Information System for “Fone For Flowers” a High Street Flower Shop in Morecambe

Andrew Waugh

BSc JHiS Information Systems with Management

2005/2006

The candidate confirms that the work submitted is their own and the appropriate credit has been given where reference has been made to the work of others.

I understand that failure to attribute material which is obtained from another source may be considered as plagiarism.

(Signature of student)_____

Summary

The following report details the process involved in researching, developing and evaluating an information system for “Fone For Flowers” a high street florist in Morecambe

Firstly appropriate development methodologies are researched; this is then applied throughout the project. Secondly the current working practices are analysed, documented and a feasibility report is discussed. The design, implementation, and testing of the system is then discussed and finally the project is evaluated.

Acknowledgements

This project would not have been a success without the support from a number of individuals and for that reason I would like to thank the following:

My Supervisor Dr Pat Hill for all of her help and guidance throughout the project and for being able to read my work despite my spelling.

Fone For Flowers, for allowing me to do a project on them and for all their help and feedback.

Dr Martyn Clarke my Project Assessor, who provided detailed feedback following both mid-project report and progress meeting. This enabled me to focus on my strengths and tackle the weaknesses

Stacey for all her support and telling me it will be ok, when stressed at the amount of work there is to be done.

Contents

Summary II

Acknowledgements III

Contents IV

Chapter 1: Introduction 1

1.1 Problem definition & Company background 1
1.2 Project Aim 1
1.3 Objectives 1
1.4 Minimum Requirements 2
1.5 Project Approach 2
1.6 Relevance to Degree Programme 3
1.7 Deliverables 3
1.8 Organisation of report 4

Chapter 2: Methodology 5

2.1 Introduction 5
2.2 Need for a Methodology 5
2.3 Selecting a Methodology 5
2.4 Types of IS development Methodologies 5
2.5 Socio-Technical Approach 7
2.6 Software Development Approach 8
2.7 Chosen Methodology for this Project 9

Chapter 3: Requirements Analysis 10

3.1 Introduction 10
3.2 Tools and Techniques 10
3.3 Process Identification 11
3.4 Documents 11
3.5 Business rules 11
3.6 People definition 12
3.6.1 Individuals 12
3.6.2 Groups 12
3.6.3 Organisations 12
3.7 Stakeholders 12
3.8 Interview 12
3.9 Soft Systems Analysis 13
3.9.1 CATWOE 13
3.9.2 Rich Picture Explanation 13
3.9.3 Use Case 13

Chapter 4: Feasibility and Specification 14

4.1 Introduction 14
4.1 Feasibility Techniques 14
4.2 Requirements Identified from Analysis 14
4.3 Potential Solutions 15
4.3.1 Existing Solutions 15
4.3.2 Generated Solutions 17
4.4 Evaluation of Solutions 18
4.5 Other Issues 19

4.6 Chosen Solution 19
Chapter 5: Design 21
5.1 Introduction 21
5.2 Data 21
5.2.1 Entity Relationship Diagram 21
5.2.1.1 Explanation of the Entity Relational Diagram 23
5.2.2 Normalisation 23
5.2.3 Integrity Constraints 24
5.3 Human Computer Interaction and Acceptance 25
5.3.1 Human Computer Interaction 25
5.3.1.1 Nielsen Points of Usability 26
5.3.1.2 Form Design 27
5.3.1.3 Menu Design 28
5.3.1.4 Query and Report Design 28
5.3.2 User Acceptance 28
Chapter 6: Implementation 30
6.1 Introduction 30
6.2 Technical Platform 30
6.3 Implementation of Design 30
6.3.1 Tables 30
6.3.2 Relationships 31
6.3.3 Form Implementation 31
6.3.4 Query Implementation 33
6.3.5 Reports Implementation 34
6.3.6 Visual Basic Implementation 35
6.3.7 Security 36
Chapter 7: Testing, User Training and Manual 37
7.1 Introduction 37
7.2 Developer Testing and the Need for End User Testing 37
7.3 Importance of Training and Training Method Used 38
7.4 Use of prototype and End User Testing 39
7.5 Final Prototype Changes 39
7.6 User Documentation 40
7.7 System handover 40
Chapter 8: Evaluation 41
8.1 Introduction 41
8.2 Evaluation Criteria 41
8.2.1 User requirements 41
8.2.2 Aim objectives min requirements 42
8.2.3 Enhancements 43
8.2.4 Business Saving – Quantative evaluation 44
8.2.5 Effectiveness of gathering information 44
8.2.6 Effectiveness of Technologies used 44
8.2.7 Effectiveness of Testing 45
8.2.8 User Evaluation / Feedback 45
8.2.9 Usability 47
8.2.10 Prototype Evaluation Outcome 48
8.2.11 User Manual Evaluation Outcome 48
8.2.12 Effectiveness of Methodology 49

