

GCSE Modelling Assignment

State of Problem

For my GCSE Modelling assignment I have decided to design a Marking system. I have chosen this as Mrs Gerrard (an ICT teacher at Bramhall High School) has trouble entering in every mark of every pupil by hand after each ICT exam or piece of coursework. It is my job to design a system that would speed up this process easily and accurately. I intend to do this by collecting all the relevant typical information that Mrs Gerrard would encounter and then apply it into a working system that she could use. I intend to look at and analyse the current data capture form for collecting marks and design an improved data capture form for my system. My system would act as an "electronic markbook" for a teacher. It would be able to work out final grades based on a set of marks. It would work out averages and even provide graphs and charts to assist the teacher. It would be clear and well presented and would be easy to operate. I intend to achieve this by designing a system that is quick, easy to read and efficient.

Investigation and Analysis

Mrs Gerrard and the rest of the ICT unit at Bramhall High School need an efficient system that will save time and effort in recording and storing pupils marks. This of course could be applied to any subject department in any school that requires a Marking System.

Mrs Gerrard and the rest of the ICT teachers teach 3 GCSE ICT classes. This is what they will have to mark and what I will have to collect in order to design a good marking system:

- 1 piece of coursework at the end of Year 10(around August 2002)
- 1 piece of coursework in the Spring term of Year 11(around January 2003)
- A mock GCSE examination in November 2002.
- The official GCSE examination in June 2003.

An example of the type of marking system I will have to produce can be found in the current Marking System for GCSE ICT. A simple system has been set up that collects the information on data capture sheets and then

stores the information for future reference. As well as working out averages etc.

An example of this data capture system can be found on the next page. I have researched which methods of data capture the ICT unit has and then collected each data capture form. There are 3 pages of A4. The first of which consist of a checklist, with all the relevant marks for GCSE ICT Assignment 1. It is split up into 14 sections labelled A-I (6 of the E sections are labelled (i)-(vi)) Each of the 14 sections have a title under which are the possible full marks in the section. In the middle of the checklist are bullet points of all the aspects, which must be fulfilled before the pupil can receive full marks. There is a box on the right hand side of each aspect, which is left blank for the teacher to write in a mark for that particular section.

Overall the form is clear, neat and well laid out. However, the section names aren't very clear, the marks are misleading and there is no box to show the total marks of each section or an overall mark of the assignment. It will be part my task to redesign and improve this data capture form.

When I redesign and improve this system and begin to input the data into the spreadsheet, I predict that I will need:

- **Searches**

1. So that simple statistics can be collected for the use of the ICT unit of Bramhall High School e.g. a search of all the students who got over/below average

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In the spreadsheet I will have to design to store all the data I will need the following field names:

Field Name	Example of data	Why it is needed
Candidate Number	00345	To inform teachers/examiners of the students number in the national database. E.g. when a student needs to be verified with his school.
Name	Dominic Feargrieve	To identify the particular person for easy access and storage. E.g. when a student needs to be found
D.O.B	15years	To determine how old the person is so that the year of the student can be identified E.g. So that other exams aren't included by mistake, such as SATs.
Year	Year 11	This could be used instead of the above field and vice-versa
Teacher that marked exam	Mrs Gerard	So that the teacher can be questioned if problems or irregularities occur E.g. If an A* student gets a D, the teacher can be summoned to be questioned or so they can remark it.
Marks	50/100 or 50%	To determine the students percentage and final grade E.g. marks from 16 to 25 =C grade.

Sex	Female	So that a simple survey can be carried out to see if Males or Females get better marks. E.g. who is more intelligent girls or boys?
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Specification

When my marking system is completed it should be able to:

- Store details of every single pupil accurately and efficiently without errors or loss of data.
 1. Saving a table of 30 pupils, opening it the next day and seeing if any information has been lost.
 2. Seeing if someone else can read and understand my system only using the user guide provided.
- Be able to be changed easily in case of expulsion/or school change without difficulty.
 1. Wait until a pupil is expelled or changes school and then see if any problem arises in changing the pupil's data.
- Be able to easily and quickly add new pupils or deleted old pupils without too much hassle.
 1. Wait until a new pupil arrives or a pupil leaves and record any problems or errors occur.
- Be simple and easy for the operators to use without any errors slowing him/her down.
 1. Ask the operator if he/she has encountered any problems that even the user guide cannot explain. If there are any the system will have to be improved.
- Be able to search for any pupil's name, results, grades, age etc in the entire database without any errors.
- Again getting anyone to see if they can run the searches successfully using only the provided user guide.

