Databases

There are three major steps involved in creating a database.

Designing the database.

This step involves deciding what information is required in the database and then setting up a layout for this information to be entered into. This stage normally only occurs once, though modifications may have to be made later.

Entering data.

This is the tedious part of keying in all the data about the people or goods that the database is storing information about. This often only occurs once though updates may have to be made from time to time.
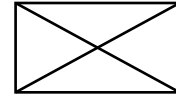
Using the database.

This involves extracting from the database the information you may want from time to time. What is John's telephone number? How many pupils take Physics? Can we send letters to all 1A2? This is the stage which goes on all the time.

Most users of databases are not at all involved in stage 1. That is left to the professionals. They are involved in stage two, but only occasionally as most of the data is keyed in in one block and is only added to now and then. Most database users are to be found in stage three. Extracting information from a database which has already been designed and created. The difficult part for you is that you will be going through all three stages from time to time and possibly all three simultaneously!!!! It is a good idea when using these notes to bear in mind which stage you are following at any given time.
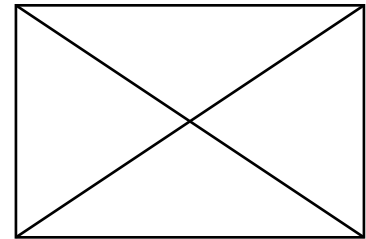

The Microsoft Works Icon.

Starting MS Works on the Mac

Double click on the Works Icon.

The **Open File**: dialog box appears.

Startup dialog box.

Creating a new database.

Click on the Data Base icon and click on *New* to start a new database.

Works creates an empty document and asks you to name the first field.

Type **First Name.**

Click *Add Field* button.

Works then asks you to name a new field.

Type **Surname.**

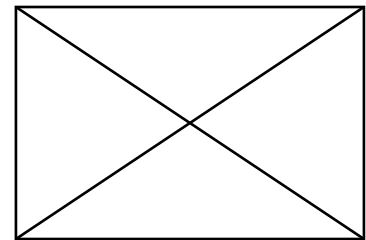Click *Add Field* button

Enter the following field names:

Class

Address1

Address2

Address3

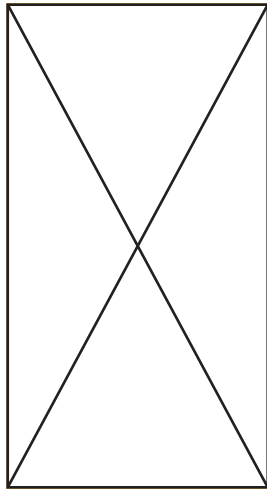When you have created all these fields click the *Done* button.

The dialog box disappears and the First Name field is selected.

New field dialog box.

Getting Around the Works Screen.

Works displays a record on screen. This includes the fields that make up the record. Across the top of the screen is the Menu bar.

File menu

Below the Menu bar is the Entry bar, and to the right of the screen are the scroll bars. These allow you to move around the record.

Moving from field to field.
There are several ways to move to another field.
Using the mouse.
Position the mouse pointer on the field you wish to move to and click. Do <u>not</u> position the pointer on the field name.

Using the keyboard.
Press the tab key until the highlight moves to the field you want . If you repeatedly press tab, the selection will cycle from the last back to the first field.
Holding shift while pressing Tab will move you through the fields in reverse.
Pressing Return works much the same as Tab.

Saving your work.
It is important, especially when working on long documents to save your work regularly.
Select *File* from the menu bar.
Select *Save as...*
Type **School** as the file name and press return.

Entering Data.
Position the highlight in the *First Name* field.
Type **John.**
Position the highlight in the *Surname* field.
Type **Duffy.**
Press Return.
For *Class* , type **1A2,** press return.
For *Address1*, type **Shanown Road**, press return.
For *Address2*, type **Santry**, press return.
For *Address3*, type **Dublin 9**, press return.