8.3 Comparison to Other Products 50
8.4 Possible Improvements 51
References 52
Appendix A – User Reflection 54
Appendix B – Original Project Schedule & Revised Schedule 56
Appendix C – Analysis Report 58
Appendix D – Rich Picture and Use Case 68
Appendix E – Feasibility Study 70
Appendix F – Prioritorised Specification 88
Appendix G – Descriptive Specification 92
Appendix H – Normalisation 93
Appendix I - Usability 95
Appendix J – Form, Query and Report Design 96
Appendix K – Tables, Relationships, Forms, Reports, and Queries 98
Appendix L - Visual Basic Code 101
Appendix M – User Manual 106
Appendix N – Evaluation Document against the Prioritisation of Specification 120

Chapter 1: Introduction

1.1 Problem definition & Company background

Fone For Flowers (FFF) is an independent flower shop on the high street in Morecambe. They stock a wide selection of fresh flowers, bouquets, house plants, silk flowers and special occasion balloons. They cater for weddings, corporate events and funerals with specialists' flowers. They have a team of florists, a delivery driver and a shop assistant. All of the staff takes orders over the phone from customers and they all also serve customers who come into the shop. There current practices involve paper based orders and processing of customer accounts. They believe that an IT solution is needed that will reduce the need for paper based ordering and allow them to mange their customer accounts more efficiently. Currently orders are processed by hand and because if the nature of the flower shop these can be split on or damaged and often they find that the hand writing of staff is not always legible to read. This causes difficulty with notes that are written on the ordering sheet that will be required to go on a flowers card. If this message is not as the customer requires it gives the impression of poor service. Storing customer data electronically they feel will also speed up their service as they have a lot of repeat custom and the customers have to give their details every time they give an order.

1.2 Project Aim

The aim of the project is to identify the opportunities in using IT for improving the work practice information management involved in running "Fone For Flowers" (FFF) a high street flower shop in Morecambe. Once an opportunity is identified then a system will be designed, implemented, tested and then evaluated.

1.3 Objectives

The objectives of the project are to**:**

1. To research a number of project methodologies and formulate a methodology most suitable to this project. This includes researching into Soft system methodologies (SSM), Waterfall Model and ETHICS
2. To keep the user informed and up to date with the project and incorporate the user in as many stages as possible.
3. To design a fully functional system incorporating the main requirements of the user.
4. To create a clear and consistent Graphical User Interface using the appropriate Human Computer Interaction techniques.
5. To implement and test the system.

6. Evaluate the system to establish whether the user requirements are met;

1.4 Minimum Requirements

The minimum requirements are**:**

- A document containing the results for the analysis of FFF current working practices containing the organisations requirements for an IT solution.
- A feasibility study into the possible solutions to the problems with the organisations working practices.
- A set of requirements and specification of the future product agreed and signed by FFF.
- A formal design of the system including user interface and data design.
- A system core with a basic user interface,
- A prototype that includes functionality such as:
    - Booking orders, changing orders and customer account.
    - All of these must be able to be viewed, searched and suitable reports created to provide FFF with the information they need.

Further enhancements to this project with the allowance of time after all minimum requirements have been completed are:

- Complex user interface offering greater usability
- A user manual.
- Linking of the system to other relevant applications.
- Link the ordering system to the FFF websites so online orders can be transmitted to the system
- Demonstrate the new system with a small number of people from the company and improve areas where feedback suggests.
- Management reporting – offering such information as yearly sales by product.

1.5 Project Approach

The project its self and the system developed by the project were managed with a user centred approach as a system can be seen as a failure if the users and their needs are not taken into account. Firstly a detailed background research into methodologies, tools and techniques to select the correct methodology for the project was carried out. Secondly a feasibility study was conducted using techniques such as ethnography and rich pictures to gather data and feedback for further analysis. Research was carried out into possible alternative solutions available and then into the development of a solution that would fit the users' needs. The system was then created using the prototyping method and improving the system from feedback from the user. The

prototype was then tested by both the developer and the end user. The evaluation of the prototype and user manual was undertaken using interviews and training sessions. Also a third party was used to test the effectiveness of the user manual.

Through out the project life cycle time allowance has been included at the end of each milestone to document the proceedings, such as meetings and information gathered at each stage. This can be seen in the original project schedule. This will allow for easier and more accurate formation of the final report as it will not relay solely on memory of the events as the documentation was written at the time of conducting that stage. The original schedule can be seen in Appendix B. The only major change to this schedule was that the write up went on a further week; the time taken to bring together the report was greater than first anticipated. Also during the design stage the initial plan had that it would be designed using UML, this was actually not needed as other more suitable techniques where used. A revised plan can also be seen in Appendix B.

