CHAPTER 1 # DATA VALIDATION

INFOCUS

One of your primary concerns with your system should be to ensure that, to the best of your ability, you'll always have accurate and relevant information in the system. You won't be able to produce meaningful information from the database if the data that is entered into it in the first place isn't accurate.

That is why in database software, such as Microsoft Access, there are plenty of features and facilities that can help to reduce the likelihood of incorrect data entering the system. For example, Access allows you to make changes to the ***field properties*** of a table. ***Properties*** are attributes that control the way that an object either works or looks. There are several field properties that can be used to check what has been typed and to restrict errors and unwanted data being entered into the table.

Ensuring the accuracy of the data is known as ***validation*** and is an important aspect of any system design.

In this session you will:

- ✓ learn how to assign default values to a field
- ✓ learn how to enter validation rules for a field
- ✓ learn how to validate numbers
- ✓ learn how to set fields as required
- ✓ learn how to work with validations.

ASSIGNING DEFAULT VALUES

With some fields it's easy to anticipate what data would normally be entered into them. When this occurs you can **assign a default value** that automatically appears in the field whenever a new record is accessed. In our *Employees* table most new employees are full time and work a 35 hour week. These values can be made the default value when new records are created in the table.

Try This Yourself:

Open File

Before starting this exercise you MUST open the file Data Validation_1.accdb...

If the yellow Security Warning appears, click on [Enable Content]

1. In the **Navigation** pane, right-click on the **Employees** table and select **Design View** to see the table in **Design View**

2. Click on **WeeklyHours** to display the **Field Properties**

3. Select the value (if any) in **Default Value**, type **35** and press Enter

    35 hours will now be the default WeeklyHours value for all new records…

4. Click on the **Fulltime** field in the top part of the window to display the **Field Properties**

5. Double-click on **No** in **Default Value**, type **Yes** and press Enter

    All new employees will appear as Fulltime as a default…

6. Click on **Save** in the **Quick Access Toolbar** (**QAT**) to save the design changes

7. Click on **Close** at the right of the table to close it

For Your Reference…

To **assign default values** to **fields**:

1. Open the table in **Design View**
2. Click on the desired field
3. Click in the **Default Value** property and type the appropriate value

Handy to Know…

- If you want to show the *current date* as a **Default Value** in a date field, type the function **Date()** into the **Default Value** property of the field. This will show the system date (that is, the current date) in all new records.

VALIDATION RULES AND TEXT

Validation rules are instructions telling Access what data to accept and what data to reject when the user types information into a field. For example, you can use validation rules to ensure that new employees are older than 18 years, that salaries are between a specific amount, and the like. Rules are generally entered as formulas, which in Access are known as *expressions*.

Try This Yourself:

Same File

Continue using the previous file with this exercise, or open the file Data Validation_2.accdb...

1 In the *Navigation* pane, right-click on the *Employees* table and select **Design View**

2 Click on *DateOfBirth* to display the *Field Properties*

3 Click in *Validation Rule*, type **<=Date()-(365.25*18)**, then press Enter to move to *Validation Text*

4 Type **Employee must be 18 years or older** then press Enter

5 Click on *Save* in the *QAT* to save the design changes

You will be asked if you wish to test the rule against the existing records…

6 Click on **[Yes]** to test all of the records in the table

7 Close the table

4

Field Properties	
General	Lookup
Format	Medium Date
Input Mask	
Caption	
Default Value	
Validation Rule	<=Date()-(365.25*18)
Validation Text	Employee must be 18 ye
Required	No
Indexed	No
IME Mode	No Control
IME Sentence Mode	None
Text Align	General
Show Date Picker	For dates