Pressing return at the last field writes the field but also simultaneouly writes the record, and so, a new blank record is presented for you to make new entries. The number 2 appears at the left of the entry bar to indicate that blank record 2 is now on screen.

Enter the following records.

First name	Pat	Mary	Joan	Sean
Surname	O'Reilly	Maguire	Flynn	Connors
Class	1A2	1A2	1A2	1A2
Address1	Santry Avenue	Shanowen Close	Swords Road	Ballymun Road.
Address 2	Santry	Santry	Whitehall	Ballymun
Address 3	Dublin 9	Dublin 9	Dublin 9	Dublin 9
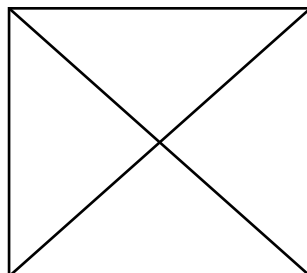
A record in Form View.

Saving your work.
Because you have already saved the database it has a name. So

provided you do not want to change the name you can save quickly by:
Select *File* from the Menu bar.
Select *Save*.

Examining records.

Having keyed in the data above you have a blank Record No. 6 on screen. You can go back and look at the other records using Shift and Tab.

If you find any errors, for example spelling errors, you can correct them by selecting the field and typing in the new data.

Printing a record.

With the record you want to print, displayed on screen.
Select File from the Menu bar.
Select Print Window.

Format menu,

Changing your view.

So far we have looked at the database record by record, sometimes it is handier to see a list of all the records.
Select *Format* from the Menu bar.
Select *Show list.*

The fields are now arranged in columns like a spreadsheet. There is a scroll bar across the end of the screen which allows you to move across the screen to see fields which are hidden.

Add a new record at the end of the database.

Select the cell beneath **Sean**.
Type **Anne**, press Tab.
Type **Murray**, Press Tab.
Type **1A2**, press Tab.
Type **Dromnanane Park**, press Tab.
Type **Beaumont**, Press Tab.
Type **Dublin 9**, press Tab.
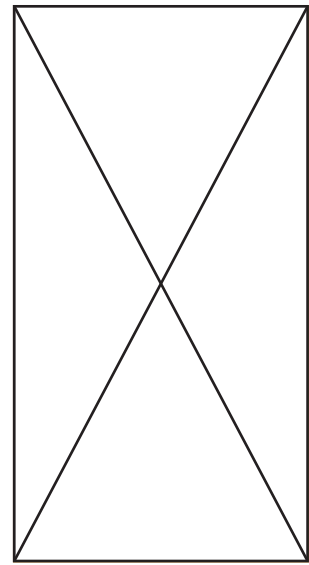

List view.

Exercise

Add new records using the following data.
Paula Dunne, 1A2, Larkhill Road, Whitehall, Dublin 9.
Andrew Greeley, 1A2, Collins Avenue, Whitehall, Dublin 9.
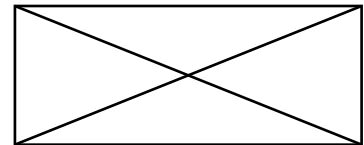
Going back to form view.

Select *Format* from the Menu bar.
Select *Show form.*

Inserting a record in the middle of the database from Form view.

If you wish to insert a new record before record 3.
Get record 3 on screen.
Select *Edit* from the Menu bar.
Select *Insert record.*
Enter the following into record 3.
Alan, Anderson, 1A2, Shangan Gardens, Ballymun, Dublin 9.

The hand pointer.

Adding a new field.

We have made no provision for house numbers in the database. We will now add a new field to accomodate the house number.

If you are not already in List format :

Select ***Format*** from the menu bar and select ***Show list.***

Select ***Edit*** from the Menu bar.

Select ***Add new field.***

A dialog box appears offering **Untitled6** as the field name.

Type **Number** and press return.

The new field is added at the right of the existing fields.

Changing the appearance of the sheet in List View.

