

Working with an Access Table

Aims of session:

To enable you to:

- Load Access
- Edit a table structure
- Add and Delete records
- Differentiate between different Data Types
- Set a key field
- Implement simple validation Rules

Creating an ACCESS folder in your MYDOCUMENTS area

Before beginning any practical Access work, it would be a good idea to create a folder in your MYDOCUMENTS area. Doing so would allow you to segregate your database design work from your other work.

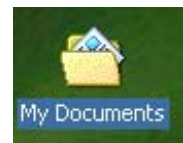
- ➔ Double Click on your MYDOCUMENTS icon to open your MYDOCUMENTS folder
- ➔ Select the FILE/NEW/FOLDER option in your MYDOCUMENTS window

This will create a new folder (called NEW FOLDER) in your MYDOCUMENTS area. Notice that the title of the NEW FOLDER icon is highlighted, to change the name of the folder;

- ➔ Type the name "ACCESS" (no quotation marks) and press the RETURN key.

You should now have a folder called ACCESS.

- ➔ Open your Access Folder by double clicking on the "Access Folder" Icon.



Access



Making your own copy of the Student records Database

Now you have created a folder for your access work, you need to find the tutorial Access database file and make a copy of it in your own Access folder.

A centrally held version of the database called

STUDENT RECORDS.MDB

is published on The Northern College web site on the Database Design Course Contents page:

(http://www.northern.ac.uk/computing_science/db_design/dbd%20main.htm)

Before we can do any work with the Student Records database, a copy must first be downloaded into your **MYDOCUMENTS\ACCESS** folder. The following steps will take you through the file download process.



Use your web browser to visit

<http://www.northern.ac.uk/ncmaterials/computing%20science/db-design/dbd%20main.htm>

Notes



Access

Course Contents - printable version (.PDF)

Use this link to begin the file download process

Schedule of Assessed Exercises		Schedule of Assessed
Aims & Objectives		Aims & Objectives - pri
Initial data (web page)	Download Database here (Student Records.mdb)	Initial data - printable ve
Understanding Database Terminology		Understanding Databas
Working with an Access Table		Working with an Access

Figure 1.3: Northern College Web Site - data file download



Click on the [Download Database here](#) link to begin the download process.



Notes

- Click on the "Save" button in the 'File Download' dialogue box (Figure 1.4).

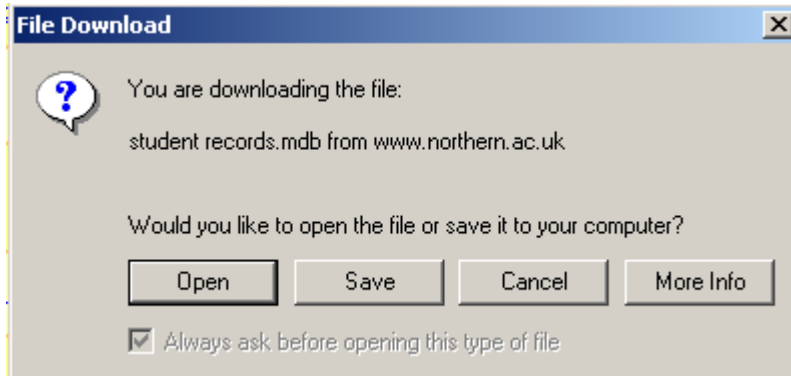


Figure 1.4: File download window

- Ensure that you name the database file as **Student records.mdb** and that you specify your **MYDOCUMENTS\ACCESS** folder as shown below (Figure 1.5).