Require data entry in this field?
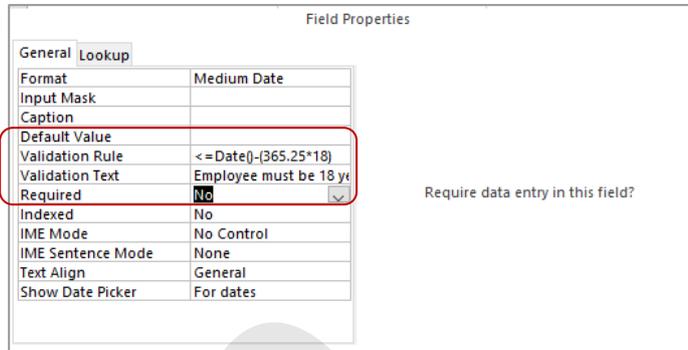
*In Access, dates are converted to numbers – every day has its own sequential number. The Date() function returns the number for the current date. The formula above says that the number for the date entered by the user must be earlier than the number for today, less the number for the day 18 years (365.25*18) from today.*

For instance, let's say the number for today is 84,356. Eighteen years ago, the number would have been 77,781 (84,356 less 6575). Therefore the number for the date that the user enters must be less than this to ensure the employee's age is 18 or older.

Microsoft Access ×

⚠ Data integrity rules have been changed; existing data may not be valid for the new rules.

This process may take a long time. Do you want the existing data to be tested with the new rules?

[Yes] [No] [Cancel]

5
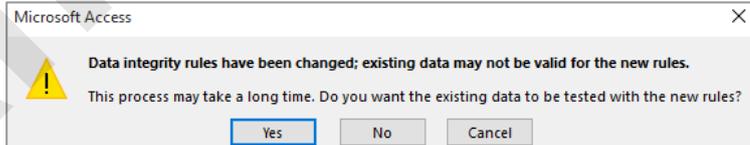
For Your Reference…

To *assign* a *validation rule* to a *field*:

1. Open the table in *Design View*
2. Click on the field
3. Click in the *Validation Rule* property and type the rule as an expression (formula)

Handy to Know…

- *Validation Text* appears when the user types a value in a field that doesn't match the expression.

VALIDATING NUMBERS

Validation rules for fields are entered into field properties as a formula, known as an expression. Numbers are usually validated in terms of a **range** – for example, the number entered by the user has to be greater than, less than or equal to a specific value. These expressions are usually entered using **operators** that represent greater than and less than.

Try This Yourself:

Same File

Continue using the previous file with this exercise, or open the file Data Validation_3.accdb...

1 In the **Navigation** pane, right-click on the **Employees** table and select **Design View**

2 Click on **WeeklyHours** to display the **Field Properties**

3 Click in **Validation Rule** and type **<=35**, then press Tab to move to **Validation Text**

4 Type **Weekly hours cannot exceed 35**, then press Tab

5 Click on **Save** in the **QAT** to save the design changes

You will now be asked if you wish to test the rule against existing records…

6 Click on **[Yes]** to test all of the records

This time a violation error appears, indicating that some records do not match the new rule. We'll correct this later…

7 Click on **[Cancel]** to stop testing records

8 Close the table

4

Field Properties

General | Lookup

Field Size	Long Integer
Format	
Decimal Places	1
Input Mask	
Caption	
Default Value	35
Validation Rule	<=35
Validation Text	s cannot exceed 35
Required	No
Indexed	No
Text Align	General

The error message that appears when you enter a value prohibited by the validation rule. Press F1 for help on validation text.

Microsoft Access ✕

⚠ **Data integrity rules have been changed; existing data may not be valid for the new rules.**

This process may take a long time. Do you want the existing data to be tested with the new rules?

[Yes] [No] [Cancel]

5

Microsoft Access ✕

⚠ **Existing data violates the new setting for the 'Validation Rule' property for field 'WeeklyHours.'**

Do you want to keep testing with the new setting?
* To keep the new setting and continue testing, click Yes.
* To revert to the old setting and continue testing, click No.
* To stop testing, click Cancel.