While the databse, as it is, will work quite well, there are some features which can be improved. The location of the house number at the extreme right of the list is not exactly logical. And the width of the field to accomodate what will probably be no more than a three digit number is excessive. In the next section we will adjust these features.

Moving a field.

Click on the Field Name **Number,** the pointer change into a hand. Hold down the button and drag to the left until the highlight is on Address1, and release. The field **Number** takes the place of **Address1** and all the others move to the right to make room.

Changing Field Width.

Move the pointer into the Field Name bar, the pointer becomes a hand. Move the pointer directly above the right boundary line of the Number field. It change into a vertical line with two horizontal arrows. This is called the two way arrow pointer.

Click the button and hold.

Drag across to the left to make the width smaller, drag to the right to make the width greater.

Adjust the width of other cells as you see fit.

Changing the appearence of a record in Form View.

Change to Form View. If you cannot remember how, check above. If you move the pointer over a field name it changes into a hand. Click on the button and hold down. Drag the field and position it where you want.

Exercise:

Re arrange the form so it is easier to understand.

Changing field widths.

When field widths are changed in List view, they are not automatically changed in Form View. If you wish to change them you can, though is not as neccessary as in List View.
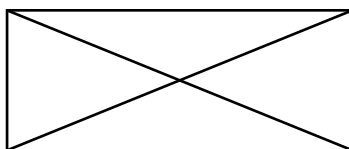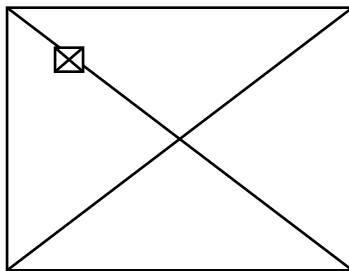
Click on the right hand boundary line of a field. The two way-arrow pointer appears. Hold the button down and drag to the left to make the cell smaller and to the right to make it bigger.
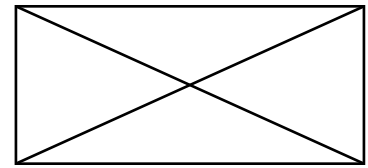

The hand pointer

The two-way arrow pointer.

*A record in form view .
The field widths have been
changed.*

Formatting fields.

Bold type, italics, borders are some of the ways that can make a database easier to understand and to use. These enhancements are referred to as formats. These formats are usually applied using the Format menu .

Set Field Attributes dialog box.

In order to apply formats it is necessary to enable the computer know which fields the formats are to applied to. This is done by selecting fields or records. There are a number of ways of selecting different parts of the database.

Selecting in List view.

For text entry a single cell can be selected by a single click.

To change John Duffy's name to Jonathan.
Click on the cell containing John.
Type**Jonathan.**
Press return.

All entries in a field can be selected by clicking on the field name.
To change all First names into bold type.
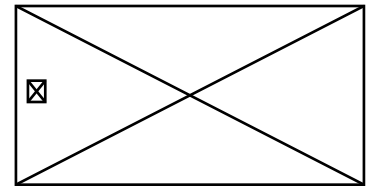Position the pointer over First Name. The pointer change to the Hand pointer.
Click once. All the entries in that field are selected.
Select*Format* in the Menu bar.
Select *Set Field Attributes...*
Select*Bold.*

A single record can be selected by clicking in the record selecton box.

A single record can be selected by clicking in the record selection box at the left of a record.
To view Mary Maguire's record in form view.
Click once in the small box to the left of Mary.
Select*Format.*
Select *Show form.*

The entire database can be selected by clicking on any entry at a corner and dragging to the diagonal corner.
To make a copy of the entire database.
Click the field entry in the top left corner and drag to the bottom right.
Select the*Edit* menu.
Select*Copy.*
Select any empty cell in the first name field.
Select *Edit.*
Select *Paste.*

In fact, we do not want this copy so select it and use *File Cut* to delete it.