1.6 Relevance to Degree Programme

The knowledge gained from a number of modules from the last 3 years have been used throughout this project; project management skills and a suitable project methodology has been drawn from project management and information systems modules (IN11,SE22, IS33, IS21). Requirements gathering and analysis techniques have been considered and chosen though the knowledge acquired during people-centred information systems (IS33). Techniques for conducting a feasibility study and the production of a report were drawn from the knowledge gained in IN11; however more research was conducted into this subject. The knowledge gained from object-oriented analysis and design (IS21) and from the database modules (DB11, DB21) will help create a logical system design for my solution. Prototyping and the need for an appreciation of the users technical knowledge has been drawn from people-centred information systems and project management modules (IS33, SE22). Evaluation techniques have been considered from my project management and people-centred information systems modules also.

1.7 Deliverables

The deliverables for this project are:

1. The main report. This will contain all the analysis and design of the software itself, a description of the implementation phase with explanations and screen shots where applicable as well as a detailed evaluation of both the success of the system (as compared to its specification & requirements) and of my own work on the project.
2. A functioning prototype – deliverable to FFF.

3. User documentation/User Manual – deliverable to FFF.

1.8 Organisation of report

The report has been organised into logical chapters describing the life cycle of the project from initial analysis and requirements gathering to development, implementation and then evaluation. Each chapter has been introduced and will set out what the chapter intends to describe to the reader and what was achieved for the project. The main body of the chapter then follows; this is divided into logical sections that show the development of the achievements of the chapter through time.

Chapter 1: This is the main introductory chapter to the project and defines the aim, objective and the approach of the project. It includes the project schedule and the relevance the project has to my degree programme.

Chapter 2: This chapter considers a number of project methodologies and their role in the development of a methodology best suited to this project.

Chapters 3: This chapter contributes towards the production of a feasibility report and contains the findings of the analysis of the problem.

Chapter 4: This chapter brings together the feasibility study and reports the findings of the study for the owners of FFF.

Chapter 5: This chapter describes how the design of an ideal systems solution was created; this includes the interfaces, menu structure and the underlying relational database design.

Chapter 6: This chapter describes the technical implementation of the system.

Chapter 7: This chapter outlines the approach to testing, training and the demonstration of the prototype. The final changes to the prototype and the discussion of a hand over to FFF and the supporting user manual concludes this chapter.

Chapter 8: This chapter presents the results of evaluating the prototype and user manual against functional and usability criteria. It also discusses the possible enhancements and compares the product to solutions already on the market

Chapter 2: Methodology

2.1 Introduction

When choosing an appropriate methodology for this project it was important to take into account the user centric nature of this project. It was important to have a methodology that had the ability to gather a clear picture of the current situation. This was needed to effectively identify the opportunities for using IT. This chapter first highlights the need for a methodology and the importance it has to IS projects. It then highlights the different types of development methodologies in IS and then researches further into these. Finally the methodology for the project in constructed and justified.

2.2 Need for a Methodology

All projects need to follow a set methodology as methodologies help define what steps need to be taken and they also help with project management. Jason Charvet [1] states that every project needs a strategy (or methodology) and that the strategy must be realistic and agreed to by everyone involved. This makes everyone aware of what needs to be done and at what stage they are in the life cycle of the project as good strategy leads to good results.

2.3 Selecting a Methodology

There are a number of trends and general characteristics of all IS development methodologies. Jason Charvat [1] also notes that one trend of all methodologies is that they have project phases, measure progress, take corrective action based on defects found and assign resources to various phases. In order for the relevant methodology to be selected it was vital that as many possibilities were looked into. In Part 6 of their book, Avison and Fitzgerald [2] categorise methodologies into six different areas; process-oriented; blended; object-oriented; rapid development; people-oriented and organisational-oriented. The best methodology for the project was one that would best suit the business and developers skills.