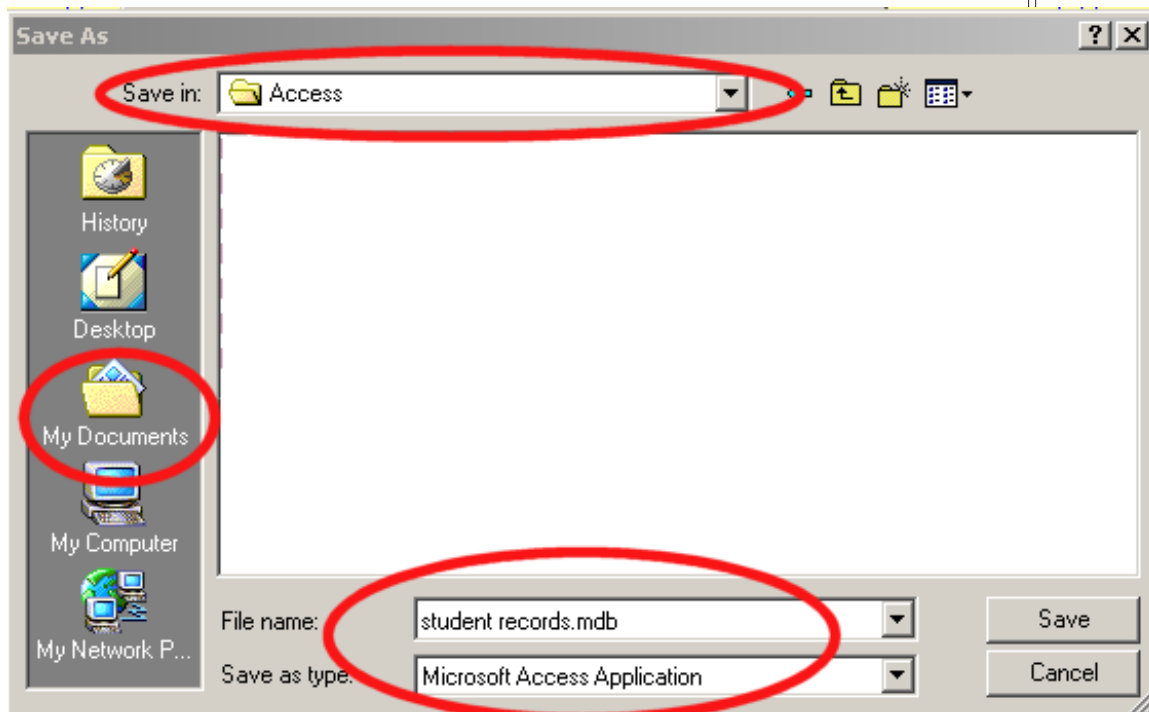


Figure 1.5: Save As student records.mdb

- Click on the "Save" button to begin the download



You should now see a “File Transfer” details dialogue box. When the download is complete the dialog box shown below (Figure 1.6) should close: if this does not happen you will need to close it yourself.

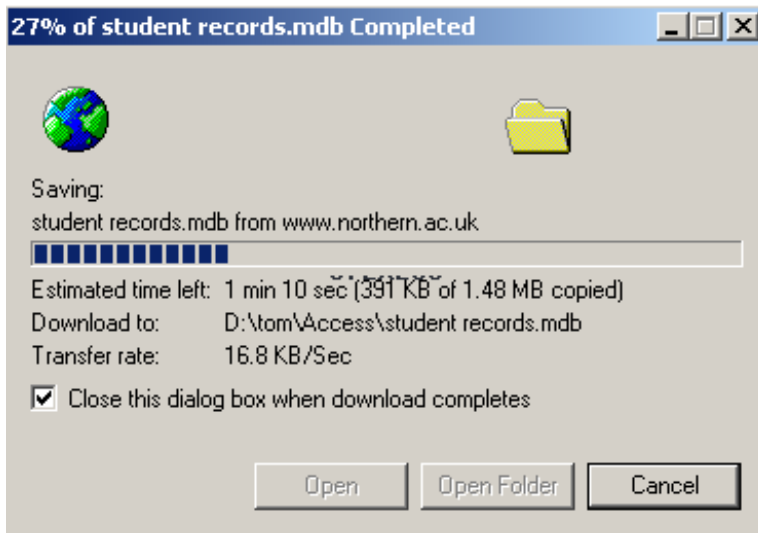


Figure 1.6: File Transfer progress

You will know you have been successful when you see the STUDENT RECORDS.MDB icon appears in your folder.

