CMC

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Chessington Community College
2002

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ANALYSIS

Introduction

Chessington Motor Centre (CMC) is a small garage specialising in replacing and servicing Vauxhall motorcars.
Drivers bring their cars to CMC and have the option of leaving their vehicle while the work is carried out or waiting at the centre, while the mechanics do the necessary work.

Work at CMC progresses quite efficiently taking into account the facility only has space for three jobs to be done at once and a further three parking spaces for cars that have been left by owners needing repair. The car owners are then charged according to the parts used and the length of time spent by the mechanics carrying out the repair work.

There are three methods of payment accepted by CMC including cash, cheque or most popular – by credit card. Copies of invoices are made allowing one to be kept for the financial records of CMC and another to be taken by the customer for their own records. In the case of credit card, an additional invoice is made as well as the credit card receipt. At the end of each month invoices are used to help calculate CMC's finances.

Deliveries of new parts are made every two weeks and it is up to CMC to place orders themselves for new parts allowing adequate time for the large distributor to ship them.

CMC is owned and managed by Mr R. Bailey who employs 3 full time mechanics as well as part time secretary/administrator, Mrs Giles.

The current system

The manager at CMC was interviewed, to ascertain the current workings. Mr Bailey made clear the following:

- When a vehicle is bought into CMC the damage/repair work is assessed. If it cannot be worked on straight away it is parked on site and left until space is available for the work to be carried out.
- On completion of the work, the mechanic who carried out the work completes an invoice based on the parts used and in some cases the scale of the job that needed to be done. The mechanic also completes a similar form showing the time taken to complete the task and other details relating who actually did the job.
- The customer is then charged either and payment can be received in three methods: cash, credit card or cheque.
- The current system is largely paper based with the only use of computers being to word process letters and extremely basic financial calculations.
- Completed invoices are checked and filed. This results in a large amount of paper in the main office. Invoices are filled and kept for both the financial

records of the company and in case there is a problem with a job that was done, CMC will have proof that the job was carried out and properly paid for.

- Stock checking involves Mr Bailey or another mechanic checking the stock area at the end of every day and noting what parts may soon need to be re-ordered or if necessary actually re-ordering stock.
- Financial calculations rely solely on the proper completion of invoices by the mechanics and by re-counting the weekly takings Friday after CMC has closed and no longer accepts customers. Primarily, the calculations of the finances are carried out by Mr Bailey and Mrs Giles

The current problem

- The main problem with the current system is that it is far to slow and takes up valuable time that could be better spent on other tasks.
- The large number of invoices that CMC may accumulate in one day means that the office at CMC are frequently full up with large amounts of paper. As a result of this, there has been the occasional loss of an invoice, which has caused some financial repercussions. Mr Bailey made it very clear that the paper problem needs to be sorted out and if not will continue to cause problems. The large number of invoices would be much better recorded on computer or in a different format. This was again another point brought up by Mr Bailey.
- The process of stock taking and checking is a very long winded one and usually requires Mr Bailey or other member of staff checking the stock area at the end of the day for what stock may soon need to be re-ordered or indeed re-ordering it if necessary.

On the next page is an example of and invoice that would be completed by a mechanic after completing a job.

CMC

CHESSINGTON MOTOR CENTRE
Davis Road
Chessington
Surrey
KT9 1DR

Invoice Number	
Date	

Customer Name _____ Vehicle_____

Part Number	Description	Quantity	Price	+VAT

INVOICE TOTAL	

PAYMENT METHOD _____

SIGNED_____ _____

CMC

Invoice Number	

Customer Details

Customer Name_____
Vehicle Registration Number_____
Model_____

Job Details

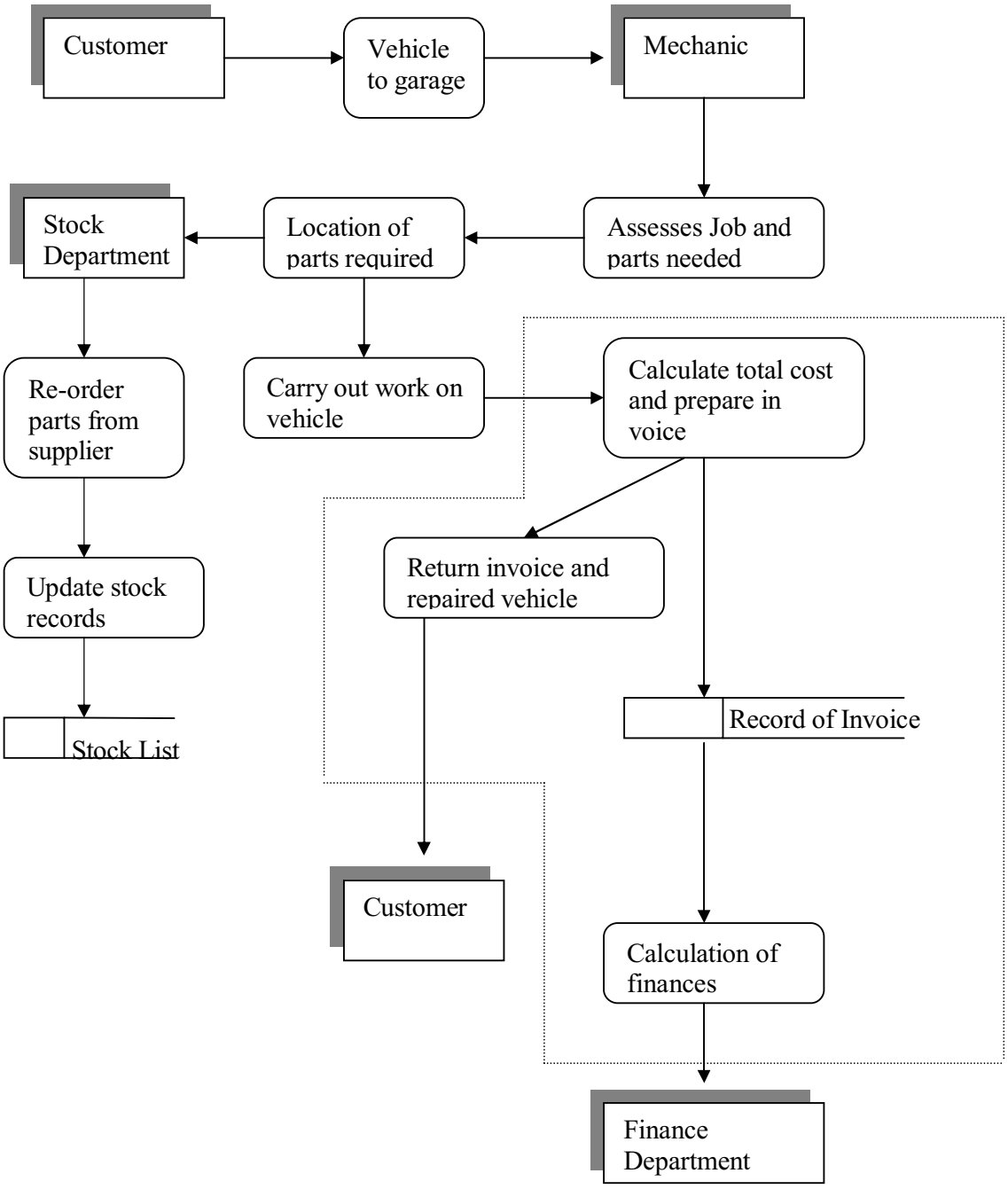
Date of job (dd/mm/yy) ___/___/___
Time of start of job (hh:mm) ___:___
Time of finish of job ___:___
Mechanic Name_____
Type of Job_____

Objectives of the new system

The manager at CMC has requested that the new system to be implemented, must:

- Allow workers to complete and store invoice.
- Be usable such that a user with limited ICT skills can use it.
- Be easy to operate and generally user friendly.