2.4 Types of IS development Methodologies

IS development methodologies are such methodologies as Systems Development Lifecycle (SDLC) [3], sometimes known as the Waterfall model. This methodology defines the different stages involved in developing a new system. The Waterfall Model [4] is often described as having seven phases, Project Planning (Problem Definition), Analysis, Design, Implementation, Testing, Deployment and Maintenance. Planning and Deployment are sometimes just assumed and are missed out as stages. Each sequential step must be completed before the other can be started. The Centre for technology in government [5] highlight possible criticisms as the model being too rigid

and unrealistic when it comes to quickly meeting customer's needs and that real projects rarely follow the sequential flow that the model proposes. Even though these drawback exist this classic cycle has been used for projects over many years, and is attributed with providing the theoretical basis for other process models. But if followed exactly, it has been found to often lead projects to failure as the name waterfall suggests once a phase is completed it does not offer a way to go back and change phases. This can be a large drawback as at the beginning of most projects there is often a great deal of uncertainty about requirements and goals, and it is therefore difficult for customers to identify there needs and criteria on a detailed level and with the models rigidness it doesn't accommodate changing requirements very well. Although there are these possible criticisms of this methodology it does have many advantages in that it has clear defined stages, covers any development from start to finish and is said to be effective for short, low risk, projects [6].

According to the Standish Group Chaos Report (1995) [7] Traditional structured methodologies have a tendency to deliver systems that arrive too late and therefore no longer meet their original requirements. So methodologies need to be looked at that have the major components of IS Development identified in the waterfall model but don't offer the same rigidness. These are called iterative methodologies or Rapid Development Methodologies according to Avison and Fitzgerald s classification [2]; examples of these are Prototyping [8] and Rapid Application Development (RAD) [4]. It is claimed that Prototyping can reduce development costs, decrease communication problems, cut project length and produce the right system first time. Iterative methodologies concentrate on completing the stages of the project quickly and repeating them a number of times throughout the timescale of the project to arrive at a final iteration which should be the best model for the entire project and draw on lessons learnt and the results of previous iterations. It allows the end user to see the product and the progress is being made as unlike the waterfall model the final product isn't produced until the final stages. Communication is improved as it works on the basis of constant communication and regular exercising of the prototype. This will also allow users to suggest modifications during the whole process. This could also be viewed as a drawback as the process could go on for a while if the user keeps on requesting added functionality at each iteration. Repeating of stages does provide noticeable benefits particularly the use of prototyping for the design and implementation phase, it will also help with testing as the product is being scrutinised at each stage.

2.5 Socio-Technical Approach

Socio-technical approaches are often described as a soft system approach because they focus on people issues and problems rather than technical system problems. The technical system problems are still addressed but in terms of the people and organisational issues.

In her book Enid Mumford [9] defines the socio technical approach as:

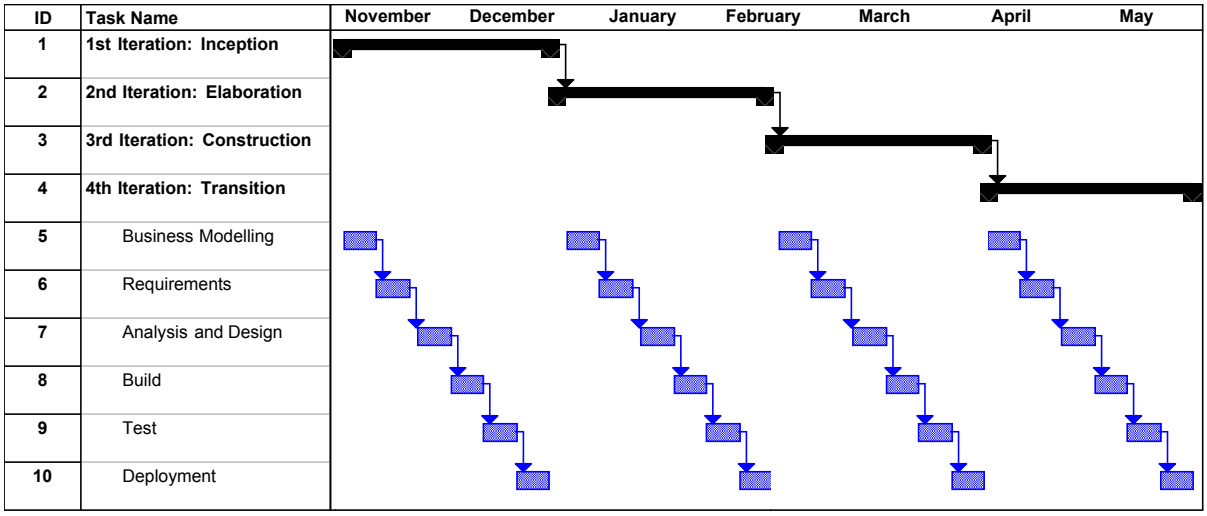
> "One which recognizes the interaction of technology and people and produces work systems which are both technically efficient an have social characteristic which lead to high job satisfaction"

An example methodology is ETHICS or Effective Technical and Human Implementation of Computer-based Systems this was developed by Enid Mumford [9] and particularly highlights the socio-technical approach and is an example of a people-oriented methodology according to Avison and Fitzgeralds classification [2]. Enid Mumford [9] defines fifteen steps that are generally human related and the technology does not feature until the later steps. The technical solution is a means to solve the people centred business problems. The idea being that a good design of the system is not just a technical design but looks at how the people will be involved in and use the system. It focuses on the change process that they will undertake when a new system is introduced. Being a methodology that has the users at the forefront will mean that end user participation would be vital.