[Yes] [No] [Cancel]

6

For Your Reference…

To **validate numbers**:

1. Open the table in **Design View**
2. Click on the desired field
3. Click in the **Validation Rule** property and type the rule as an expression (formula)

Handy to Know…

* Common operators used in formulas are:
  <   less than
  <= less than or equal to
  >   greater than
  >= greater than or equal to
  =   equal to
  <> not equal to

SETTING REQUIRED FIELDS

There will usually be one or more fields in a table which absolutely must have a value whenever a record is entered. In our *Employees* table, each employee must have an employee number. We can also set other fields as required using the *Required* field property. This will ensure that an entry is made into these fields whenever a new record is created in the table.

Try This Yourself:

Same File

Continue using the previous file with this exercise, or open the file Data Validation_4.accdb...

1 In the *Navigation* pane, right-click on the *Employees* table and select **Design View**

2 Ensure that *EmpNo* is selected, then check that *Yes* appears in the *Required* field

3 Click on *LastName*, then double-click in the *Required* field property so *Yes* appears

Double-clicking acts as a toggle between No and Yes…

4 Repeat step *3* for the *Started*, *DateOfBirth* and *Salary* fields

5 Click on *Save* to save the design changes

You will now be asked if you wish to test the rule against existing records…

6 Click on **[No]** to skip record testing

7 Close the table

2

Field Properties	
General Lookup	
Field Size	6
Format	
Input Mask	
Caption	
Default Value	
Validation Rule	
Validation Text	
Required	Yes
Allow Zero Length	Yes
Indexed	Yes (No Duplicates)
Unicode Compression	Yes
IME Mode	No Control
IME Sentence Mode	None
Text Align	General

A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.

3

Field Properties	
General Lookup	
Field Size	25
Format	
Input Mask	
Caption	
Default Value	
Validation Rule	
Validation Text	
Required	Yes
Allow Zero Length	Yes
Indexed	Yes (Duplicates OK)
Unicode Compression	Yes
IME Mode	No Control
IME Sentence Mode	None
Text Align	General

Require data entry in this field?

Microsoft Access ✕

⚠ Data integrity rules have been changed; existing data may not be valid for the new rules.

This process may take a long time. Do you want the existing data to be tested with the new rules?

[Yes] [No] [Cancel]

5

For Your Reference…

To *mark* a *field* as *required*:

1. Open the table in *Design View*
2. Click on the desired field
3. Double-click on the current value in the *Required* property until *Yes* appears

Handy to Know…

- You can mix and match field properties to achieve accurate data entry. For example, you can mark a field as required to ensure that something is entered, and then create a validation rule to ensure that it is entered correctly.

WORKING WITH VALIDATIONS

It is a good idea to thoroughly test the validations that you enter into a table to ensure that they work as anticipated. This also helps you to understand how your user will see the system, especially the various error messages that you have created as *Validation Text*. It is important that the error messages accurately reflect the *Validation Rules* and how to satisfy them.

Try This Yourself:

Same File

Continue using the previous file with this exercise, or open the file Data Validation_5.accdb...

1 In the *Navigation* pane, double-click on the *Employees* table to open it

2 Click on the *New (blank) record* button at the bottom of the window to create a new record

3 Type the details as shown, pressing [Tab] after each to move to the next field

4 Ensure that you are in the *DateOfBirth* field, then type **10/9/03** and press [Tab]

Because this makes the employee younger than 18, a validation message will appear…

5 Click on **[OK]**, then double-click on *03* in the date, type **83** and press [Tab] until you reach *Salary*

6 Type **27000**, then click on another record to save the new record

7 Close the table

2

⊞ 187	Trevor	Simpson	Sales & Market	63024
⊞ 188	John	Cummings	Administratior	61007
⊞ 189	Ajith	Isaac	Administratior	61018
⊞ 190	Aris	Alexopoulos	Administratior	61009
⊞ 191	Brett	Thurst	Administratior	61019
⊞ 192	Christof	Ahlund	Administratior	61017
⊞ 193	David	Zylinski	Administratior	61008
⊞ 194	Ellinor	Hurst	Administratior	61010
⊞ 195	Goja	Andric	Sales & Market	63036
⊞ 196	Ian	Beaman	Research & De	62014
⊞ 197	Frederick	Berninghauser	Research & De	62035
⊞ 198	Kathryn	Munro	Sales & Market	63017
⊞ 199	Leticia	Badea	Research & De	62015
⊞ 200	Mark	O'Connor	Sales & Market	63033
⊞ 201	Michael	Rockland	Research & De	62026
⊞ 203	Philip	Hutchins	Administratior	61011
⊞ 204	Susan	Baker-Smith	Administratior	61020
⊞ 205	Trond	Abelseth	Administratior	61014
✱				