Data flow diagram of the current system



System Boundries

The dashed line surrounding part of the data flow diagram, indicates the part of the system that will hopefully be covered in this project.
Mr Bailey and Mrs Giles control the Finance and Stocktaking department.

Performance of the new system

The points listed below are indicators that will be used in designing the project:

1. Somebody with limited ICT skills should be able to operate the system
2. All sheets should be easily accessible by a main menu screen, from which the user should be able to select his/her chosen sheet by clicking a button or selecting something from a menu
3. Accidental deletion of formulae and heading etc. must be almost impossible
4. Help on how to operate the system must be readily available
5. The time taken to enter each invoice must be under 1 minute
6. Macros should be smoothly executed and the user should not see "the working"

Availability of software and hardware

CMC has available for use 3 PC's each with 9Gb hard drives and 128Mb of RAM. A single laser printer is used to produce "hard" copies of documents, as all 3 computers are linked on a network. As for software, the CMC network includes Windows 2000 as well as Office 2000, which, allows access to programs such as Microsoft Word, Excel and Access.

Production of the system will take place both on a networked school system, which gives all students a user area to which work can be saved. Work will also be carried out at home on a stand alone PC with similar specifications to those mentioned at CMC.

To aid the transfer of work between home and school a floppy disk will have to be used. If the size of the system and its documentation exceeds the capacity of the disk, several may have to be used for home to school transportation. If for any reason the system exceeds the storage capacity of the disk then the system will be e-mailed as an attachment to a web-based e-mail account the retrieved and worked on from home. Then similarly sent back to the school e-mail system.

Skill level of users

Mr Bailey, the manager of the company has an excellent knowledge of Excel and is extremely computer literate. Similarly the Administrator is recognised as having almost the same level of knowledge as the Manager.
The three mechanics have an extremely basic computer literacy; however Mr Bailey has stated that he will finance basic training in Excel to the required level of knowledge.

DESIGN

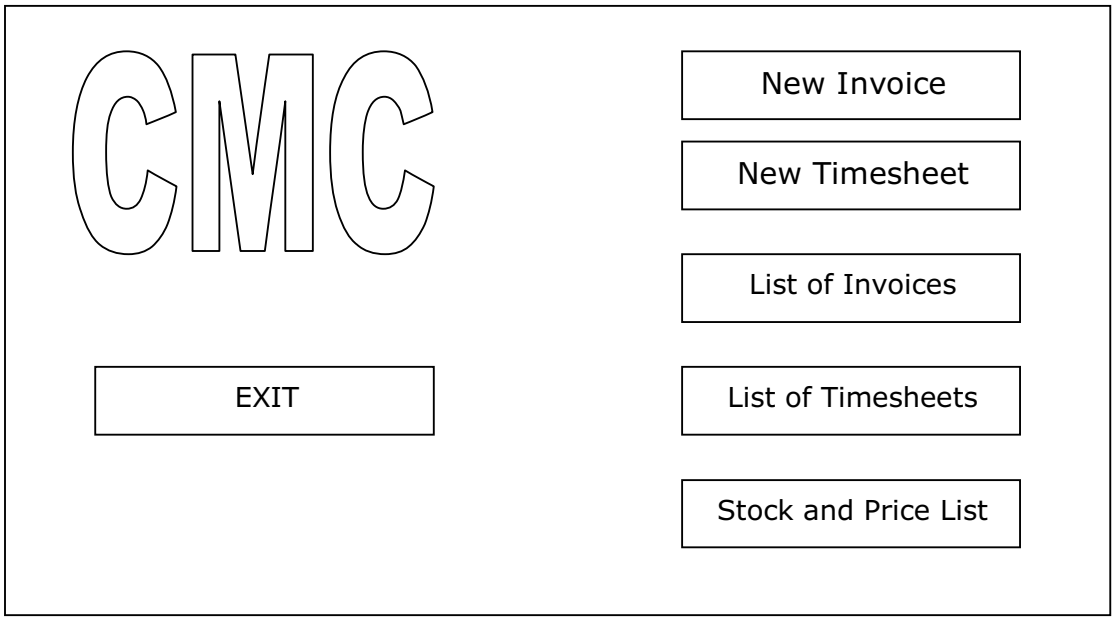
Software choice

The system will be implemented using Excel 2000 as this allows many advanced features that will help improve the current system at CMC.
The advanced features that will be included are:

- Ability to create and fill in a blank invoice
- Ability to lock individual work sheets to prevent accidental changing of template
- Macros to automate changing between worksheets
- Creation of templates to help employees filling out invoices

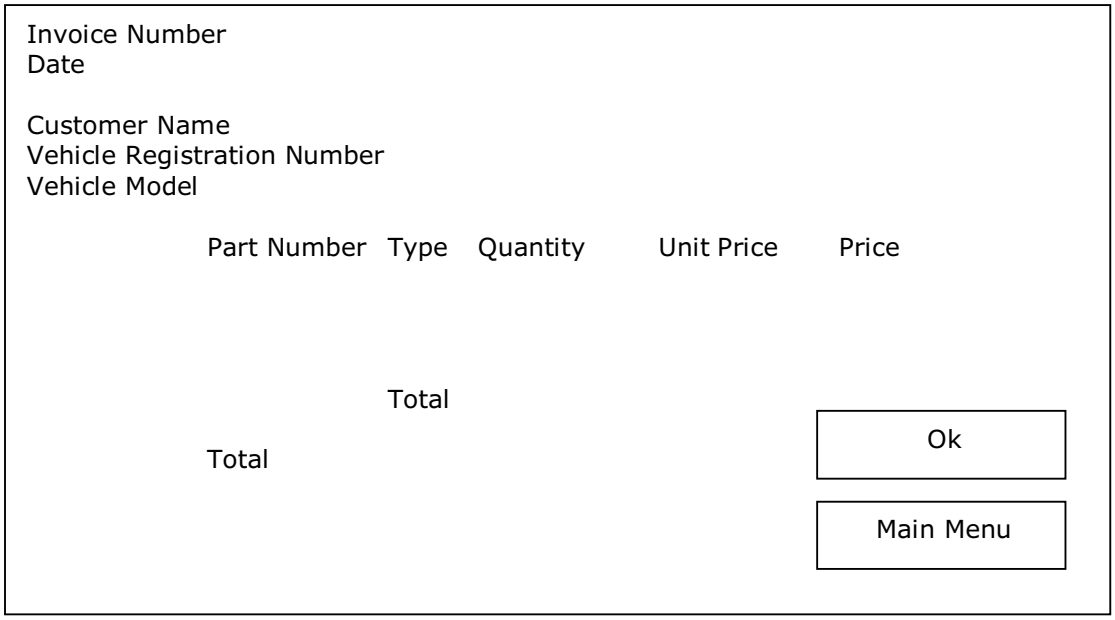
Design of the worksheets

Sheet1 will be the MAIN MENU and subsequently the first sheet seen by the user when they access the system. To make sure it is the first seen, I will use an "Auto_Open" macro. The sheet will provide the user with clear and quick links to other sheets by buttons that must be selected. There will be 6 buttons to choose from; Exit, New Invoice, New Timesheet, List of Invoices, List of Timesheets and Stock and Price List. Also displayed will be the company logo so that the system is personalised to CMC.