A further methodology is SSM or Soft System Methodology as defined by Peter Checkland. SSM is an example of organisational-oriented methodology according to Avison and Fitzgeralds classification [2]. It deals with soft problems which are difficult to define; soft problems are thought of as the problem situations rather than the problem itself [10]. SSM views the world in terms of human activity systems, it uses tools to help identify and understand the systems and how they connect. Two tools which feature heavily in SSM are CATWOE and rich-pictures [11]; these are analytical tools which help highlight the people involvement, the communication channels (or lack of) and any conflicts that exist. After the analysis the next step is to create conceptual models, compare them with reality and then study their feasibility. Criticisms of SSM are that it doesn't actually tell you how to build a system and that there is no real method. It also ignores the issue of power within a work force; it assumes that all colleagues in an organisation have choice, and in fact equal choice. It was felt that the issue of power would not arise in this project as the business is only small with a few staff.

2.6 Software Development Approach

It was important to consider methodologies and their approach to the software development aspects of a project. The approach to software development considered most appropriate for this project is one that would quickly and clearly construct a design for a solution and hopefully allow users to participate in the design. The participation of the user in the design was important in order to produce a user centred solution. Prototyping could be a suitable approach as with its iterative nature solutions may be quickly implemented, and was able to gather requirements and feedback and then a second prototype could be built. This is evolutionary prototyping where each iteration of the prototype builds upon the last until a final complete version of the system is built. Another methodology that enables quick construction of the design and has good tools which would enable the user to feedback on is RUP. From previous knowledge during the modules IS21 and SE22 RUP gives good results when discussing the design of the system with people who have limited IS knowledge. RUP is mainly document driven and covers the full life cycle of the system. How pure RUP works is that it does quick flows through the waterfall model in iterative steps [3]. Shown below is the waterfall process done four times in iterative steps, this is how RUP would be used.



Source IS11 2005 OAJ

Document templates used in RUP are such as the Vision document for describing the problem definition and scope. Although RUP isn't strictly people centred it is in fact according to Avison and Fitzgerald s classification [2] an object-oriented methodology it does use a tool called UML. UML is not only useful for the actual requirements and design but because it is pictorial by nature it will be useful in describing and discussing the system with the users.

2.7 Chosen Methodology for this Project

It was felt the most appropriate methodology for this project was a combination of several methodologies. The project would try to combine the soft approaches of some methodologies and the structured approach of others. Generally, it would follow the conventional stages of the Waterfall Model but would adopt several of the features and tools that are used in the soft approach methodologies and RUP. The features particularly incorporated were the inclusion of the end user in several stages. Tools such as rich pictures and CATWOE for analysis were also used. UML tools and frameworks that RUP provides were also used. The use of pictorial information that these methodologies provided helped with the analysis and design and enabled both the developer and the user to understand the problem fully and communicate the ideas for improvements. It also helped the user confirm their view of the current situation in a non technical easily understood way. In addition to this prototyping features to create the final system were used, this was as a full system was not realistically possible in the time frame and the number of iterations it required for the developer to reach the final solution.

Chapter 3: Requirements Analysis

3.1 Introduction

To get a full understanding of the current situation and the possibilities for improvements using IT at FFF, requirements analysis was undertaken. The results of the analysis were documented in a report. The full report is available in Appendix C. This chapter will firstly discuss the techniques used to capture the analysis and why they where chosen. The results of the analysis will then be reported and discussed.

3.2 Tools and Techniques

An important part to the success of the project was the involvement of the people at FFF, because of this ethnography was used as it is a technique that takes into consideration the people issues. An ethnography session took place on Saturday 19th November. A semi formal interview with the staff also took place on this day. Burke and Kirk [12] describe ethnography as not so much a method but as a category of human-computer interaction research. This means that there is no exact way of using ethnography to help identify people interactions and processes. The principles within ethnography can however be adapted to help assess the needs and the roles and processes within a business. Ethnography also suggests that the ethnographer can get actively involved in the business to identify the needs from the users perspective, this was a valuable tool as it helped identify problems that may not have been found in an interview situation. Ethnography allows for great freedom in the analysis, focused questions where asked, observations where recorded and the ethnographer involved them self in the business process to get further understanding of the situation.