Running Access

There are two ways to open the Student records database in Access.

The first is to open your “Microsoft Applications” window and double click on the Access Icon. Use the FILE/OPEN menu option within Access to locate and open the Student Records database.

The second (preferred) way is to double click on the student records icon. This will automatically load Access and open the Student Records database.

Notes



student records



MSACCESS



student records



Opening the STUDREC data table



Open the your copy of the Student Records database by double clicking on the Student Records Icon.

The first thing you should see is an Access screen similar to Figure 1.7.

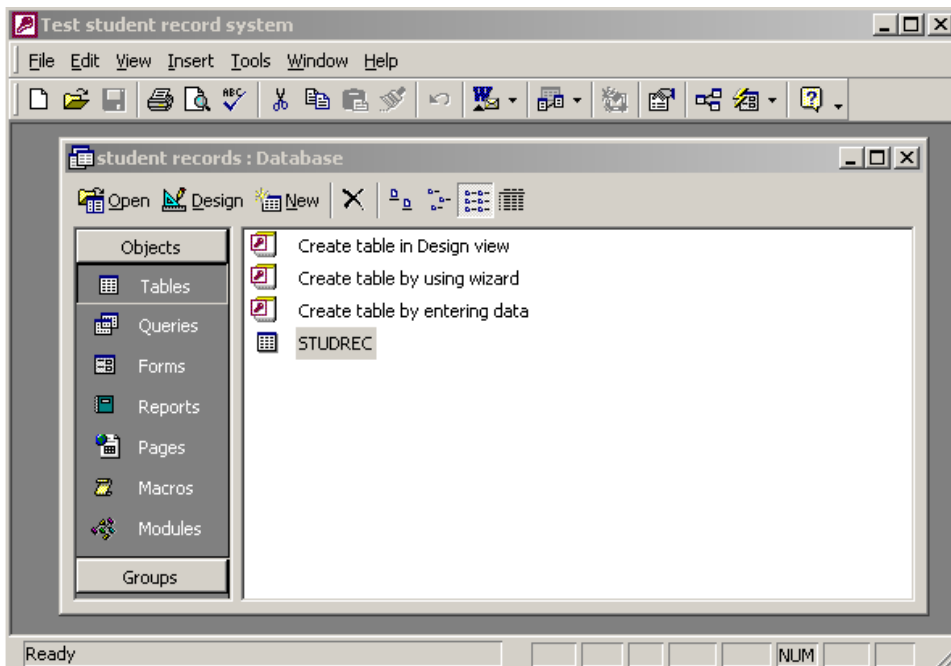


Figure 1.7: Access Start up Screen

Datasheet View and Design View of a table

Consider figure 1.8 (next page). This is the “Data Sheet” view. There are two ways of viewing a table, “Datasheet View” which lists the data held in the table and “Design View” which allows us to change the underlying design of the table.

It is possible to switch between the two views by using the VIEW/DESIGN VIEW and VIEW/DATASHEET VIEW menu options.