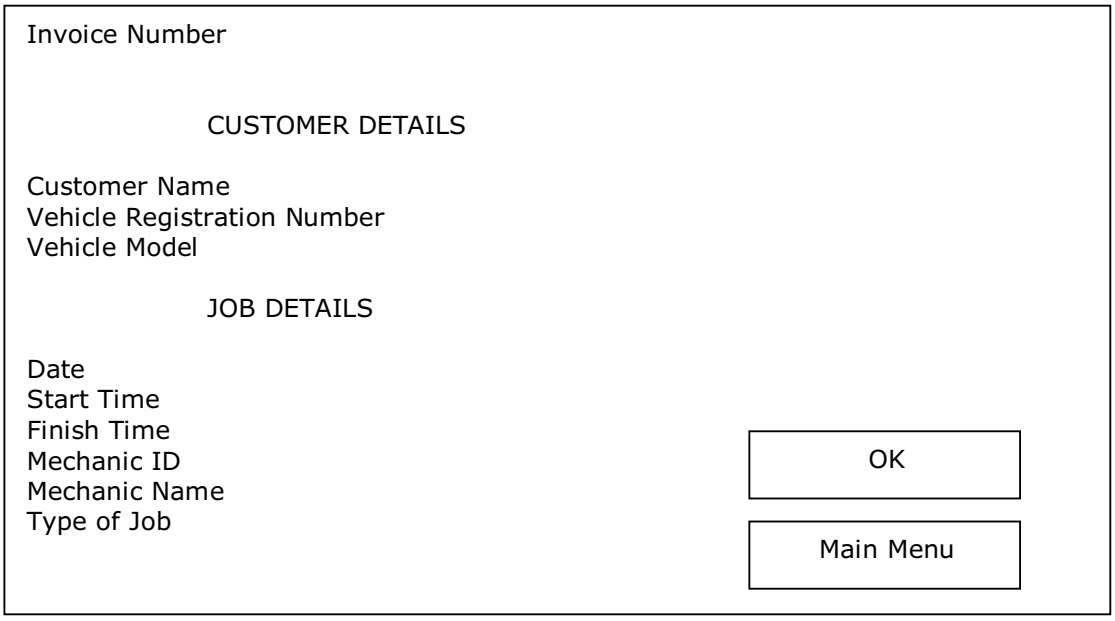


Sheet 2 will be a blank invoice. The invoice will be laid out in much the same way as the old paper invoices CMC used to use. Validation will be used on the cells

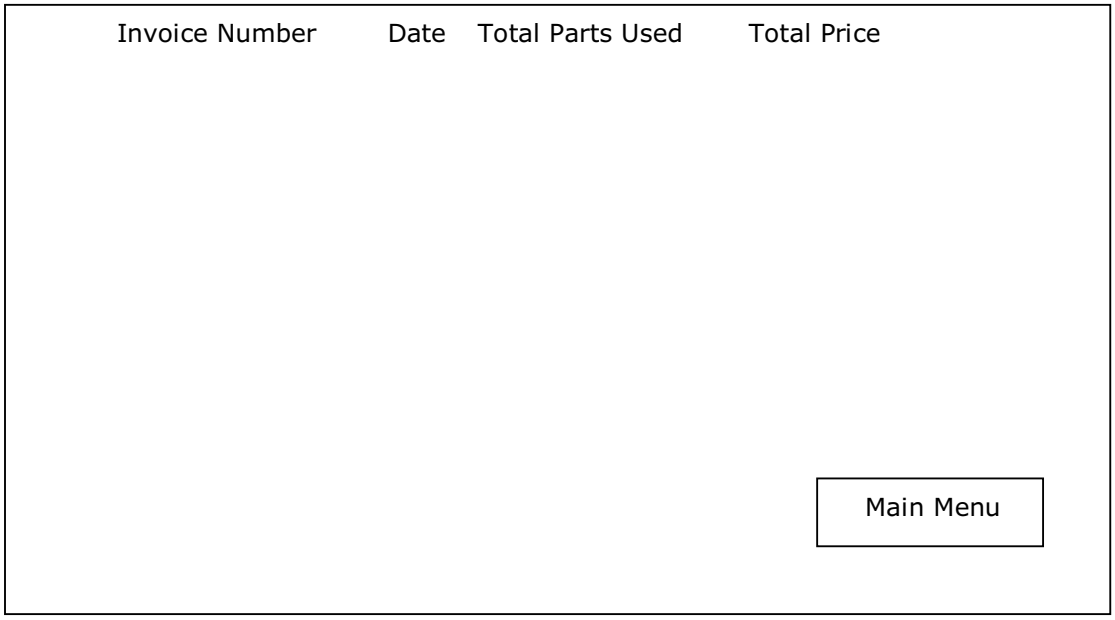
containing the date, invoice number and vehicle registration number. The following formulae will be used in the following cells:
Also on the sheet will be 3 buttons. The first will link this sheet to the Main Menu and the second to the Stock and Price List. The third will save all entered data to the List of Invoices sheet.



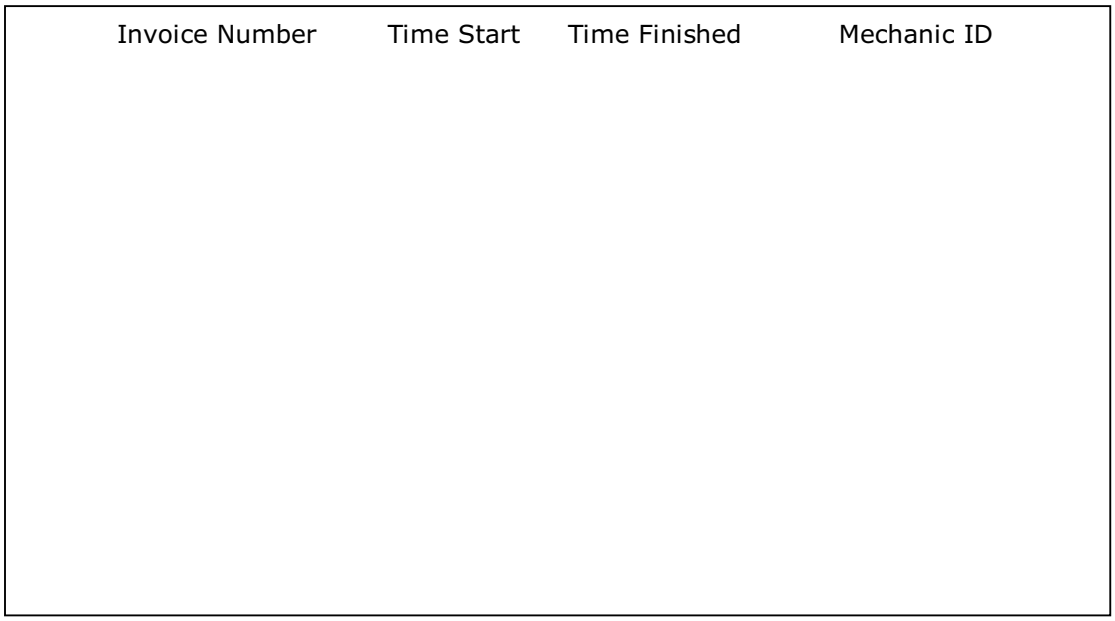
Sheet 3 will be a blank timesheet. Similarly to the Invoice sheet, this will be laid out in a similar way to the old paper Timesheets that used to be used. Validation will be in the cells containing date and time. The following formulae will be used in the following cells: A drop down menu is available for specifying the type of work carried out. Buttons on this sheet link it to the Main Menu. There is also a save button which will save any data entered to the List of Timesheets sheet.