As mentioned in chapter 2 CATWOE analysis which is part of the SSM methodology was used during the ethnography analysis to capture information about the full environment and the people involved in FFF. This was used in conjunction with people definition which defines the individuals, groups and organisations involved in a business, this was again aided in making sure that all stakeholders were thought of and the larger picture was viewed. The processes that take place in FFF were also captured during the ethnography session along with the business rules and the documents used. This enabled the ethnographer to understand the workflow that takes place in FFF and what documents where included with each process.

A semi structured interview also took place, this was to allow for any information that may have been missed during the ethnography session or any changes and ideas that FFF had that would not have been found by studying the current processes.

A rich picture was also created this aided in the presentation of the current situation to the FFF once the analysis had been conducted. This again is part of the SSM methodology which was chosen because of its user centric approach. The rich picture was used as it helps capture how the people involved in the system communicate and interact with each other and other entities in the system. A rich picture also has no diagrammatical rules and conventions and so it can be made as complex or as simple, as technical or as straightforward as needed. This is important for this project due to the need to communicate with non-technical users that may find it hard to understand conventions in UML diagrams.

3.3 Process Identification

During the ethnography session 10 processes were identified these were then split between front and back end processes. The front end processes were that of taking a customer order, the order could be of the type standard, wedding or with sympathy. The people involved in the process were also noted along with any intangible information such as colour or style of the arrangement. The back end processes were such as amending the orders, arranging the orders and preparing the orders for the next day. The orders taken from the front of the shop or by phone are filed in the correct place. Therefore the system needed to be able to store sort and change orders. A relational database would allow for this to take place. A full description of all the processes can be found in Appendix C in the analysis report.

3.4 Documents

The next logical step was to analyse the documents that were used in FFFs working practices. FFF used 3 documents to perform their tasks; these were the flower order form, wedding order form and the delivery order form. Both order forms are jointly used when customers require a quotation for flowers. This was an opportunity for the system to produce a professional looking quotation rather than just an order form changed to look like a quotation.

3.5 Business rules

Business rules are such that they are often known by the staff but are not written down formerly. The business rules for FFF were all to do with the delivery process. It was important that these rules were to be transferred to the new system as without them the system would work in ways

unexpected by the users. For example deliveries can only be between 8am and 6pm, so if the system accepted orders outside these times then it could cause problems for the users.

3.6 People definition

3.6.1 Individuals

Many individuals were identified during the ethnography session, these are important as these will be the people affected by the new system. By understanding their needs and how they interact with the processes and each other the system can be created as not to cause conflict or issues between them. The main individuals identified are managers, florists, shop assistant and delivery driver.

3.6.2 Groups

By recognising groups and their roles within an organisation the developer was able to take into account their needs and how the new system will affect the groups dynamic. This is important as if the system affects the group the system my fail, but if the effects are foreseen then such activates as training and user involvement could be undertaken to reduce the impact of change. The only group found in the analysis was the staff members.

3.6.3 Organisations

The only organisation identified during the process was Teleflorist. The impact they have on FFF is minimal and the interaction with Teleflorist is separate to the other business processes and outside the scope of this project.

3.7 Stakeholders

From the ethnography session it was then possible to generate a list of stakeholders for the system. These were needed during the specification stage as each specification would be marked against which stakeholder that specification effects. This is important as if a specification is not able to be completed it is possible to find out who will be effected by it and take appropriate action because of it. The stakeholders identified are: Managers, Delivery driver, Florists, Shop assistant, Supplier and Teleflorist

3.8 Interview

The interview was used to gather information that may have not been but across in the other exercise or studies. The interview was semi structured and the interviewer allowed the interview to take its natural course this way and information FFF wanted to include would be said, but by

having some questions it gave the interviewer the ability to direct the interview when needed and to make sure he received all of the answers he initially thought he would require. The questions asked and the summary of the interview can be found in Appendix C in the analysis report.

3.9 Soft Systems Analysis

Many soft systems analysis techniques were undertaken because of their user centric nature. These will not only help identify key factors and stakeholders but will also help in showing FFF how the new system will affect them and what issues in the business it will try and solve.

3.9.1 CATWOE

CATWOE analysis although very similar to the people definition was used because of the ease in which stakeholder can be identified and forces the ethnographer to view the impacts that are outside the immediate problem situation that if not considered could cause the system to fail.
The main points that came out of this analysis were the level of competition in the local area and the invoicing of businesses. Competition in the area meant the system had to be robust and be able to be easily backed up, as if the system fails and orders are lost it could affect FFFs reputation and they could lose custom. The ability to invoice customers also needed to be included in the system as in the old process it was done by hand and was time consuming,

3.9.2 Rich Picture Explanation

The rich picture as seen in Appendix D contains all of the stakeholders included in the system and their relationships with each other. It includes the data stores in the system, these do not have to be an electronic store and in FFF case these are physical filing cabinets. The orders are first processed and the flowers created, once created the order is then filed. The managers use past orders to look for sales information and also to bill customers who have accounts. The deliver driver use the order processing section to create there delivery list.