Notes



student records

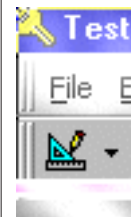


Notes

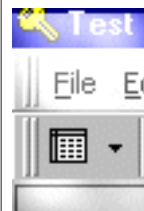
SREF	INIT	SNAME	DOB	GENDER	RES	KIDS	HTOWN
1	TJ	OSMAN	29-Sep-53	M	No	0	MILLHOUSE GREEN
2	S	LANGLEY	21-Aug-57	F	No	0	HUDDERSFIELD
3	H	WILSON	07-Jul-62	M	Yes	1	HUDDERSFIELD
4	J	CARTER	21-Mar-54	F	Yes	2	BARNSLEY
5	A	JONES	10-Nov-48	F	Yes	2	SHEFFIELD
6	S	ISHMO	05-Dec-50	M	No	0	LEEDS
7	K	ARNOTT	01-Aug-60	F	Yes	2	SHEFFIELD
8	B	ARNOTT	23-May-62	F	Yes	1	LEEDS
9	N	GREEN	30-Sep-58	M	Yes	1	SHEFFIELD
10	H	JACKSON	21-Apr-41	M	Yes	0	SHEFFIELD
11	A	ARNOTT	23-Aug-54	M	Yes	2	BARNSLEY
12	N	HEY	10-Oct-55	F	No	0	SILKSTONE
13	K	WILSON	13-Mar-65	M	No	2	BARNSLEY
14	J	BROWN	29-Sep-53	F	Yes	1	BARNSLEY
15	A	ARNOTT	23-Aug-54	F	No	1	BARNSLEY
16	G	WHITE	03-Mar-65	M	Yes	3	BARNSLEY
17	J	GREEN	06-Aug-69	F	No	0	BARNSLEY
18	J	GREEN	09-Aug-45	M	No	0	BARNSLEY
19	F	WATSON	03-Mar-58	M	Yes	1	THURLSTONE
20	L	HARVEY	03-Aug-54	F	No	2	THURLSTONE

Figure 1.8: Data Sheet View of Studrec

Alternatively, it is possible to click on the DESIGN VIEW icon (right) that is located just under the FILE Menu. This will move the table into the design view, this is shown in figure 1.9.



When the table is in design view, the design view icon is replaced by a DATASHEET VIEW icon (right). Clicking on this will move to the datasheet view.



Try moving from the datasheet view to the design view and back. Do this a few times.

The data design view of the Studrec table should look like Figure 1.9.

The design view allows us to create and edit the underlying structure of a table. At present it can be seen that the data fields in Studrec are:

- Student's reference number
- Initials
- Surname
- Date of Birth
- Male/Female
- Is the student in residence at the college? (Yes/No)
- Number of children that are at the college
- Home Town (cut down version of student's address)



Notes

Field Name	Data Type	Description
SREF	Number	
INIT	Text	
SNAME	Text	
DOB	Date/Time	
GENDER	Text	
RES	Yes/No	
KIDS	Number	
HTOWN	Text	

Field Properties

General	
Lookup	
Format	Yes/No
Caption	
Default Value	
Validation Rule	
Validation Text	
Required	No
Indexed	No

The field description is optional. It helps you describe the field and is also displayed in the status bar when you select this field on a form.

Figure 1.9: Studrec data design view

Data Types

The design view (above) shows that there is a range of different types of data. Some data are text, other data are numerical, some are dates and yet others are logical (yes/no).

Choose your data types carefully. Doing so will allow a measure of data validation, e.g. if the KIDS data field was defined as a Number data type, the Access DBMS will prevent users from accidentally inputting text; also it will be possible to easily calculate statistics such as the total number of children or the average number of children.

The main data types are shown in the following table



Setting	Type of data	Size	Notes
Text	(Default) Text or combinations of text and numbers, as well as numbers that don't require calculations, such as phone numbers.	Up to 255 characters or the length set by the FieldSize property, whichever is less. Microsoft Access does not reserve space for unused portions of a text field.	
Memo	Lengthy text or combinations of text and numbers.	Normally up to 65,535 characters of text.	
Number	Numeric data used in mathematical calculations.	1, 2, 4, or 8 bytes (16 bytes if the FieldSize property is set to Replication ID).	
Date/Time	Date and time values for the years 100 through 9999.	8 bytes.	
Currency	Currency values and numeric data used in mathematical calculations involving data with one to four decimal places. Accurate to 15 digits on the left side of the decimal separator and to 4 digits on the right side.	8 bytes.	
AutoNumber	A unique sequential (incremented by 1) number or random number assigned by Microsoft Access whenever a new record is added to a table. AutoNumber fields can't be updated.	4 bytes (16 bytes if the FieldSize property is set to Replication ID).	
Yes/No	Yes and No values and fields that contain only one of two values (Yes/No, True/False, or On/Off).	1 bit.	