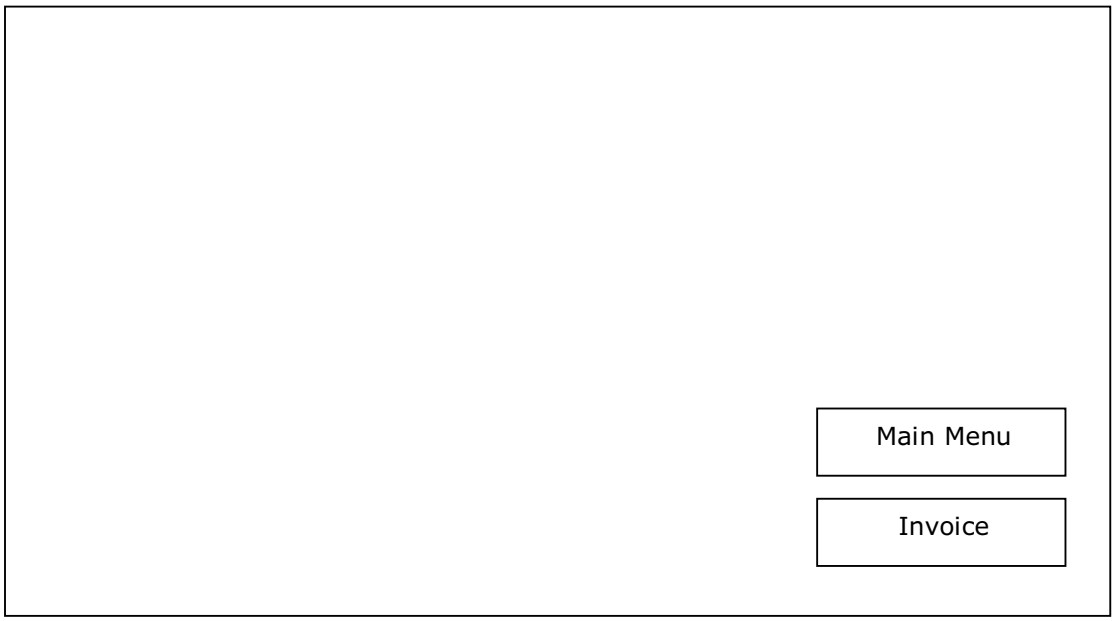
Sheet 4 will be a list of the last 25 Invoices saved. Only key parts of the invoice can be saved; the Invoice Number, date, Number of Parts used and Total price for the whole invoice. A Main Menu button will be in the bottom corner to take the user back to the Main Menu.



Sheet 5 will be a list of the last 25 Timesheets saved. Once again, only key parts of the Timesheet can be saved: Invoice Number, Start and Finish time and the individual Mechanic ID code. A Main Menu button will be in the bottom corner to take the user back to the Main Menu



Sheet 6 will present the user with a price list of all parts kept on site at CMC and all jobs that can be carried out. Each part will also have a unique code. Once again, on this sheet is a button linking this sheet to the Main Menu and the Invoice sheets.



Entering of data and validation

Entering of the date – dates must be manually entered. The date will always be presented to the user in the form dd/mm/yy but can be typed in any format. For example: 12 Dec 2001 will automatically change to 12/12/01

Invoice number – cells in which an invoice number must be entered have been validated to only accept a whole number between 1 and 9999999999.

Time – the time like the date, must be manually entered in the form hh:mm on the 24-hour clock. Cells in which time must be entered have been validated to only accept times in between the opening hours of CMC, 09:00 to 17:00

Macros

The following macros will be used to automate various functions within the workbook. (These macros will be written in the correct syntax in the Implementation and testing section):

EXIT → Close Workbook

NEW INVOICE → Go to New Invoice sheet

NEW TIMESHEET → Go to New Timesheet sheet

LIST OF INVOICES → Go to List of Invoices sheet

LIST OF TIMESHEETS → Go to List of Timesheets sheet

STOCK AND PRICE LIST → Got to Stock and Pricelist sheet

MAIN MENU → Go to Main Menu sheet

SAVE_INVOICE → Print 2 copies of completed Invoice

Copy Invoice number to Timesheet

Copy Date to Timesheet

Copy Customer Name to Timesheet

Copy Vehicle to Timesheet

Copy Vehicle Registration to Time sheet

Delete data in all unlocked cells

SAVE_TIMESHEET → Print 1 copy of completed Timesheet

Delete Data in all unlocked cells and B23

Security

The workbook will be protected so that data can only be entered in those cells that have been unlocked. A password will be used. At first the password will be a default one, which can be changed by the User (see User Manual for default password)

Test Strategy

The test strategy I will use will include:

- Simple testing of Macros linking sheets
- Testing of "Print" Macros
- Testing affects of extreme data
- Testing by completing a whole process of input through to expected output
- Testing of data validation

Test Plan

The following tests will be performed on the system:

No.	DESCRIPTION	EXPECTED OUTCOME
1	Select “New Invoice” button	Workbook should move from Main Menu to the New Invoic Sheet.
2	Select “New Timesheet” button	Workbook should move from Main Menu to the New Timesheet Sheet.
3	Select “Stock and Price List” button	Workbook should move from Main Menu to the Stock and Pricelist Sheet.
4	Select “Exit” button	Workbook should exit giving the user the option to save data
5	Select “Main Menu” button	Workbook should move from active sheet to the Main Menu
6	Fill in Invoice with Test Data 1 (see bottom of table)	Sheet should correctly and automatically enter the type of pa based on the code entered, the price of the part and should also correctly calculate the total price for the whole invoice.
7	Fill in Invoice with Test Data 2 (see bottom of table)	Sheet should correctly and automatically enter the type of pa based on the code entered, the price of the part and should also correctly calculate the total price for the whole invoice.
8	Fill in Invoice with Test Data 3 (see bottom of table)	Sheet should correctly enter the type of part based on the coc entered, the price of the part and should also correctly calculate the total price for the whole invoice.
9	Test “OK” button.	Sheet should print two copies of invoice, then copy relevant data to Timesheet and clear the current invoice.
10	Enter data into a locked cell	This should not be possible.
11	Enter an Invalid date on the invoice	The user should be presented with an error message.
12	Enter an Invalid vehicle registration number	The user should be shown a customised error message.
13	Enter invalid date on the Timesheet	The user should be presented with an error message.
14	Enter “Start Time” on Timesheet tha is earlier than 09:00	The user should be shown a customised error message.
15	Enter “Finish Time” on Timesheet that is later than 17:00	The user should be shown a customised error message saying that the data entered is invalid.
16	Enter Mechanic ID 1 into Timesheet (See bottom of table)	The cell below should display the correct name.
17	Enter Mechanic ID 2 into Timesheet (See bottom of table)	The cell below should display the correct name.
18	Enter Mechanic ID 3 into Timesheet (See bottom of table)	The cell below should display the correct name.
19	Enter Test Data 4 into Timesheet	Sheet should correctly accept data

Test Data

The data below will be used in testing my system:

Test Data 1

Invoice Number: 50
Date: 4th July 2002
Customer Name: Customer One
Vehicle Registration Number: M345JWW
Vehicle: Corsa
Part Codes: cortir x 1, braflu x 1

Test Data 2

Invoice Number: 6352
Date: 26th September 2010
Customer Name: Customer Two
Vehicle Registration Number: J523MMR
Vehicle: Zafira
Part Codes: zafwip x 5, zafhub x 4, zaftir x 4, braflu x 20, antfre x 25

Test Data 3

Invoice Number: 2
Date: 13th January 2003
Customer Name: Customer Three
Vehicle Registration Number: A456D55
Vehicle: Astra
Part Codes: asttir x 1