Some formatting commands apply to the entire database and so do not require selection.
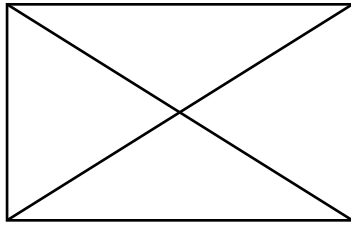
Short Cuts

Double click on an entry to change it's field attributes.

Double click a field name to change its name.

When in List view.
Double click on any empty cell to change to Form view..

When in Form view,
Double click on any blank space to enter List view.

Dates - short format.
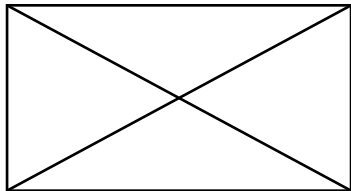

Dates - long format.

Changing Font and Size.
Select *Format.*
Select *Font.*
Select a font of your choice.

Select *Format.*
Select *Size.*
Select a size of your choice.

Setting field attributes.
When you start your database all entries including numbers are treated as Text. It is often useful to treat some entries as other than text.
Select all entries in the field **Number,** by clicking on the word number.
Select *Format.*
Select *Set Field Attributes.*
Select *Type Numeric*.
Change *Decimal Places* to *0* if it is not already zero.
Click *OK.*
Now try to change any of the numbers into a word. Can you?
Add a new field for Entry Date.
Select *Edit.*
Select *Add New Field...*
Change the field name in the dialog box to **Entry Date.**
Click *Add Field.*
Select the all the entries in the field Entry Date by clicking on the word Entry Date.
Select *Format.*
Select *Set Field Attributes...*
Select *Type Date.*
Select *Display Short.*
Click *OK.*

Exercise:
Enter an Entry Date for each pupil.
Change Field attributes for Display Medium, and then to Display Long.
Observe the changes.

Section 2
A Useful Database

At the start of Section 1, I suggested that there are three main steps in creating a database:
1)   Designing the database
2)   Entering data
3)   Using the database.

So far we have used 1) and 2) to help us to understand the mechanics of MS-Works. To start step three a more substantial database is

required. To this end, you are now going to modify the database, removing old fields, adding new ones and entering sufficent data to enable the database to work. This new database will essentially list the members of two classes. This can then be used to generate various reports on the classes.

Removing Field

For our puposes the Entry date Field is not particularly useful, though in a real school situation it would be, so we are going to remove it.
With the database in Form view, move the pointer up to the field name Entry Date untilit becomes the hand pointer and click. This selects all the entries in the Entry Date field.
Select Edit, Delete Field.

Adding New Fields

Add a new field for Birthdate
Select *Edit, Add New Field....*
Type**Birthdate**for the field name.
Click *Add Field*

Exercise:

Format this field as a short format date.
Add new fields for Irish, English, Maths, Science and Computers.
The fields for the subjects will only contain a grade, so adjust their size accordingly.
Add a new field for Sex. Position this field between Surname and Number.
It is intended to use F or M to denote sex. Adjust the size of the field to suit.
Enter the following data into the database.

First Name	Surname		Class	Num	Address1	Address2	Address3
Birthdate	Irish		Eng	Maths	Sc	Comp	
John	Duffy		1A1	27	Shanowen Road	Santry	Dublin 9
5/1/04	C		D	E	D	C	
Pat	O'Reilly		1A2	123	Santry Avenue	Santry	Dublin 9
19/3/04	D		C	E	D	C	
Mary	Maguire		1A2	21	Shanowen Close	Santry	Dublin 9
5/1/78	F		C	D	F	C	
Joan	Flynn		1A1	45	Swords Road	Whitehall	Dublin 9
10/7/78	A		D	A	A	A	
Sean	Connors		1A1	98	Ballymun Road	Ballymun	Dublin 9
1/2/78	C		D	E	D	C	
Anne	Murray		1A1	104	Dromnanane Park	Beaumont	Dublin 9
19/3/78	D		C	E	D	C	
Olivea	Walsh		1A1	23	Shanowen Road	Santry	Dublin 9
23/6/78	F		C	D	F	C	