Table 1.1 : Common Data Types



Notes

Each data field has a FieldSize property that in the case of a number data type has the following settings:

Setting	Description	Decimal precision	Storage Size
Byte	Stores numbers from 0 to 255 (no fractions)	None	1 byte
Integer	Stores numbers from -32,768 to 32,767 (no fractions).	None	2 bytes
Long Integer (Default)	Stores numbers from -2,147,483,648 to 2,147,483,647 (no fractions).	None	4 bytes
Single	Stores numbers from -3.402823E38 to -1.401298E-45 for negative values and from 1.401298E-45 to 3.402823E38 for positive values.	7	4 bytes
Double	Stores numbers from -1.79769313486231E308 to -4.94065645841247E-324 for negative values and from 1.79769313486231E308 to 4.94065645841247E-324 for positive values.	15	8 bytes
Replication ID	Globally unique identifier (GUID)	N/A	16 bytes

Table 1.2: Number Data Type FieldSize Property

Editing the Structure of a Table

The data table you have is incomplete for the purposes of this course. We need to add another field and we also need to add more records. First we'll add another field. Imagine that we need to know how far away from the College each student lives; for example, we might wish to carry out an investigation into our recruiting patterns.

We are going to add another data field to hold the distance (in miles) of each student's home town from the College, we'll call this field distance and we'll make it a numeric field.



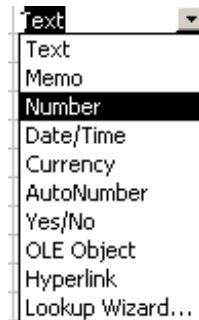
The field details are:

Name: DISTANCE
 Type: NUMERIC (field size = INTEGER)

Why choose integer, why not BYTE? Can you think of the reason?

To add the DISTANCE data field, carry out the following actions:

- Ensure that you have design view selected
- Enter the field name (DISTANCE) in the Field Name column immediately under the HTOWN field name, (Notice that the data type defaults to TEXT).
- Move to the Data Type Column and click on the “pull down arrow” in the field data type cell and select the data type NUMBER.



By default a number data type is set to “Long Integer”. This takes up 4 Bytes of data storage space. We should declare this particular data field as an INTEGER because that takes up only 2 Bytes and we can store values of up to 32,767.

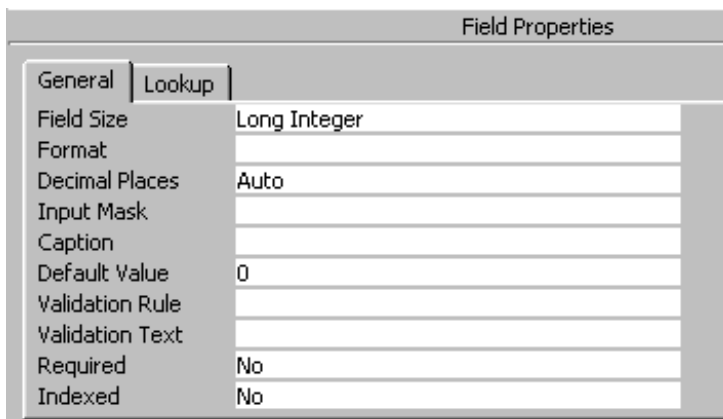


Figure 1.10: Field Properties

We are now going to define the data field as an integer.

- Ensure that you have the DISTANCE row in the design view of the Studrec table selected.



Notice the FIELD PROPERTIES section of the screen (lower half of screen).

- ☛ Ensure that the "General" tab is selected.

This will give you a display that is similar to the one shown in Figure 1.10.

- ☛ Click in the "Field Size" property box (where it currently displays "Long integer").

A pull down arrow will appear. ▾

- ☛ Click on the arrow and select the FieldSize "Integer".

- ☛ Switch back to Datasheet View.