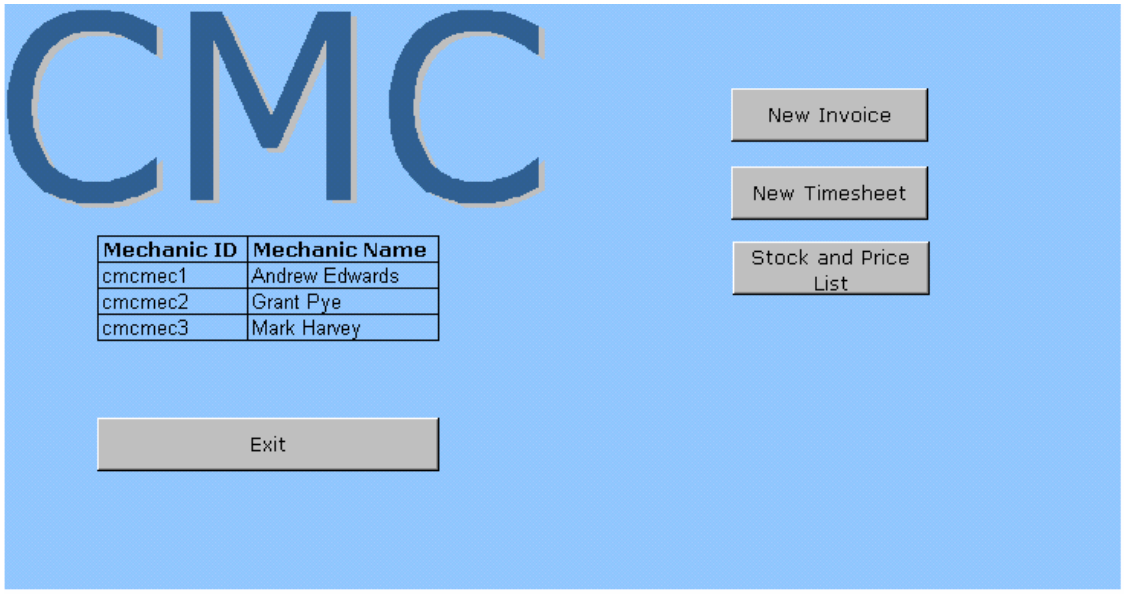
Test Data 4

Invoice Number: 50
Customer Name: Customer One
Vehicle Registration Number: M345JWW
Vehicle: Corsa
Date: 4th July 2002
Start Time: 10:15
Finish Time: 10:29
Mechanic ID: cmcmec1
Mechanic Name: Andrew Edwards
Type of job: Replacement

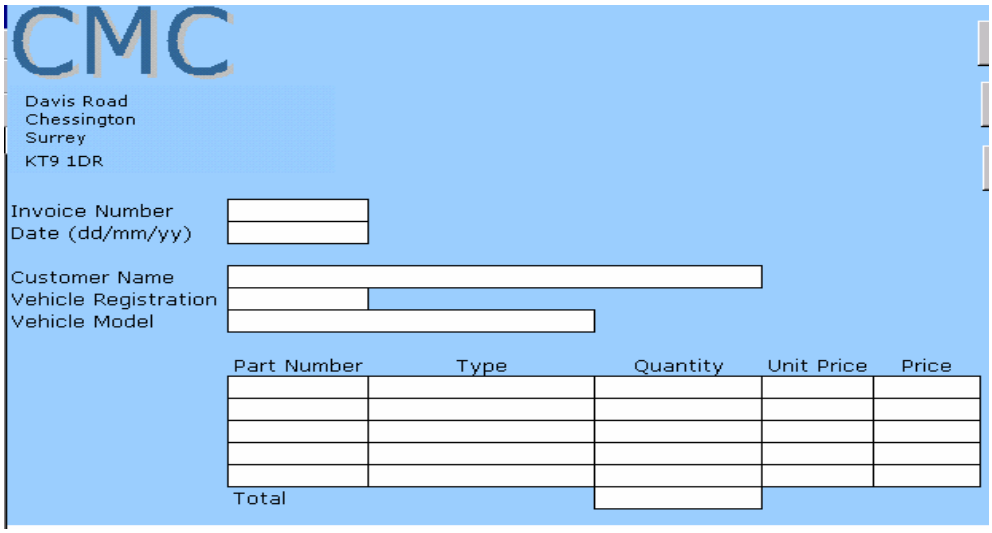
IMPLEMENTATION AND TESTING

Overview of System

Sheet 1 – Main Menu
This will be the first sheet seen by the user on accessing the system. Buttons link this sheet to the other parts of the system. The sheet will look like this:

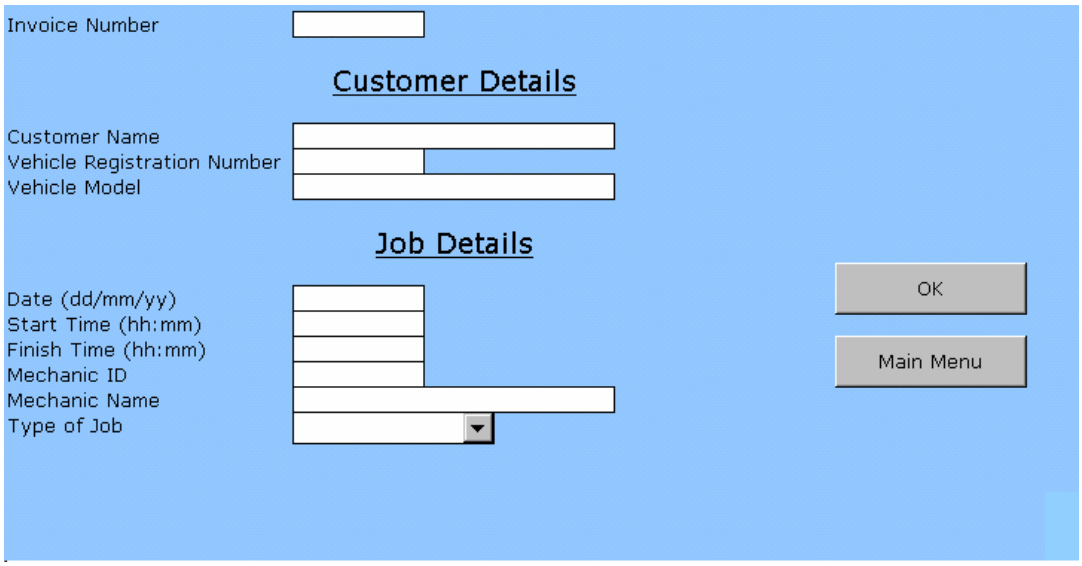


Sheet 2 – Invoice
This sheet shows the user a blank invoice in the same format as the previously used paper ones. A "save" button will save the data, while the "main menu" button will take the user back to the main menu. The "Stock" button will take the user to the stock list if they need to look up a code for a particular part. The sheet will look like this:



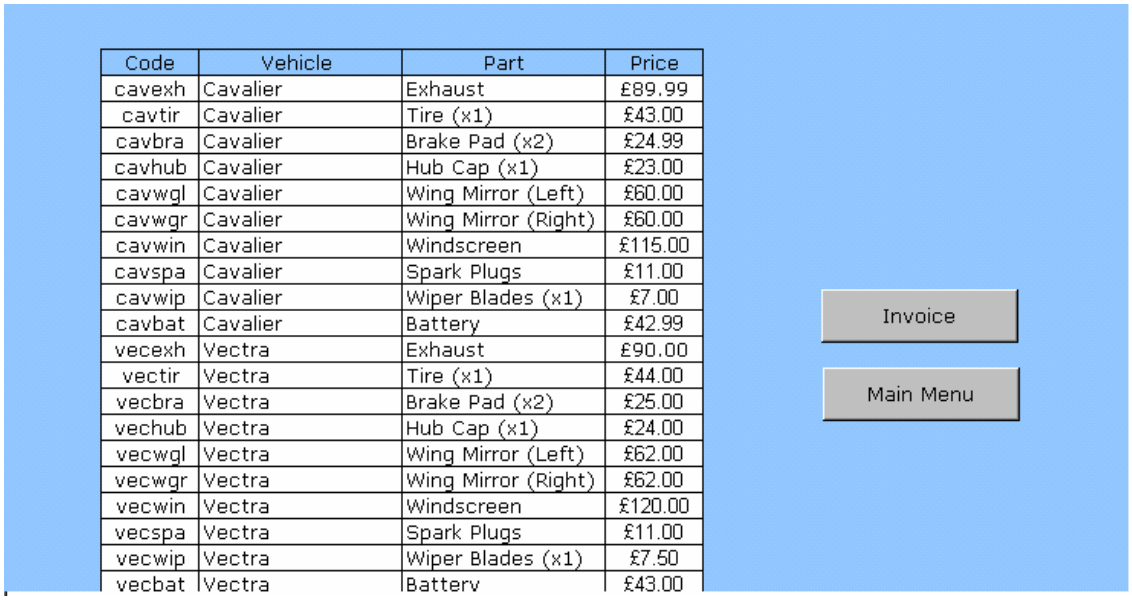
Sheet 3 – Timesheet

This sheet shows the user a blank Timesheet like the Invoices, in the same format as the previously used paper ones. A "save" button will save the data, while the "main menu" button will take the user back to the main menu. The sheet will look like this:



Sheet 4 – Stock and Pricelist.

