#,##0.00) tells the program to display a dollar sign followed by the number for a positive number. The pound sign (#) to the right of the dollar sign tells the program to place a number there if one has been entered. If the number is less than a thousand, a zero will not be forced into that location and the comma will be dropped. If a number under \$1.00 is entered, a zero is displayed in the first position to the left of the decimal.

The **second component** (\$#,##0.00[Red]) uses the same format as a positive number, but will display negative numbers in red.

The **third component** (#) tells the program to leave the field blank if no value has been entered.

Exercise III – Conditional Format

1. Using the Intermediate database click on the Tables object button.
2. Select the Software Training table and open it in Design view.
3. Click in the Expense field which is already set as a currency field.
4. Select the Currency format and delete it.
5. Enter the following string into the Format property box: **\$#,##0.00;#,#0.00[Red];#**. This string was explained above.



6. Click the view button on the toolbar to switch to Datasheet view. Scroll to the right, and notice that the records that had no entries for the Expense field now display a blank instead of \$0.

Customizing the Yes/No data type

The Yes/No data type has several predefined format selections. The default display for the Yes/No field is a check box. However, it can be customized to allow text instead of a check box. The following exercise will walk you through the process of customizing the Yes/No data type.

Exercise IV – Customizing Yes/No

There are three sections that must be included in a custom Yes/No data type. Each section is separated by a semicolon (;). The first section is not used, but a semicolon must start the expression. The second section contains the text for the Yes or True value and the third section contains the text for the No or False value.

1. Open the Personal Data table in design view.
2. Click anywhere on the gender field name.
3. Select the Yes/No data type.
4. Erase the format line in the properties section, and type, “**;Male**”;”**Female**”. This text will replace the check box.
5. Click on the Lookup Tab then click the Display Control down arrow. Select Text Box.
6. Click on the General Tab. This is so the defined formats will be displayed.

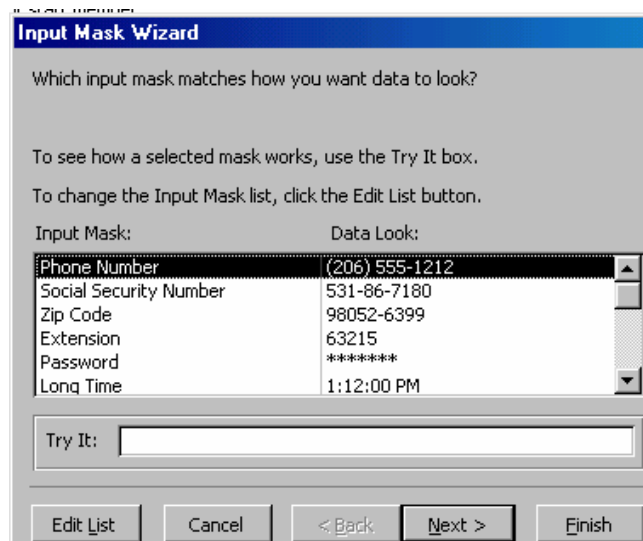
Input Mask

Access also provides the Input Mask property as a solution to improve data accuracy. The Input Mask property allows you to control how data is entered into a field, which helps make data entry simpler. An Input Mask is used to create a consistent input pattern or format. Phone number and social security number fields are good examples of fields that can use the Input Mask. With the Mask there is no need to type the format characters. You just type the numbers, and Access will format the number for you.

Exercise V – Input Mask Wizard

Use the Input Mask to change the format of the Social Security Number field in the Software Training table.

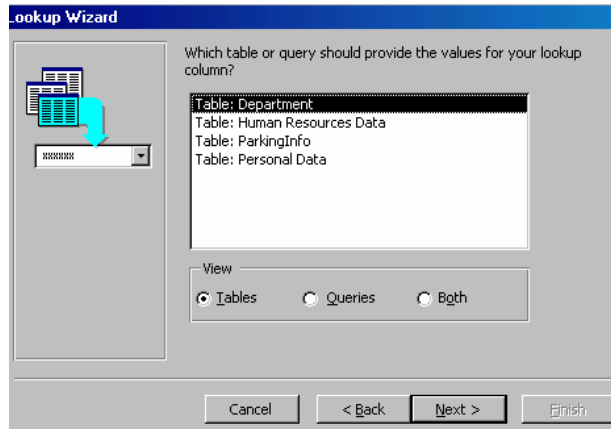
1. Open the table in Design view. Select the table, and then click the design button on the database window.
2. Click anywhere in the Social Security number field. Click the Input Mask property.
3. A build button is now displayed next to the Input Mask property. Click the build button to start the Input Mask wizard. If this feature is not installed on your computer, Access will try to install it now (You may need the Microsoft Office CD).