Karen	Casey	1A1	3	Santry Avenue	Santry	Dublin 9	8/9/79	A	D	A	A	A
Loretta	Clarke	1A2	34	Shanowen Close	Santry	Dublin 9	23/4/77	F	C	D	F	C
Fiona	Browne	1A2	5	Swords Road	Whitehall	Dublin 9	5/7/78	A	D	A	A	A
Sheila	Doyle	1A1	6	Ballymun Road	Ballymun	Dublin 9	5/3/78	C	D	E	D	C
Audrey	Walsh	1A1	67	Dromnanane Park	Beaumont	Dublin 9	30/1/79	D	C	E	D	C
Ruth	Casey	1A1	87	Shanowen Road	Santry	Dublin 9	3/6/78	C	D	E	D	C
Rebecca	Clarke	1A1	65	Santry Avenue	Santry	Dublin 9	3/8/78	D	C	E	D	C
Sinéad	Reid	1A1	89	Shanowen Close	Santry	Dublin 9	7/7/78	F	C	D	F	C
Seán	O'Mahoney	1A2	54	Swords Road	Whitehall	Dublin 9	16/11/78	A	D	A	A	A
Raymond	Sweeney	1A2	65	Ballymun Road	Ballymun	Dublin 9	12/1/77	C	D	E	D	C
Adrian	Murphy	1A1	76	Dromnanane Park	Beaumont	Dublin 9	12/6/78	D	C	E	D	C
Alan	Power	1A1	43	Shanowen Road	Santry	Dublin 9	12/6/77	F	C	D	F	C
Keith	Caffrey	1A1	65	Santry Avenue	Santry	Dublin 9	12/6/78	A	D	A	A	A
Paul	McClean	1A1	54	Shanowen Close	Santry	Dublin 9	31/1/04	F	C	D	F	C
Thomas	Aherne	1A1	56	Swords Road	Whitehall	Dublin 9	9/1/04	A	D	A	A	A
Ciarán	Carolan	1A2	54	Ballymun Road	Ballymun	Dublin 9	19/3/04	C	D	E	D	C
Vincent	Nulty	1A2	65	Dromnanane Park	Beaumont	Dublin 9	1/2/04	D	C	E	D	C
Neil	Morris	1A1	54	Dromnanane Park	Beaumont	Dublin 9	31/5/78	F	C	D	F	C
Gordon	Doggett	1A1	443	Shanowen Road	Santry	Dublin 9	1/2/29	A	D	A	A	A
Breda	Martin	1A1	33	Santry Avenue	Santry	Dublin 9	19/3/77	F	C	D	F	C
Áine	Gallagher	1A1	333	Shanowen Close	Santry	Dublin 9	12/4/77	A	D	A	A	A
Sarah	Griffin	1A2	543	Swords Road	Whitehall	Dublin 9	23/6/79	C	D	E	D	C
Elizabeth	Hogan	1A2	32	Ballymun Road	Ballymun	Dublin 9	23/4/78	D	C	E	D	C

Use Save as... to save this database. Use School2 as the name.

Organising the Database.
Sorting

Open the database School2 , if it is not already open.

Select the field **Surname.**
Select *Organise, Sort......*
The **Sort** dialog box appears, it offers Alphabetical order (From A to Z) as the sort criteria.
Click *OK t*o accept.
The database is reorganised with Surnames in alphabetical order.

Sort in Reverse Alphabetical order.
Repeat the instructions above but select Z to A for sort order.

Sort the database into class order.
Using the **Class** field to sort the database into alphabetical order will put it in class order.
Select the field Class.
Select Organise, Sort......
The Sort dialog box appears, it offers Alphabetical order(From A to Z) as the sort criteria.
Click *OK* to accept.
The database is reorganised with Class 1A1 grouped together first and 1A2 grouped together second.
Notice that they are also in alphabetical order according to class. This is because we already sorted them in alphabetical order for Surname.
This type of nested sorts can be carried out by sorting fields in reverse order of priority. That is, sort the least important category first, as we did here.