Record: I◄ ◄ 100 of 100 ► ►I ►✱ 🏷No Filter Search ◄

4

EmpNo:	208
FirstName:	Fred
LastName:	Smith
Department:	Administration
PhoneNo:	64705
Started:	04/04/08

6

⊞ 20-Dec-82	☑	40	$56,000.00
⊞ 27-Jul-67	☑	40	$45,000.00
⊞ 07-Jul-65	☑	40	$43,000.00
⊞ 14-Jun-86	☑	40	$38,700.00
⊞ 21-Feb-62	☐	35	$28,900.00
⊞ 28-Jun-57	☑	40	$42,300.00
⊞ 30-Aug-54	☑	40	$59,500.00
⊞ 15-Nov-53	☑	40	$48,700.00
⊞ 26-May-81	☐	25	$26,200.00
⊞ 10-Sep-83	☑	35	$0.00
✱	☑	35	$0.00

Record: I◄ ◄ 100 of 100 ► ►I ►✱ 🏷No Filter Search ◄

For Your Reference…

To *work* with *validations*:

1. Open the table in *Datasheet View* and create a new record
2. Enter data into the fields – correct errors as they are notified to you

Handy to Know…

• The trickiest validation is the *Required* property. If you leave a required field empty, you will only be notified when you move off the record – this is when Access attempts to save the record and discovers that something that is required has been missed.

FORMATTING TABLES

Formatting refers to the process of changing the appearance of something, usually so that it is more visually pleasing or easier to read.

The default formatting for tables in Access is rather bland. Fortunately, Access provides a number of tools for formatting tables including changing the gridlines between columns and rows, shading the background of cells, and changing fonts and font colours.

Since tables can be easily printed, formatting a table provides a quick and efficient way of creating and printing simple reports of the data.

In this session you will:

✓ learn how to change the width of table columns

✓ learn how to format cells in a table

✓ learn how to change the fonts used in a table

✓ learn how to move fields in a table

✓ learn how to freeze and unfreeze columns in a table

✓ learn how to hide columns in a table

✓ learn how to unhide columns in a table that have been hidden.

CHANGING COLUMN WIDTHS

Often you will find that the width of a column in *Datasheet* view is not appropriate for the data in the field. Either the column is too small and you can't see the data, or the column is unnecessarily wide. Access allows you to change the width of a column. You can use commands in the ribbon for precise sizing or you can drag the column heading using the mouse.

Try This Yourself:

Open File

Before starting this exercise you MUST open the file Formatting Tables_1.accdb…

1 In the *Navigation* pane, double-click on the *Employees* table to open it

2 Click on any *LastName* field

3 On the *Home* tab, click on *More* in the *Records* group and select **Field Width** to display the *Column Width* dialog box

4 Type **20**, then click on **[OK]** to widen the *LastName* column

5 Point to the border between the *FirstName* and *LastName* headers until it changes to a double-headed arrow, then click and drag right until the *FirstName* field is about half as wide again, as shown

6 Point to the border between *Department* and *PhoneNo*, then double-click to perform a best fit on the *Department* column

7 Click on *Save* in the *QAT* to save the design changes

8 Close the table

For Your Reference…

To *adjust table column widths*:

- Click in the column, then on the *Home* tab, click on *More* in the *Records* group and select **Field Width**, or
  Drag the field name border to change width

Handy to Know…

- To retain the changes to layouts you must save them by clicking on *Save* in the *Quick Access Toolbar*.
- Changing the width of a column on screen doesn't change the field size property – the field size determines how much data can be placed in a field.