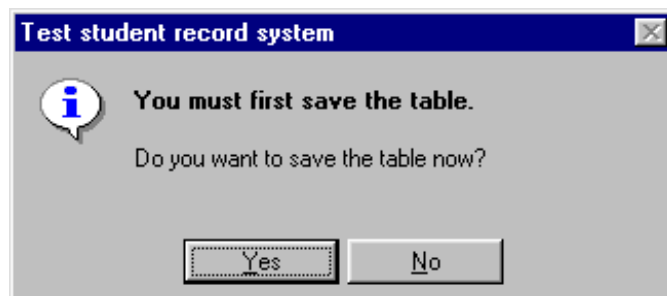


Figure 1.11: Save the Table

When you do so you will be asked to save the changes you have made in the design view.

- ☛ Answer Yes.

You will now see an additional column (called DISTANCE). Add the required distances to your data table, refer to Figure 1 for the specific data.

- ☛ If you haven't already done so, this would be a good point to save your work. Do this by using the FILE/SAVE menu options.



Setting a key field

A key field is a vital concept in database design, the key field will identify specific records. In the Studrec example we want to ensure that the SREF field (Student Reference Number) is identified as the key field. We use a reference number because it is quite possible to have different students with the same name.

To set a field as a key field, do the following:

- ➔ Ensure that you have your tutorial database loaded and that you are in the design view.
- ➔ Ensure that the insertion point is anywhere along the SREF row of the design form.
- ➔ Click on the “Key Field” icon on the toolbar (right).
- ➔ Save your work

This will set SREF as the key field in the STUDREC table. This is indicated by the key symbol that appears to the immediate left of the field name. When a field is set as a key field certain restrictions apply, the field must contain data (it cannot be empty - NULL), in addition there cannot be duplicate values (of a key field) within the same table.

It is possible to define a primary key field *after* data has been entered but Access will generate an error message if the key field contains duplicate or null values. If this happens you can either:

- 1: Choose another key field
- 2: Remove any duplicate and or null values
- 3: Add another field, define it to be an “auto number” data type and set that to be the primary key.

Simple validation rules

Data validation is the act of ensuring that only valid data is input into the database. The table Studrec has a field GENDER in it. A reasonable assumption would be that there are only two valid values (M or F). To ensure that the database contains valid data we may try to set things up so that only the letter M or the letter F (in upper case) can be input into this field. Validation rules enable us to achieve this goal.



We are going to set both validation rules and input masks for the fields in the table STUDREC.



Make sure that you are in design view



Check that the field properties of each field in your Studrec table is as shown in Table 3: (**Field Properties for Studrec** - next page). Note that you will need to change existing properties as necessary.

Input Masks

Input masks are used to force the users' input into a particular form. In the case of the gender field we wish to accept only M or F in upper case. The mask looks like this:

>A

This forces the input into upper case (>) and requires at least one character (A).

If that's all we did for the gender field, we could type any character in this field. We use **validation rules** to prevent anything except M or F from being entered. The validation rule in this case is:

Like "M" Or Like "F"

At this stage it doesn't matter too much how these masks and rules work, see Appendix A for further details.



Notes

Field Properties for Studrec

SREF - Numeric

FieldSize	Integer
Format	Fixed
Decimal Places	0
Input Mask	
Caption	
Default Value	
Validation rule	
Validation Text	
Required	Yes
Indexed	Yes (No Duplicates)

INIT - Text

Field size	3
Format	
Input mask	>A??
Caption	
Default Value	
Validation rule	
Validation Text	
Required	Yes
Allow Zero Length	No
Indexed	No

SNAME - Text

Field size	15
Format	
Input mask	>A??????????????
Caption	
Default Value	
Validation rule	
Validation Text	
Required	Yes
Allow Zero Length	No
Indexed	No

(1 x "A" + 14x "?" = 15 characters)

DOB - Date

Format	Medium Date
Input mask	
Caption	
Default Value	
Validation rule	
Validation Text	
Required	Yes
Indexed	No

Note: If you check the date of birth of 'T Jamison' you will note that when you carry out operations such as ordering students by date of birth, that Access interprets the year '29 as 2029 rather than 1929. This is a manifestation of the "Y2K bug" date problem that gripped the computing industry in 1998, 1999 and faded when, in 2000 we realised that we'd got away with it.