This sheet will present the user with a list of all stock that is kept at the garage that *do not* have to be ordered externally. Also shown for each part is a unique code and the price for each component. The sheet looks like this:



Code	Vehicle	Part	Price
cavexh	Cavalier	Exhaust	£89.99
cavtir	Cavalier	Tire (x1)	£43.00
cavbra	Cavalier	Brake Pad (x2)	£24.99
cavhub	Cavalier	Hub Cap (x1)	£23.00
cavwgl	Cavalier	Wing Mirror (Left)	£60.00
cavwgr	Cavalier	Wing Mirror (Right)	£60.00
cavwin	Cavalier	Windscreen	£115.00
cavspa	Cavalier	Spark Plugs	£11.00
cavwip	Cavalier	Wiper Blades (x1)	£7.00
cavbat	Cavalier	Battery	£42.99
vecexh	Vectra	Exhaust	£90.00
vectir	Vectra	Tire (x1)	£44.00
vecbra	Vectra	Brake Pad (x2)	£25.00
vechub	Vectra	Hub Cap (x1)	£24.00
vecwgl	Vectra	Wing Mirror (Left)	£62.00
vecwgr	Vectra	Wing Mirror (Right)	£62.00
vecwin	Vectra	Windscreen	£120.00
vecspa	Vectra	Spark Plugs	£11.00
vecwip	Vectra	Wiper Blades (x1)	£7.50
vecbat	Vectra	Battery	£43.00

Macros used

The macros used in the implementation of my system can be found at the back of this project, in the Technical Manual.

Choice of project

I chose to complete this project, as the problem would have been able to solve in the allocated time for the project and also because it allows for the basic "Input – Process – Output" process.

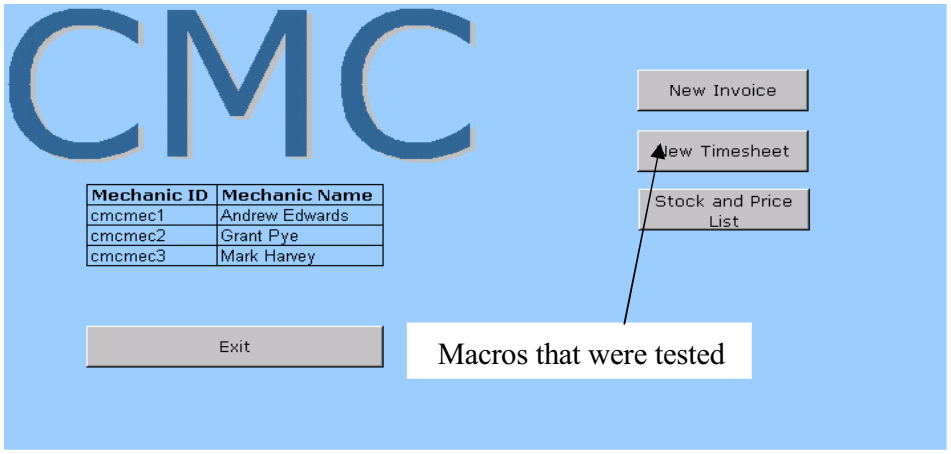
Preliminary design choices

When first designing the system it was my intention to use a template for the Invoice and Timesheet, as this would make it easier for the user and also prevent accidental deletion of data in surrounding cells. However, this was not very feasible, as it would require the templates to be in a separate workbook than the rest of the system. For ease I decided it would be best to keep all sheets contained in the same workbook and to simply lock a cell to prevent accidental deletion of formulae etc.

I also considered, when saving a completed invoice that it should be copied to Microsoft Word and then print. This would have many benefits including the fact that they would be a lot easier to save. However, when trying to copy data from my worksheet to the Word document, problems occurred with the layout of the data on the screen. I felt that too much time would be wasted on trying to rectify this problem so I decided that I should simply write a macro to print the Invoice straight from the screen in front of the user. This does not involve the writing of a particularly complex macro and is easy to implement in the time allocated.

Commentary on testing

Tests 1 – 5. These test the basic macros within the workbook that allow easy transferral between sheets.



Test 6 – Entering into Invoice of Test Data 1

After entering the specified test data, the system performed as expected, with all calculations being made and properly and correctly.

Test 7 – Entering into Invoice of extreme Test Data 2

Upon entering the previously mentioned test data, the system made all calculations correctly without any problems. The data entered was extreme, as chances are someone would not buy 25 bottles of Brake Fluid.

Test 8 – Entering into Invoice of extreme Test Data 3

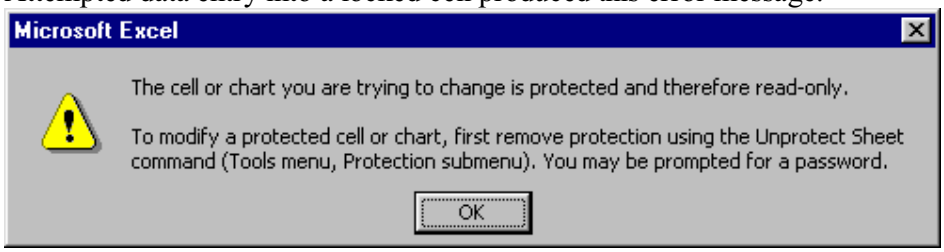
The system performed as required with the entering of this extreme data. All calculations were properly executed without fault.

Test 9 – Entering onto Timesheet of Test Data 4

The v-lookup formula worked correctly and upon entering the mechanic ID, the correct Mechanic name was placed in the correct cell.

Test 10 – Entering data into a locked cell.

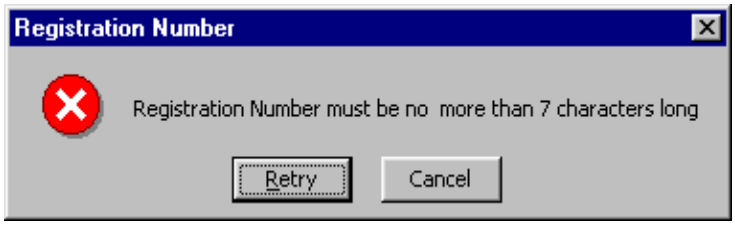
Attempted data entry into a locked cell produced this error message.



Test 11 – Enter an invalid date on Invoice (30th February 2002). At first the system accepted this date as being a valid one. To overcome this problem, I put data validation on the cell so that it would only accept valid dates and present the user with an error message if the date was invalid. After doing this, I re-entered the invalid date and the system displayed a standard Excel error message. As a result I decided to change the error message to be customised for my system.

Now, entry of an invalid date will present the user with the following error message:

Test 12 – Enter an Invalid Registration on Invoice (More than 7 characters long)
Entry of the invalid data produced this customised error message:

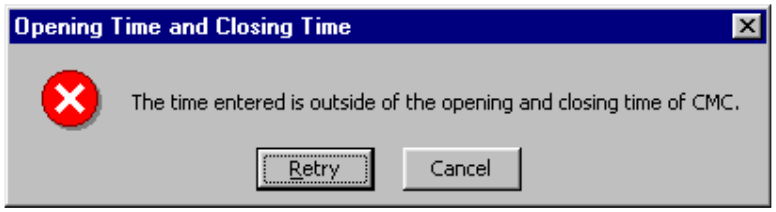


Test 13 – Enter an invalid date on Timesheet. (This should work fine provided the date entered on the invoice is also correct.)