4. Select the Social Security Number mask and then click **Next >**.
5. The next dialog box gives you the option to edit the default input mask settings. Do not change the setting, and click **Next >**.
6. The next screen asks how you want the numbers stored. You can choose to have the numbers stored the same way they will be displayed on the screen, or store the numbers without the format symbols. Make your selection, and then click **Next>**.
7. Click **Finish >** and switch table view and note the results.
8. To test how the Input Mask assists in data entry, enter a new record.

Exercise VI – Lookup Wizard

The Lookup Wizard allows you to create a list for a field. By doing so, a user can select from a drop down list rather than type information into the field. You can use the Lookup Wizard to create a list that selects data from another existing table or query. If your database included acronyms, an easy way to look up a description would be to create a lookup list from the table that contains the descriptions for the acronyms.



Create a **Lookup Wizard** for the Department column to allow the user to select the department from a list.

1. Open the Department and Human Resources Data tables to familiarize yourself with their content.
2. Close the Department table and switch the Human Resources Data table from Table view to Design view.
3. Change the data type of Department field to Lookup Wizard.
4. The first dialog box of the Lookup Wizard gives you the option of creating the list from an existing table or query, or typing the values that you want for the list. Choose lookup from an existing table or query and then click **Next>**.
5. Select the Department table from the available tables and queries and then click **Next>**.
6. Add the department code field from the available field list and then click **Next>**.
7. The next screen gives you the option of adjusting the width of the column. Adjust the width and then click **Next>**.
8. The next screen allows you to change the name of the Lookup field. Keep Department as the field name and then click finish.
9. Save the table, and click the View button to switch to Table view. Tab to the Department field and click on the down arrow to view the list.

Required and Indexed Data

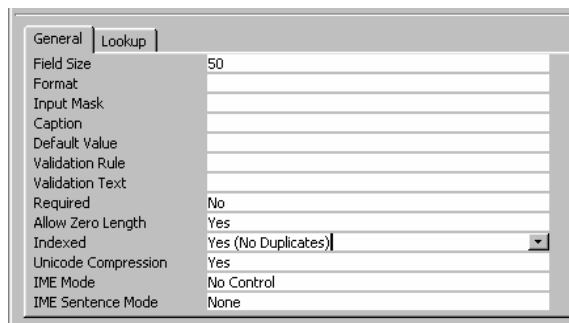
The primary key field's properties are set by default as required, and indexed with no duplicates. With the Required property you can set any field in a table to be required (data must be typed into this field). Also with the Index property any field can be indexed with the option to be set to either accept duplicates or not. An indexed field is stored in alphabetical or numeric order. This allows Access to find data stored in an indexed field quickly.

Setting the Required property

1. Switch to Design view and click anywhere in the field name that you would like to set required.
2. Click on the Required property on the lower half of the design grid.
3. Use the Required down arrow to select **yes** from the short menu.

Avoiding Duplicates

1. Switch to Design view and click anywhere in the field name that you would like to index.



The screenshot shows the 'Properties' window for a field in Access, with the 'General' tab selected. The 'Indexed' property is set to 'Yes (No Duplicates)'. Other properties shown include Field Size (50), Format, Input Mask, Caption, Default Value, Validation Rule, Validation Text, Required (No), Allow Zero Length (Yes), Unicode Compression (Yes), IME Mode (No Control), and IME Sentence Mode (None).


Property	Value
Field Size	50
Format	
Input Mask	
Caption	
Default Value	
Validation Rule	
Validation Text	
Required	No
Allow Zero Length	Yes
Indexed	Yes (No Duplicates)
Unicode Compression	Yes
IME Mode	No Control
IME Sentence Mode	None

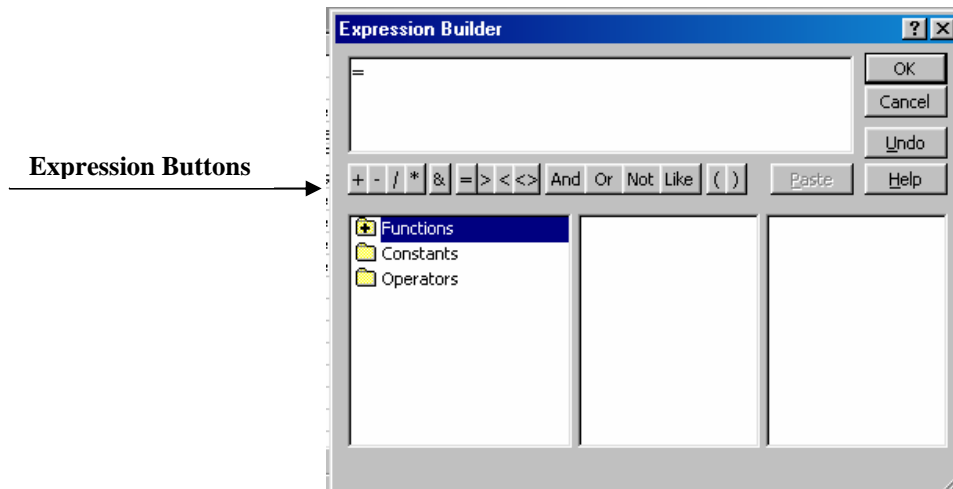
2. Click on the Index property and select from the short menu either yes (duplicates OK), or yes (no duplicates).