Notes

The problem arises from programmers trying to save space by storing the year portion of dates as 2 digits and assuming the prefixing '19'. That worked until we entered a new millenium.

Windows (and hence Access) gets round this problem by implementing a 'sliding window' protocol that (currently) states that any 2 digit year from 00 to 29 is interpreted as 2000, 2001, ... 2029 whilst 2 digit years between 30 and 99 are interpreted as 1930, 1931, ... 1999.

The solution to this misinterpretation in Access is to redefine the date format to "Long Date" and then to edit T Jamison's date of birth from 2029 to 1929.

You should carry out these alterations as outlined in the preceding paragraph.

GENDER - Text

Field size	1
Format	
Input mask	>A
Caption	
Default Value	
Validation rule	Like "M" Or Like "F"
Validation Text	
Required	Yes
Allow Zero Length	No
Indexed	No

RES - Yes/No

Format	Yes/No
Input mask	
Caption	
Default Value	
Validation rule	
Validation Text	
Required	Yes
Indexed	No



		Notes
KIDS - Number		
FieldSize	Byte	
Format		
Decimal Places	0	
Input Mask		
Caption		
Default Value		
Validation rule	>=0	
Validation Text		
Required	No	
Indexed	No	
HTOWN - Text		
Field size	16	
Format		
Input mask	>A??????????????	(1 x "A" + 15 x "?" = 16 characters)
Caption		
Default Value		
Validation rule		
Validation Text		
Required	Yes	
Allow Zero Length	No	
Indexed	No	
DISTANCE - Number		
FieldSize	Integer	
Format		
Decimal Places	0	
Input Mask		
Caption		
Default Value		
Validation rule	>=1	
Validation Text	Mileage Must be 1 or More.	
Required	No	
Indexed	No	

Table 1.3: (field properties for the Studrec table)





At this stage, save your work. You should see a message to the effect that the existing data may not fit the changed rules, answer YES to check this.





Adding a record


Adding record to the Studrec table is done in the Datasheet View mode.

-  Ensure that you are in Datasheet View mode.
-  Select the INSERT/NEW RECORD menu option

The insertion point will now be in the last row on your datasheet (record 41).



-  Enter your own details (make up your date of birth if you must!), SREF should be 41.
-  Deliberately try to input data that you know won't fit.

Observe what happens if you try to enter data that breaches the validation rules that you entered earlier. Try to relate any messages back to your validation rules.

-  Enter a second record with SREF=42 (it doesn't matter what you put in it because we are going to delete it in the next exercise).

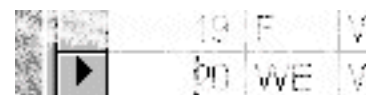
Deleting a Record

No database would be complete without the ability to edit and delete records. To delete a record, carry out the following steps:

-  Ensure that you are in Datasheet view
-  Ensure that you have the record to be deleted selected (it should be the last record you entered, i.e. record 42).

A good check is to note where the record selector icon is (right).

There are many ways of deleting the selected record, we'll go for one of the most straightforward.





Click on the "Delete Record" icon on the toolbar (right), this will delete the record.

Notes



Exercise 1:

- 1: Ensure that you have worked through this worksheet in time for next week's lesson. It is important that you have successfully completed the work in time because next week's work will assume that you have done so.

- 2: If you haven't yet done so, ensure that the DOB filed is in Long Date format and that T Jamison's date of birth is 1929 - NOT 2029.

- 3: Print out a copy of the Studrec table. Write on the printed copy your name, and the date you printed it and show this to your tutor. Keep a copy of the print out in your own files as it may be needed for moderation (this applies to all printed work done throughout this course).