Once again as when I entered the invalid date on the invoice, the Timesheet also accepted the invalid date. To rectify the problem, I applied the same data validation as with the previous problem. As a result the error message presented to the user is also:

Test 14 – Enter a "Start time" for a job that is outside the operating hours of CMC. Entering the "Start time" as being 08:59 presented the user with the following customised error message:

Test 15 – Enter a "Closing time" that is outside the operating hours of CMC. Entering the "Closing time" as being 17:01 produced the following customised error message:



Test 16 – 18 – Enter Mechanic ID's into Timesheet. These worked fine and all ID's matched up with the correct Mechanic name as they should:

Mechanic ID	Mechanic Name
cmcmec1	Andrew Edwards
cmcmec2	Grant Pye
cmcmec3	Mark Harvey

EVALUATION

Based on the "Performance of the new system" in the Analysis section of this project, I have concluded the system has achieved the following:

i. The system is very simple to operate and could very easily be used by someone with limited ICT skills and a low level of computer literacy. All sheets show the user quite clearly what data is to be entered in which cell. Also the protecting of cells makes data entry even easier as he/she can simply "tab" between cells.

ii. The Main Menu is clear and obvious as to which button will take the user to the corresponding sheet. Selecting a button will take the user directly to the chosen sheet without a problem. Use of these buttons ensures that the user should not need to use the sheet tabs at the bottom of the screen. Seeing as the sheet tabs have been removed, they do not have much choice.

iii. The invoice sheet is very easy to complete. Cells in which data can be entered are clearly defined by the fact that they are a different colour to the rest of the sheet and the background and in the way they the specific piece of data that must entered into that cell is labelled at the side. The way in which the cells are locked such that the user can "tab" between cells will aid efficiency in completing an invoice and make the whole process a lot faster.

iv. Accidental or indeed deliberate deletion of formulae is not possible at all. This is because I have protected each sheet with a password that will be given to the user on his collection of the new system. In protecting the sheet it was important that I specified which cells would allow data to be entered into. For example those cells on the Invoice and Timesheet. In the event that a user will need to edit a formula or add new stock, the user must unprotect the sheet using the password provided, make the changes and re-protect the sheet.

v. There is very little in the way of user help. There are customised error messages that indicate to the user if they have made a mistake but other than that there is practically nothing. The user and technical manuals will provide little assistance. I do hope however that the system is that easy to operate that the user simply will not need that much help in operating it.

vi. Data entry into the invoice is extremely quick and testing suggests that the time takes well under a minute to completely fill one in. This will ensure that time is not wasted on the computer that can be better spent repairing cars.

vii. All macros operate quickly and properly. When writing the macros, I added the line "' Hide operations from the user. Application.ScreenUpdating = False." This will means the user does not see the screen moving from sheet to sheet as a macro is executed.

On the whole I feel that my system is easy to operate and does for the most part meet the requirements set out in the design section. I decided to hide the sheet tabs, row and column headers and the scroll bars. Hiding the sheet tabs means that the user is forced to use the button on all the sheets in the workbook. I removed the column and row headers as they serve no purpose in the system and are simply not needed. For the same reason, I took out the scroll bars.

I feel that the company logo and address could have been made a bit bigger on the invoice sheet as the invoice is something the customer takes away with them and it would need to be clearer both for advertising purposes and simply to makes it stand out better.

I also feel that the Stock and Price list could have been arranged in a better layout. The current one is simply a large table, spanning over one hundred rows and three columns. If I were to re-design the sheets I feel I would amend the layout to make it easier for the user to search for stock and also to make it more pleasant to look at which is another important feature of a user interface.

Another problem that given a chance I would repair is getting the invoice number to automatically increase by one. The system relies on the user correctly entering the Invoice number rather than it happening automatically.

Similarly, I would have liked to have been able to include a function whereby the user could search the "Stock and Price List". However this could not easily be done with a macro and would result in a customised toolbar having to be created. This is not a major problem but the fact that to complete a search would result in having to unprotect the sheet, leaving it vulnerable for data deletion is not worth the risk.

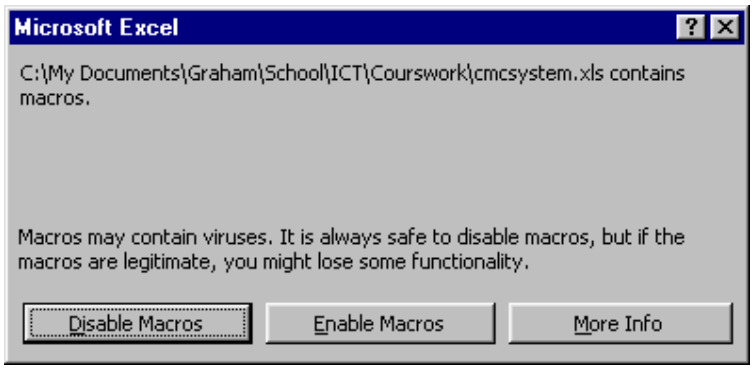
USER MANUAL

This system is designed solely for the use of Chessington Motor Centre. It runs well in both Excel 2000 and Excel 97.

The total size of the system is 88.5 KB and so will not use much memory at all.

Starting the system

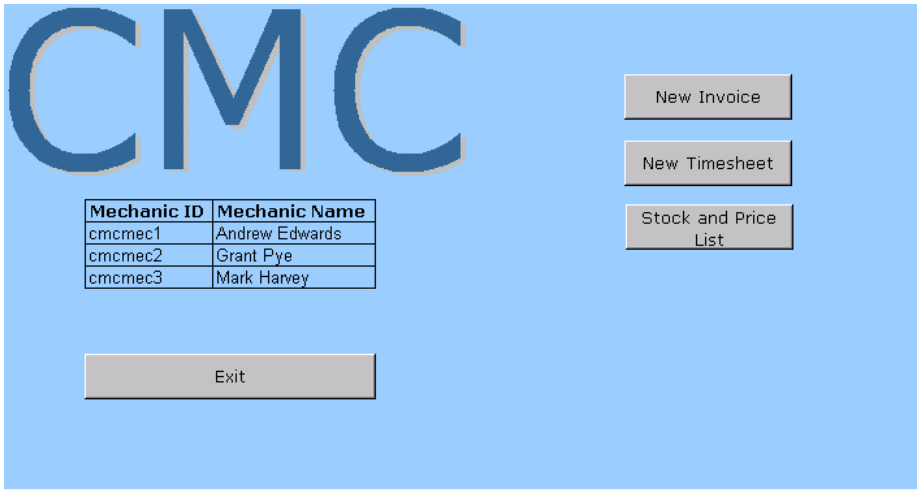
To open the system, access your "My Documents" file and double click on the "CMC system" icon. Excel should open and present you with this message.



To proceed, click on the "Enable Macros" option.

(There is a way of disabling this message so that it no longer appears, however this leave the system susceptible to virus's, that could potentially ruin you whole PC.)

You should now be at the "Main Menu" as below.



Please note, selecting the "Disable Macros" button will also give you access to the system, however the macros will not work, effectively disabling the whole system.