FORMATTING CELLS IN A TABLE

Access provides a number of options for changing things such as the grid lines displayed in the table, the background colours of cells, the alternate background colours of cells and much more. Formatting cells in the table is achieved using the various commands on the ribbon or through the options in the *Datasheet Formatting* dialog box.

Try This Yourself:

Continue using the previous file with this exercise, or open the file Formatting Tables_2.accdb...

1 Double-click on the *Employees* table to open it

2 On the *Home* tab, click on the dialog box launcher in the *Text Formatting* group to open the *Datasheet Formatting* dialog box

3 Click on the options in *Cell Effect* and observe the changes in *Sample* – when done, click on *Flat*

4 Click on the drop arrow for *Alternate Background Colour* and click on *Maroon 2* in *Standard Colours* (column 6, row 3)

5 Ensure that both *Horizontal* and *Vertical* appear ticked in *Gridlines Shown*

6 Click on the drop arrow for *Gridline Colour* and click on *Green* in *Standard Colours* (column 7, row 1)

7 Click on **[OK]** to apply the changes

8 Save and close the table

For Your Reference…

To *change cell formatting*:

1. On the *Home* tab, click on the dialog box launcher in the *Text Formatting* group
2. Change the effects as desired
3. Click on **[OK]**

Handy to Know…

- Unlike a spreadsheet application, such as Microsoft Excel, in Access you can't change individual cells. You can either format the entire table or not at all.

CHANGING FONTS

Access uses a set of standard fonts to display your data in a Datasheet, but you can change the font and apply virtually any font installed on your computer. You can increase or decrease the font sizes, apply coloured fonts and much more. It is important to make sure you use a font that is easy to read for the sake of accuracy.

Try This Yourself:

Same File

Continue using the previous file with this exercise, or open the file Formatting Tables_3.accdb...

1. Double-click on the **Employees** table to open it

2. On the **Home** tab, click on the drop arrow for **Font Colour** in the **Text Formatting** group to display a palette of colours

3. Click on **Dark Blue** in **Standard Colours** (column 4, row 1) to change the colour of the font

4. Click on the drop arrow for **Font Size** and click on **14** to increase the font size

   A little overwhelming…

5. Click on the drop arrow for **Font Size** and click on **8** to decrease the font size

   Now it's a bit small…

6. Repeat step **5** and increase the font size to **11**

7. Click on the drop arrow for **Font** and click on **Book Antiqua** to change the font

   Let's change this back…

8. Repeat step **7** and set the font back to **Calibri (Detail)**

9. Save and close the table

For Your Reference…

To **change** the **fonts** in a **table**:

1. On the **Home** tab, click on the respective drop arrows in the ribbon for **Font**, **Font Size** and **Font Colour** in the **Text Formatting** group
2. Click on the appropriate option

Handy to Know…

- There are a myriad of font formatting options available. However, sometimes keeping the default settings is the most pleasing to the eye. Don't go overboard with "busy" fonts and colours unless you are really trying to make a statement.

MOVING COLUMNS IN A TABLE

The order in which columns are presented in a table is determined by the order in which fields were defined in the design of the table. While these positions may have made sense when the table was designed, they may be inappropriate for viewing the data in a table. You can alter the column positions in a table and move columns around by dragging.

Try This Yourself:

Same File

Continue using the previous file with this exercise, or open the file Formatting Tables_4.accdb...