Hardware/Software

To put all the data and information on to a database you would need:

Hardware

- ✓ A normal 14" monitor. An *Adi Pro Vista* would be suitable.
- ✓ A processor linked to a network so that all the information can be shared with any other operators in the park.
- ✓ A standard mouse with pad (or maybe as the company advances a touch screen for easy, effective use).
- ✓ A base unit (such as *Firstec Computers*, *energy EPA pollution Preventer* or any others with quite a large memory for any amount of members e.g. 40GB) which has a basic floppy disk drive, a basic CD-ROM and a basic graphics card so that photos of the pupils may be displayed.
- ✓ A quality printer which would need to be joined to the network so that any information can be printed off at any time.
- ✓ A standard keyboard (such as a *Chicony KB-2971*) which is quick and easy to use.

Software

To store information on the computer a suitable software package will be necessary:

- ✓ 'Bramhall High' will need some sort of system for sorting information quickly and easily, such as Microsoft Excel. As it can:
 1. Store information clearly and save without loss of data.
 2. Help you design and run searches with reliable results.
- ✓ Microsoft Windows NT: It can run both of these programs and run a network system, which is needed, in 'Bramhall High'.

Data Capture

I have designed my data capture form in an eye catching, formal presentation that will impress the teacher filling it out. It has a neat

border and has the school logo at the top of the page for a professional look. The important parts of the form are clearly underlined and in **bold** for easy accessibility. The sections where you write the information have plenty of space for the longest name or surname. In other parts where information is required I have put tick boxes (☐) next to several options where the teacher will have to tick either one. Most of the information needed for the form is required in the form of text but for such fields as exam marks and coursework marks require numeric data.

Validation

While the data capture form is being filled out and the spreadsheet is being set up mistakes are sometimes inevitable. Therefore validation is necessary to prevent important information being mistyped. In my data capture form you are, at first, advised to fill out the form in pencil to prevent mistakes that cannot be erased.

In the actual creating of the spreadsheet errors can be avoided if a validation rule is entered in the appropriate box whilst making a table. You can use the validation rule to specify requirements for data entered into a cell. 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. Data that has been entered into the data capture form, which is invalid, can be corrected by my spreadsheet through a simple validation rule. This can be seen here:

Microsoft Excel - GCSE Modelling Assignment Markbook Spreadsheet

File Edit View Insert Format Tools Data Window Help

100%

Warning: You must enter a value of 126 or less. A number from 0-126 must be entered. Continue? Yes No Cancel

	B	C	D	E	F	
	Age	Year	Group	Original Exam Marks (out of 126)	Final Exam Marks (out of 40)	1st Coursework Marks (out of 40)
1						
2						
3	16	11B		127	40.3	32
4	15	11B		74	23.5	33
5	15	11A		64	20.3	28
6	15	11A		50	15.9	20
7	15	11H		71	22.5	30
8	15	11J				27
9	15	11H				31
10	15	11J				33
11	15	11D				37
12	15	11A				23
13	15	11C				27
14	15	11A		56	17.8	22
15	15	11A		78	24.8	34
16	15	11A		76	24.1	31
17	16	11A		39	12.4	29
18	16	11C		40	12.7	25
19	15	11B		35	11.1	25
20	15	11YY		20	6.3	32
21	15	11F		40	12.7	30

Sheet1 / Sheet2 / Sheet3 /

Ready

Possible problems could be resolved when if the operator enters a validation rule saying that certain letters or numbers that refer to a specific field can be entered only. E.g. the "Sex" field, a simple "M" or "F" could be typed instead of "Male" or "Female". This is entered because it saves time and prevents spelling errors. A validation rule would avoid such mistakes. The validation rule can be applied to any field and check any part of the information.

The following fields could be validated:

◆ **Final Grade**

1. This could be validated to avoid mistakes in the students grade and save time when recovering the information. Instead of a long-winded "Grade B" a simple "B" could be entered instead.

Here is an example of the "Final Grade" Validation Rule:

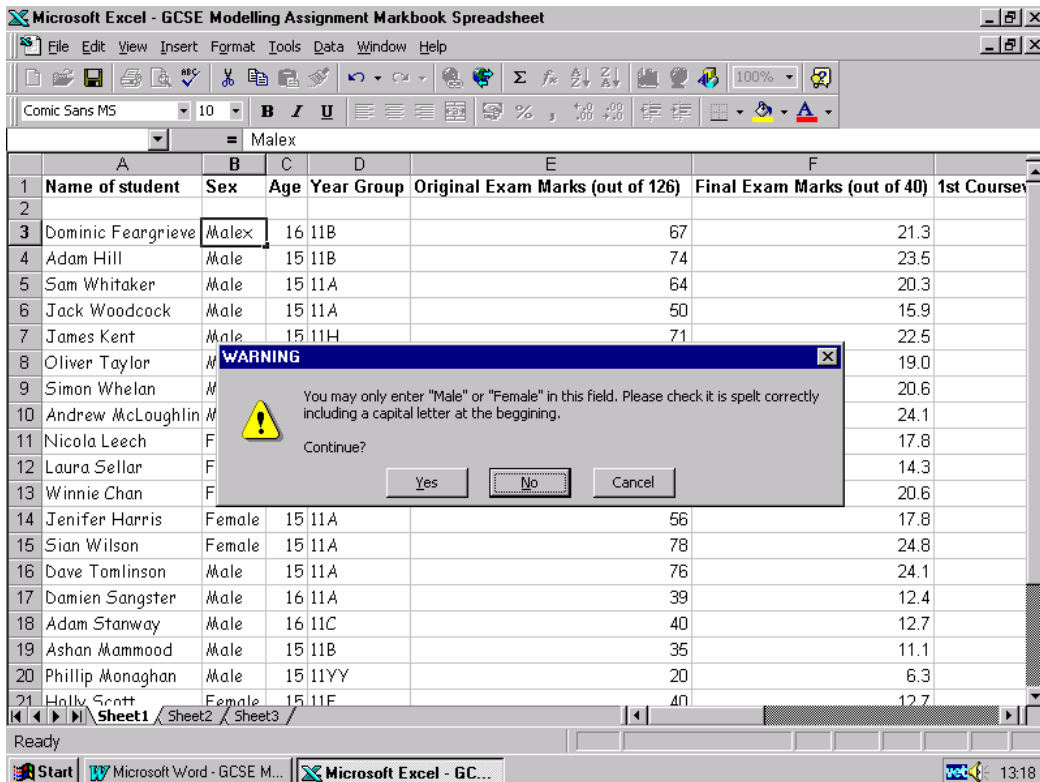
The screenshot shows a Microsoft Excel spreadsheet titled "GCSE Modelling Assignment Markbook Spreadsheet". The spreadsheet has columns J, K, and L, with headers "Final Coursework Total (out of 60)", "Final Total Marks (out of 100)", and "Final Grade" respectively. Rows 1 through 21 contain student data. A warning dialog box is displayed over the spreadsheet, stating: "WARNING: You must enter a value of A* or less. A letter from U-A* must be entered. Continue?" with "Yes", "No", and "Cancel" buttons. The dialog box is triggered by an invalid entry in the "Final Grade" column of row 3, where the letter 'z' has been entered.

	J	K	L	M	N	O	P
1	Final Coursework Total (out of 60)	Final Total Marks (out of 100)	Final Grade				
2							
3	51.8	73.0	z				
4	50.3	73.7	A				
5	45.8	66.1	B				
6	39.8	55.6	C				
7	46.5	69.0	B				
8							
9							
10							
11							
12							
13							
14	38.3	56.0	C				
15	46.5	71.3	A				
16	43.5	67.6	B				
17	42.0	54.4	A				
18	37.5	50.2	B				
19	37.5	48.6	D				
20	42.0	48.3	D				
21	39.8	52.4	C				

♦ **Sex**

1. It could be validated by only allowing certain words or codes into the cell e.g. "M" for Male and "F" for Female. This would help to avoid spelling errors and would provide a quicker and more effective data input.

Here is an example of the "Sex" Validation Rule:



The following fields could not be validated:

• **Name of Student**

1. This could not be validated because there must be 25 students that have different initials e.g. "Sam Whitaker" could be validated to "SW" but that would clash and cause errors in searches with "Sian Wilson".

• **Age**

1. This could not be validated because people have different DOB. On the odd chance 2 people have the same DOB (twins) this would be indicated in the spreadsheet but would not matter as other fields would be different.

- **Year Group**

1. This could not be validated because people have different addresses. On the odd chance 2 people have the same address (relatives) this would be indicated in the database but would not matter as other fields would be different.

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1. This could not be validated because people have different Telephone numbers. On the odd chance 2 people have the same emergency telephone number (relatives) this would be indicated in the database but would not matter as other fields would be different.

As a part of my validation I have entered several different validation rules to alert the teacher of what should be entered in the selected cell. This obviously reduces the event of an error. However, I have discovered and applied a technique that when you enter a certain value in the " Final Total Marks" column the spreadsheet will automatically present the relative grade for that mark. This is called "VLookup". It is basically a formula that searches for a match in a point of reference/lookup table, e.g. simple grade boundaries table, and calculates the grade that applies to the mark. An example of the formula is shown here: =VLOOKUP(L3,\$Q\$2:\$R\$10, 2, TRUE).