Exercise
Sort the database according to their result in Irish.
Sort the database according to their age, and Print the results.
Any particular Sort can be saved using the Save as... comand.

Finding Fields.

Lets say you want he address of "Paul Whatshisname", How do you do it.
You could just look down the list. However if this were a real database containing several hundred names, that method could be tedious.
So, let the machine do the work....

Select *Organise, Find Field....*
Type**Paul i**nto the dialog box .
Click *Find Next.*
The highlight jumps to the first field containing Paul.
To find the next occurance, repeat the process. If no other occurance of Paul is found the machine will beep and display a message.

There are two**Sean**s. Try finding them.

What if a name is spelled wrongly?
Matches do not need full words. Se is enough to find Sean, but it might also find other things as well. Try it!!

Well, did you find Casey??? or Shanowen Close???

If you expect to find a number of entries, using Find Next repeatedly gets tedious. There must be something better!! There is.....Match Records.....

Match Records

to get a list of field entries that contain a given character or group of characters, Match Records... is used.
Select *Organise, Match Records.....*
Se will be offered in the dialog box as a search pattern, if you have already used it as a search pattern in Find Field... If not type Se in.
Click**OK.**
The full database disappears from screen and a partial list appears.
These are all records where a field entry contains the letters **se**. Examine these carefully to find where the**se** is.
Use Print Window to print this list.
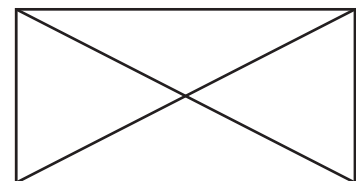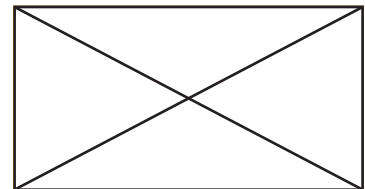To return to the full database:
Select**Organise**,
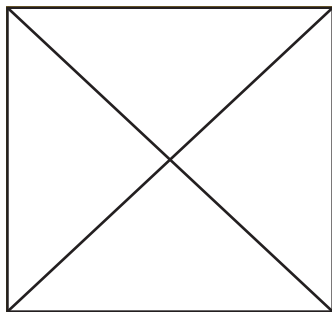At this stage**Match Records** has a checkmark indicating that it is active.
Select**March Records...** to deselect it.
This switches off the Match Records option and returns you to the full database.
Exercise:
Sort the database according to date of birth.

Sort the database according to grade in Maths.
Use find Field to find all pupils with the name Joan.
Print a class list for 1A2 and for 1A1.
Print a list of all pupils who got an A in any subject.

Better Organisation.
Record Selection

Our attempts at organising the database using Find Field.... and Match Records... have been somewhat crude. When we were looking for all those whose name is Sean we used Se as the search field. This also found entries like Santry Close and Casey. We will now use **Record Selection...** as a more precise way of locating records.

Find all whose First Name is Sean.

Select *Organize, Record Selection...*

This offers two lists, the one on the left lists all the Field names in the database. Scroll down through the enlist. Check that the field name do appear here.

The box on the right lists Record comparisons. Scroll through this list. Notice the types of comparisons that are possible.

There is a dialog box which allows comparison information to be typed in.

We will set up the rule to find all entries which have Sean as the First name.

Select *First Name* from the Field selection list.

Select *equals* from the Record comparison box.

Type **Sean** into the Record Comparison Information box.