3.9.3 Use Case

The use case diagrams were used to both show and help formulate the needs of the system with FFF. This process was done with the managers at FFF, this meant they where able to include their input and ideas in what they believe they require the system to do. This also helped see what stakeholders required what tasks and helped formulate the specification. Many use cases were identified, examples are, the managers required the ability to know what sales there has been, where as the delivery driver wanted to know what is to be delivered and when. The diagrams produced in the session can be found in Appendix E.

Chapter 4: Feasibility and Specification

4.1 Introduction

Before the actual design of the system could take place it was crucial that the system is practicable. The construction of the feasibility report allowed the specifications for a solution and a recommendation for the managers to be created. The full feasibility report can be viewed in Appendix E. This chapter firstly discusses the techniques of conducting a feasibility study. The chapter then describes the feasibility study and its outcome.

4.1 Feasibility Techniques

In order to find out an appropriate method for conducting a feasibility study it was important to consult a number of resources. Matson [13] highlights that a feasibility study should be conducted after the project aims and objectives have been identified, and that it will highlight the different possibilities for a system that have been designed or researched into. A feasibility study helps assess the technical and economic benefits and costs of implementing a system.

A feasibility study includes producing the specification and recommendation, but it also includes the initial analysis of the current situation and the research into existing solutions so that the recommendations can be formulated and a possible solution can be created. Two formats were found for writing the actual report, these identified what information needed to be gathered and what other steps needed to be taken to help support the decision-making needs of the managers [14, 15]. The feasibility report format shown in [14] was found to be the most relevant for this project. The resulting report enabled the managers and the developer to fully grasp the nature of the problem and to choose a solution that best met their needs. This report also proved valuable to the systems design and to establish a criterion for the system to be evaluated against.

4.2 Requirements Identified from Analysis

As part of the feasibility study the analysis report created in chapter 3 is analysed in order for the requirements to be identified. The section was split up to correspond to the sections in the analysis report this lead to speedier analysis to take place. The sections were the analysis of the business process, documents, interview and any assumptions made for the solution. In the process analysis the problems identified were linked to the processes that they effected, this aided the developer to access the impact of the solution. Each section of the analysis report led to the identification of a number of potential business problems. These business problems were the basis for the formulation of the specification needed for the ideal solution. The specification is

available in section 3 of the feasibility study in Appendix F. The assumptions made for the solution were:

- There is no budget available for the project
- The staff are willing to learn how to use the solution and improve there computer skills.
- They have access to a desktop PC
- They have access to an internet connection
- The managers are willing to change business processes in order to fit in with the solution.

These assumptions had a great impact on what possible solutions could be achieved for FFF. For example a solution that used a server wouldn't have been possible because they did not have access to one, or had the budget to purchase one.

The specification created was for an ideal solution, this then needed to be prioritorised so that the fundamental requirements were firstly included in the design of the solution. Each requirement was prioritorised as either essential, possible and not to be implemented. The decision for these where made by the impact they would have on the problem. If the requirement was given the priority as possible this requirement was then analysed against the time taken for the requirement to be implemented and again the impact it will have, then it may have been changed to not to be implemented if appropriate. The prioritorised specification can be seen in Appendix F.

The specification created was created for the developer; because of this if the specification was shown to FFF they would have had trouble in understanding exactly what the system would include. In order to keep with the user centred nature of the project a descriptive specification was created for FFF this enabled them to understand what the solution will provide in plain English. This specification was also signed by FFF to show that they accept the requirements the solution will include. This descriptive specification can be found in Appendix G.

4.3 Potential Solutions

After the specification was established the next section of the report researched into possible solutions to the problem. This involved researching into existing solutions and also possible solutions generated by the developer.

4.3.1 Existing Solutions

It is important to identify and assess the existing solutions that are available to purchase and the functionalities that they provide There were a number of existing products available that use technology to help with the running of a business only a few how ever were specially designed

for the flower industry. This research into existing solutions also proved useful in providing ideas for the generation of the developers' possible solutions.