1 Double-click on the **Employees** table to open it

2 Click on the **LastName** field header to select the entire column

3 Point to the bottom of the field name until the pointer changes to a four-headed arrow, as shown

The four-headed arrow is the move pointer…

4 Hold down the left mouse button and drag left until a thick line appears to the left of the **FirstName** column, as shown

5 Release the mouse button to reposition the **LastName** column

6 Save and close the table

3

	EmpNo	FirstName	LastName	Department
⊞	101	Julianne	Kerr	Executive
⊞	102	Harry	Jones	Executive
⊞	103	Angel	Harrington	Executive
⊞	104	Peter	Dawson	Executive
⊞	105	Mark	Jones	Executive
⊞	106	Maureen	Grayson	Executive
⊞	107	Augustine	Millson	Administration
⊞	108	Amanda	Bennet	Administration
⊞	110	Neville	Smith	Administration

4

	EmpNo	FirstName	LastName	Department
⊞	101	Julianne	Kerr	Executive
⊞	102	Harry	Jones	Executive
⊞	103	Angel	Harrington	Executive
⊞	104	Peter	Dawson	Executive
⊞	105	Mark	Jones	Executive
⊞	106	Maureen	Grayson	Executive
⊞	107	Augustine	Millson	Administration
⊞	108	Amanda	Bennet	Administration
⊞	110	Neville	Smith	Administration

5

	EmpNo	LastName	FirstName	Department
⊞	101	Kerr	Julianne	Executive
⊞	102	Jones	Harry	Executive
⊞	103	Harrington	Angel	Executive
⊞	104	Dawson	Peter	Executive
⊞	105	Jones	Mark	Executive
⊞	106	Grayson	Maureen	Executive
⊞	107	Millson	Augustine	Administration
⊞	108	Bennet	Amanda	Administration
⊞	110	Smith	Neville	Administration

For Your Reference…

To **move** a **field** in a **table**:

1. Click on the column header of the field to select it
2. Drag the column to the desired location

Handy to Know…

- Dragging field headers in a table does not alter the position of fields in the table structure when viewed in **Design View**.

FREEZING COLUMNS IN A TABLE

When you have a table that contains many fields, chances are that as you scroll right through the table, the information in the fields at the left will disappear because the screen is not wide enough to display all of the data. This can be annoying, particularly if there is *reference point data* in the left fields. You can freeze columns in a table, thereby keeping fields locked on the screen.

Try This Yourself:

Same File

Continue using the previous file with this exercise, or open the file Formatting Tables_5.accdb...

1 Double-click on the *Employees* table to open it

2 Click on the *EmpNo* header, hold down `Shift`, then click on the *LastName* header to select both columns

3 On the *Home* tab, click on *More* in the *Records* group, then select **Freeze Fields**

The selected fields will now be locked on the screen…

4 If necessary use the horizontal scroll bar to scroll right until *WeeklyHours* appears next to *LastName*

Let's unfreeze the fields again…

5 On the *Home* tab, click on *More* in the *Records* group and select **Unfreeze All Fields**

6 Save and close the table

2

	EmpNo	LastName	FirstName	Department
⊞	101	Kerr	Julianne	Executive
⊞	102	Jones	Harry	Executive
⊞	103	Harrington	Angel	Executive
⊞	104	Dawson	Peter	Executive
⊞	105	Jones	Mark	Executive
⊞	106	Grayson	Maureen	Executive
⊞	107	Millson	Augustine	Administration
⊞	108	Bennet	Amanda	Administration
⊞	110	Smith	Neville	Administration

4

	EmpNo	LastName	WeeklyHou	Salary	Comm
⊞	101	Kerr	40	$250,000.00	
⊞	102	Jones	40	$140,000.00	
⊞	103	Harrington	40	$145,000.00	
⊞	104	Dawson	40	$140,000.00	
⊞	105	Jones	40	$132,000.00	
⊞	106	Grayson	40	$85,000.00	Promo
⊞	107	Millson	40	$85,000.00	
⊞	108	Bennet	40	$87,000.00	
⊞	110	Smith	40	$78,000.00	Studyi

For Your Reference…

To *freeze* or *unfreeze columns* in a *table*:

1. Select the column(s) to freeze or unfreeze
2. On the *Home* tab, click on *More* in the *Records* group
3. Select **Freeze Fields** or **Unfreeze All Fields**

Handy to Know…

- You can only freeze multiple columns that are next to one another. If you wish to freeze a column further to the right you will need to reposition it to be alongside the other column(s) first.