Validation Rule

Data entered in certain fields can be restricted by using the validation rule property. You can limit a field to accept several possibilities. You can use the Validation Rule property to specify requirements for data entered into a field. When data is entered that violates the Validation Rule setting, you can use the Validation Text property to specify the message to be displayed to the user.

Exercise VII – Setting Validation

1. Click the view button to switch to design view (Software Training table).
2. Click anywhere in the Word field to select it, then click the Validation Rule box in the field property area.
3. Click the build button on the right side of the Validation Rule box to open the expression builder.

4. Click the = sign button to begin building the expression.



5. Type the number 0 (zero), then click the Or button.
6. Follow the above procedure until the expression reads: = 0 Or 1 Or 2 Or 3.
7. Click OK, and then type “**This is not a valid option. Please enter the number 0, 1, 2, or 3.**” in the Validation Text box.

Calculations

A calculated field is a “virtual field” in a query for which the value is a function of one or more fields in the underlying table.

The syntax of a calculated field is always the same:
<calc field name>: <definition>

The calculated field name can be just about anything, as long as it is unique. The definition is any expression that Access can evaluate.

When you use field names in expressions, Access normally adds square brackets. This is not cause for concern because in Access, square brackets simply indicate the name of a field (or some other object in the Access environment). However, if your field name contains blank spaces (e. g., Dept Code), the square brackets are NOT optional—you must add the square brackets yourself.

The Ampersand (&) Operator

The ampersand operator is like any other operator (e. g., +, -, ^, %) except that it is intended for use on strings of characters. What the ampersand does is simply add one string on to the end of another string (hence its other name: the “concatenation” operator).

Exercise VIII – Calculations in a Query

1. Open the Intermediate.mdb file, and click on the Tables object tab.
2. Open the human resources data table, personal data table and the department table. Review the data and field headings and then close all tables.
3. Click the queries tab, and then click Create query in design view. From the show tables dialogue box select department, human resources, and the personal data tables.
4. Maximize the design grid if necessary. Select the following fields: Department, Last Name, Hours, and Pay Rate.
5. Create a virtual field to multiply the hours times pay rate. Name the virtual field Weekly Pay.
6. Save the query as Weekly Pay.
7. Create a new query using the same table above.
8. Select Department Name from the Department

	Dept Name	Total Weekly P
▶	Information Systems	\$3,685.00
	Marketing	\$4,870.00
	Relocation Services	\$3,330.00
	Support Staff	\$1,990.00
	Training and Development	\$4,200.00

9. Right click on the next blank field on the grid, and select Zoom from the short-cut menu.

10. Type “**Total Weekly Pay:intHours*curPayRate**”, then press OK.
11. Click the Total button on the toolbar. Notice that a new Total line is now on the properties section of the design grid.
12. Click the Total section for the Total Weekly Pay field and select Sum.
13. Run the query to view the result.
14. Save the query as Department Weekly Pay.

Calculated Fields in a Report or Form

You can perform calculations on a form or a report. For example if you had a table or query with departments and employee pay, then you could create a report to list this information by department and have your report display totals for each department.

Exercise IX – Calculations on Reports

1. Open the Intermediate database, and click on the Report object tab.
2. Click Create a report by using wizard.
3. Select the Weekly Pay query from the pull down list.
4. Click the second button to select all fields and then click **Next>**.
5. Select view data by Department and then click **Next>** twice.
6. Sort data ascending by the last name field, and click **Next>**.
7. Select the stepped layout and click **Next>**.
8. Choose a style for your report and click **Next>**.
9. Name this report rptWeekly Pay by Department and click finish.
10. Click the view button on the toolbar to switch to design view.
11. Click the text box button from the toolbox.
12. Left click once in the Header section above the Detail section.
13. Name the label Total, and type “=sum([curPayRate])” in the text box.
14. Click the view button to view the result.