Firstly, the syntax of the formula is as follows:

- =function name(parameter, parameter list)

In this case my function name is VLOOKUP. The first parameter is the cell that contains the mark. The second parameter is the range of cells that contains my lookup table. The third parameter is the column in my lookup table that contains the grade. The last parameter determines that I do not have to find an exact match for my mark; the next lowest number will approximate to a match.

I use "\$" signs in my formula to indicate that the cells they refer to (my Lookup table) are to be recognised as an absolute reference as opposed to a relative reference. If it were a relative reference on my spreadsheet then when I tried to copy the formula to other cells the reference to the lookup table would move as well, causing errors on the spreadsheet.

Data Structures

Field Name	Why it is needed?	Example of typical data	Data Type	Could it be coded?	Could it be validated?
Candidate Number	To inform examiners of the student's number in the national database.	00345	Number	No	Yes
Surname	To identify the student on a more personal level instead of candidate number.	Smith	Text	No	No
Date of birth	To determine how old the person is so that an average mark/grade for that age group can be established for newspapers/annual reports etc.	1986	Number	No	Yes
Sex	So that BHS can carry out simple surveys of who gets better marks/more A's; Males or Females	Male	Text	Yes	Yes
Original Exam Marks (out of 126)	This is needed so the spreadsheet can calculate the Final Exam Marks (out of 40).	67	Number	No	Yes- A validation could be set up so that a value between 0-126 can

					only be entered.
Final Exam Marks (out of 40)	This is needed for the spreadsheet to calculate the Final Total Marks (out of 100).	22.5	Number	No	Yes- A validation could be set up so that a value between 0-40 can only be entered.
1st Coursework Marks (out of 40)	Needed along with the Second Coursework Marks to calculate the Original Coursework Total (out of 80).	32	Number	No	Yes- A validation could be set up so that a value between 0-40 can only be entered.
2nd Coursework Marks (out of 40)	Needed along with the First Coursework Marks to calculate the Original Coursework Total (out of 80).	37	Number	No	Yes- A validation could be set up so that a value between 0-40 can only be entered.
Original Coursework Total (out of 80)	Needed as these are the Original marks for the coursework before they are	69	Number	No	Yes- A validation could be set up so that a

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	scaled down.				value between 0-80 can only be entered.
Final Total Marks (out of 100)	These are the Final Total Marks out of the entire spreadsheet. They are the cells with the Vlookup formula.	73.0	Number	No	Yes- A validation could be set up so that a value between 0-100 can only be entered.

Output Format

I have designed my spreadsheet so that it has a friendly and easy to use interface. The cells are bordered and formatted in a sensible size and style of font. The important headings of the spreadsheet are put in bold font so that they stand out. The headings that contain marks, have the appropriate range of data in brackets next to them e.g. "**Final Total Marks (out of 100)**". The spreadsheet is also designed so that the name of the students are on the left so that you can easily follow their information across the page on the computer or on a printout. I have designed my spreadsheet in landscape format so that the information can be easily read on a printout.

For the convenience of the operator my spreadsheet can also be exported onto other operating systems in different formats. My spreadsheet can be made into a Microsoft Access Report or put into a Query where the search function may operate. This can easily be done using these instructions:

- 1) Close the Microsoft Excel workbook that contains the data you want to use in Microsoft Access. If the Microsoft Excel worksheet contains column labels in the first row, Microsoft Access uses the labels as field names in the new table it creates to contain the imported data.
- 2) On the File menu in Microsoft Access, point to Get External Data, and then click Import.
- 3) In the Import dialog box, click Microsoft Excel in the Files of type box.
- 4) In the Look in list, locate the file you want to import, and then double-click the file.
- 5) Follow the directions in the Import Spreadsheet Wizard.

A sample of this output format can be found in a printout on the next page.

By using Microsoft Access I can also create a report by exporting my spreadsheet into Microsoft Access. This can be done by using the methods above. This way a handy professional report can be printed so

that the teacher can use it as a formal printout. It could also be used to display averages or totals.

A sample of this output format can be found in a printout on the next page.

By using Microsoft Access I can also create query which would allow the operator to perform a search as this function is not available on Microsoft Excel. This has many advantages as the teacher can now produce certain statistics, such as:

- How many children got grades A-C
- How many children got grades D-U
- What grades people in a certain Form Group got
- Which sex got better overall grades

This function can be done using the above method. Except the operator should make a query and then use the following method to perform a search:

-