Click *Install Rule.*

Click *Select.*

A list of records where the first name field is Sean appears.
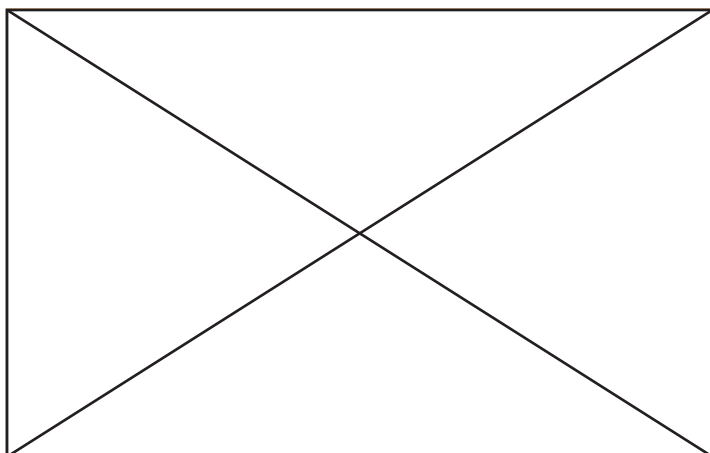
But are all those whose name is Sean listed? Remember some of them might have been typed in as Seán and some as Sean. We will try to find both.

Select Organize, Record Selection.

At the moment, only one selection rule is in effect. We will now create a second rule.

Select *First Name* from the Field selection list.

Select *equals* from the Record comparison box.

Type **Seán** into the record comparison information box.

Select *Or* as the operator under selection rules.

Click *Install Rule.*

Click *Select.*

This may find additional pupils whose first name is Sean or even Seán.
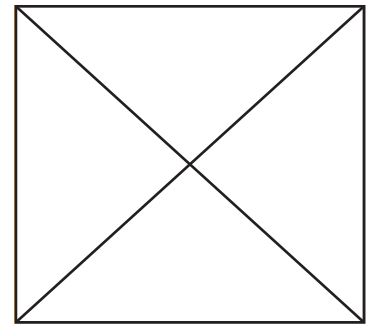
Deleting a selection rule.

Select *Organize, Record Selection.*

At the moment, two selection rules are in effect. We will now delete these.

Click *Delete Rule.* The last rule in the list is deleted.

Click *Delete Rule* again. The remaining rule is deleted.

Click *Select.* As there are no rules the full database is shown.

Find all pupils whose name begins with S.

Select *Organize, Record Selection.*

Select *First Name* from the Field selection list.

Select *Begins with* from the Record comparison box.

Type **S** into the record comparison information box.

Click *Install Rule.*

Click *Select.*

The records which meet the criteria are shown. The list includes Sean spelled either way. It also includes Sheila, Sinead, and Sarah.

Change back to the full list.

Select *Organize, Show all Records.*

List all those in 1A1 who got an A in Irish.

Select *Organize, Record Selection.*

Select *class.*

Select *equals.*

Type **1A1.**

Click *Install Rule.*

Click *And.*

Select *Irish.*

Select *equals.*

Type **A.**

Click *Install Rule.*

Click *Select.*

You should have a list of pupils in 1A1 who got an A in Irish.

List all in 1A1 who got an Honours grade in Irish.

Select *Organize, Record Selection.*

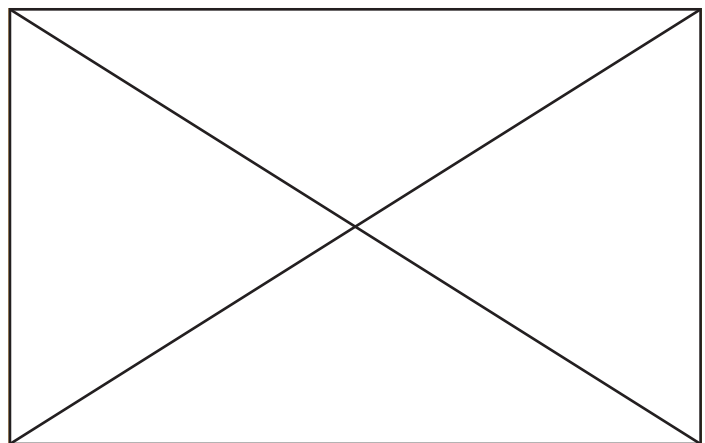Select *Delete Rule* to remove the Irish equals A rule. Leave the Class equals 1A1 rule.