Processing a transaction

After completion of a job, the Mechanic must complete both and invoice and a timesheet. This can be done as follows:

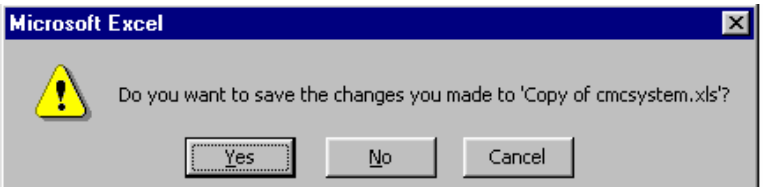
- Select the "New Invoice" button. This will take you to a blank invoice. Press the "Tab" button until the "Invoice Number" cell is selected.
- Enter the appropriate data into each cell, pressing "Tab" to move to the next one.
- When completing the table in which the stock brought by the customer is entered, should you need to check the code of a particular part/product, simply select the "Stock and Price List" button. This will take you to the stock screen. Once you have found the part, select the "Return to Invoice" button and continue the entry of data.
- Once all data has been entered, click on the "Ok" button. This will print two copies of the invoice, one for the customer and one for CMC. You will then be prompted to complete a Timesheet by a customised message.
- The workbook will the transfer from the "Invoice sheet" to a Timesheet. Certain details will have been copied from the invoice. They are, the invoice number, the name of the customer, the vehicle registration number and the model of the vehicle.
- Fill in the remaining details on the Timesheet using the same method as with completing the invoice. I.e. enter data then tab to the next cell.
- Once data entry has been completed, select once again the "Ok" button. This will print one copy of the timesheet, clear the timesheet to leave it blank and return the workbook to the "Main Menu" ready for the next Invoice to be completed.

Checking Stock and Prices

Checking stock is extremely straightforward and can be done in very little time. At the "Main Menu" screen, select the "Stock and Price List" button. This will take you to a list of all the parts available to CMC and certain extras such as Brake fluid, Anti Freeze and Oil.

Exiting the system

To exit the system, return to the "Main Menu" and select the exit button. You will be presented with the following message:



Seeing as no data will have been saved or changes made, it does not matter whether or not you select "Yes" or "No

TECHNICAL MANUAL

The system is given on a 3 ½ inch floppy disk.

Stored on the disk are two files. One is a Microsoft Excel file called “cmcsystem”.

This is the new system and must be transferred to your “My Documents” folder. The second is a Microsoft Word file called “User Manual”. This is the user manual and can be stored in a place of your choice.

Changing the default password

- To change the user password select you must follow these steps
- From the menu bar select: Tools → Protection → Unprotect Sheet.
- Enter the default password.
- The sheet will now be unprotected so it is essential that you do not erase or edit anything on the sheet.
- From the menu bar select: Tools → Protection → Protect Sheet
- Enter the new password.

Please note it is essential that the same steps are repeated for every sheet in the system.

Changing list of employees

Should you need to change the names of any of the employees at CMC or their user ID’s you must follow the following method:

- Open the file “cmcsystem”
- At the “Main Menu”, go on the menu bar to Tools → Protection → Unprotect Sheet
- When prompted, enter the password
- Go to the table containing the list of Mechanics and their appropriate Mechanic ID’s.
- Amend the table accordingly
- Re-protect the sheet. (See Changing the default password)

Design of Worksheet

If for any reason it becomes necessary to edit the formulas or the design of the system, the screenshots below indicate the formulae used and the names of each worksheet.

Sheet 1 is called “Main Menu” and contains no formulae

Sheet 2 is called “Invoice” and contains the following formulae:

Type	Quantity	Unit Price	Price
=IF(B18="",,(VLOOKUP(B18,parts,3,FALSE)))		=IF(B18=0,,(VLOOKUP(B19,parts,4,FALSE)))	=SUM(D18*E18)
=IF(B19="",,(VLOOKUP(B18,parts,3,FALSE)))		=IF(B19=0,,(VLOOKUP(B19,parts,4,FALSE)))	=SUM(D19*E19)
=IF(B20="",,(VLOOKUP(B18,parts,3,FALSE)))		=IF(B20=0,,(VLOOKUP(B19,parts,4,FALSE)))	=SUM(D20*E20)
=IF(B21="",,(VLOOKUP(B18,parts,3,FALSE)))		=IF(B21=0,,(VLOOKUP(B19,parts,4,FALSE)))	=SUM(D21*E21)
=IF(B22="",,(VLOOKUP(B18,parts,3,FALSE)))		=IF(B22=0,,(VLOOKUP(B19,parts,4,FALSE)))	=SUM(D22*E22)
	=sum(D18:D22)		
=SUM(F18:F22)			

Sheet 3 is called “Timesheet” and contains the following formulae:

Invoice Number

Customer Details

Customer Name
Vehicle Registration Number
Vehicle Model

Job Details

Date (dd/mm/yy)
Start Time (hh:mm)
Finish Time (hh:mm)
Mechanic ID
Mechanic Name =IF(B15=0,,(VLOOKUP(B15,'Main Menu'!B10:C13,2)))
Type of Job

Macros used in system

The following Macros have been used in the implementation of the system:

Sub auto_open()
'
' auto_open Macro

```
' Macro recorded 4/18/02 by G TILLEY
'

Sheets("Main Menu").Select
End Sub




Sub exit_system()
'
' exit_system Macro
' Allows user to exit system giving them the option to save any data that has been
entered
'
ActiveWorkbook.Close
'
End Sub

Sub invoice()
'
' invoice Macro
' Takes user to a new invoice ready to be completed
'


'
    Sheets("Invoice").Select
End Sub

Sub timesheet()
'
' timesheet Macro
' Takes user to a new Timesheet to be completed
'


'
    Sheets("Timesheet").Select
End Sub

Sub stock_and_price_list()
'
' stock Macro
' Takes user to a list of stock available for use and sale
'


'
    Sheets("Stock and Price List").Select
End Sub

Sub main_menu()
```

```
'
' main_menu Macro
' Takes user user to the main menu
'

'
    Sheets("Main Menu").Select
End Sub


Sub save_invoice()
'
' save_invoice Macro
' Saves and prints data entered in Invoice
'

' Hide operations from the user
    Application.ScreenUpdating = False
    ActiveWindow.SelectedSheets.PrintOut Copies:=2, Collate:=True
    Range("B10").Select
    Selection.Copy
    Sheets("Timesheet").Select
    Range("B6:D6").Select
    ActiveWindow.ScrollRow = 1
    Range("B2").Select
    ActiveSheet.Paste
    Sheets("Invoice").Select
    Application.CutCopyMode = False
    Selection.ClearContents
    Range("B13:D13").Select
    Selection.Copy
    Sheets("Timesheet").Select
    ActiveSheet.Paste
    Sheets("invoice").Select
    Range("B15").Select
    Selection.Copy
    Sheets("Timesheet").Select
    Range("B8").Select
    ActiveSheet.Paste
    Range("B11").Select
    Selection.ClearContents
    Range("B13:D13").Select
    Selection.ClearContents
    Range("B14").Select
    Selection.ClearContents
    Range("B15:C15").Select
    Selection.ClearContents
    Range("B18:B22").Select
    Selection.ClearContents
    Range("D18:D22").Select
    Selection.ClearContents
```

```
    ActiveWindow.ScrollRow = 1
    MsgBox ("Please complete Timesheet")

End Sub
```

```
Sub save_timesheet()
'
' save_timesheet Macro
' Prints one copy of a the Timesheet
'

'
    ActiveWindow.SelectedSheets.PrintOut Copies:=1, Collate:=True
    Range("B2").Select
    Selection.ClearContents
    Range("B6:D6").Select
    Selection.ClearContents
    Range("B7").Select
    Selection.ClearContents
    Range("B8:D8").Select
    Selection.ClearContents
    Range("B12").Select
    Selection.ClearContents
    Range("B13").Select
    Selection.ClearContents
    Range("B14").Select
    Selection.ClearContents
    Range("B15").Select
    Selection.ClearContents
    Range("B23").Select
    Selection.ClearContents
    Sheets("Main Menu").Select
End Sub
```