Select *Irish.*

Select *is less than* (Why is not is greater than?)

Type **C.**

Click *Install Rule.*

Click *Select.*

You should have a list of pupils in class 1A1 and who have grade of A or B or C in Irish.

Exercise:

Find all Pupils who live on any of the Shanowens i.e. Shanowen Drive,

Park, Road etc.
Find all pupils who are under 13 on 1-1-91.
Find all pupils from 1A1 who live in Santry.
Find all pupils from 1A2 who live in Beaumont.
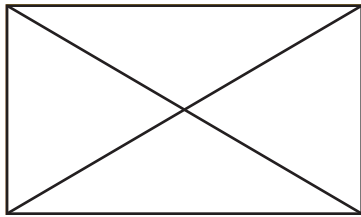Find all pupils whose name begins with J and are under 12 on 1-1-91.
Find all pupils who got a grade A in Science or in Maths.
List all the girls who got an honours grade in Computers.

Reports.

Reports make use of the Report menu and the Organize menu. But the Organize menu changes when you go into report mode.

Setting up a report.

Select *Report.*
Select *New Report...*
The screen is now divided into two. The upper portion of the screen lists any current Selection rules. The lower portion displays the database.
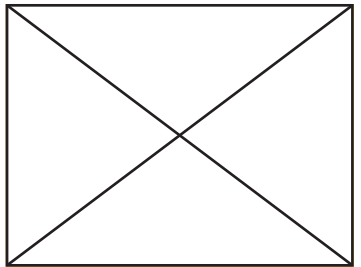Select *Organize.*
There are only two items on the new Organize menu.
Select *Record Selection.*
The familar(?) Record Selection screens appears.
This may display the last set of selection rules that you used. If so, delete them.
Select *Class.*
Select *equals.*
Select *1A1.*
Click *Install Rule.*
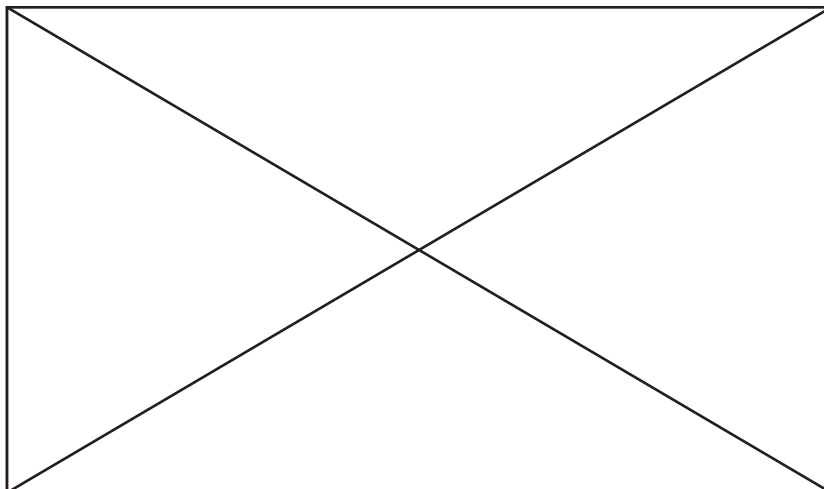Click *Select.*
You now have a class list for 1A1.
Select *File.*
The Print option which was previously greyed out is now available.
Select *Print.*
The Print dialog box appears. Leave the default settings.
Click *OK.*
You now have a full printed list of 1A1.

Exercise.
Print a list of all the girls in 1A2.
Print a list of all the boys under 13 on 1-1-91.
Print a list of all those who live in Whitehall or Ballymun.