CSA Customer order processing

CSA customer order processing is created by CSA data solution some of the functions they include are:

- Customers can be retrieved by account number, name, zip code, phone number, or city.
- New customers can be added to the system during order entry.
- Existing customers can have their account information displayed and changed as part of the order taking process.
- Retrieves all open orders for a customer.
- Allows previous sales information for a customer to be displayed.
- Items can be retrieved by item number, description, manufacturer's item number, or customer item number.
- Displays the extended sales description for a product upon request.
- Processes cash advances with the order.
- Comprehensive Sales Analysis Module
- Allows invoices to either be generated individually and included with the shipment, or generated as a batch and mailed to the customer.
- Supports customer contract pricing
- Maintains separate price list for each customer type

Visual Ticket MicroFlorist Floral Management Systems, Florist Point of Sale Software

Visual Ticket MicroFlorist Floral Management Systems, Florist Point of Sale Software is created by floral systems some of the features are:

- Visual Ticket is time tested tough.
- Visual Ticket is one of the first Windows-based florist software systems in the floral industry and now boasts over a thousand users.
- Each System is individually configured for the shop needs.
- Features can be added
- Print Invoices or Statements in Seconds by clicking a few buttons.
- Map your deliveries automatically
- Each item can have a Regular Price and an Adjusted Price.
- Record and play back both Video and Audio for customer messages on enclosure cards, production instructions, etc.
- Agents run in the background and do chores that otherwise you would have to wait for them to execute.

florist2florist

Florist2florist is an online business that offers an alternative to Teleflorist and Interflora. The ordering system is preliminary for florist to florist transactions but has the capabilities to be used as a customer ordering system. Functionality includes:

- It offers a relay service between florists
- Orders paid before delivery
- Full relay returns printed and sent to

Orderwise

Orderwise stock control and order processing software is sage integrated business solution. Some of it functionality is:

- Comprehensive User Manual
- Quick Key Reference
- Implementation Note Paper
- Vast module add-ons
- POS system
- Locate customer records

you
- Orders passed to the executing shop for you
- Florist makes 20% on all orders sent
- Nice big buttons make it easy to follow
- On screen pictures.
- The program will re-size the pictures if own are added
- Enter the card message and the f2f program will print the cards for you
- Create new Sales Orders
- Quotations
- Previous order details can be displayed and edited

Quotations converted into orders and customer pricing checked

ACCess To Go

ACCess To Go offers a range of ready made databases and modules for use with Microsoft Access. Some of these are Simple Sales Orders & Invoices Database and contact relationship manger. Functionality of these are:

- Variable tax rates per product item.
- Straight forward order entry; select a customer or enter a new one, list the items and issue the invoice, optionally print a delivery note as well.
- No stock or price lists to maintain; it remembers items you have entered on previous orders and offers them again in the pick list with the last price and tax rate you charged, select or enter a new item.
- Optionally record payment received against invoices issued.
- View customer records on screen with basic contact details and information about invoices issued, payments received and items ordered.
- So simple to use for single or multiple users to share.
- Fully customisable, you can add your own additional functionality (the database is not locked, so you can change or add whatever you need
- Record actions against contacts; actions you have taken or that need to be taken. Assign them to yourself or another user for action by a due date
- Record actions against contacts; actions you have taken or that need to be taken. Assign them to yourself or another user for action by a due date

4.3.2 Generated Solutions

The generated solutions had to take into consideration the assumptions stated in section 4.2. The different solutions generated took into account the existing solutions functionality as well as the business problems and the assumptions made. The solutions suggested were a Microsoft Access Database, Web-based solution, a Microsoft SQL Server Database and a Spreadsheet Based Solution. Full descriptions of the generated solutions are available in Appendix E.

4.4 Evaluation of Solutions

All the solutions both generated and existing were evaluated against the specification produced and the assumptions made. The table below is taken out of the feasibility report and documents the evaluation of the system.

Solution	Evaluation	Possible solution
CSA Customer order processing	This product offers a lot of the needed functionality that is required for the specification but I feel its offers to many functions that are not needed for this solution. Having many function may mean that the ones required by FFF may not be easy to use and it will add added complexity which is the opposite of what they require. The cost of this product is too expensive to be a worth while solution.	**No**
Visual Ticket MicroFlorist Floral Management Systems, Florist Point of Sale Software	This offers a full IT solution for a flower company from point of sale through to customer details processing. This would be a good solution if they where starting from scratch. They already have EPOS infrastructure in the shop so this solution again would be too large for their FFF. The cost of this solution is also too great for the company.	**No**
florist2florist	This would be a good solution if FFF was not already part of Teleflorist. The actual ordering a customer management side isn't the main use of the program so it doesn't offer the functionality needed for the ideal solution.	**No**
Orderwise	This again has the same issues as CSA	**No**
ACCess To Go	This is a good solution it isn't to expensive but a least two modules would be required to cover some functionality required so this would increase costs. Large amounts of customisation would be needed and the modules would need joining together. What at first looks like a good solution would require a lot of work which could be greater than creating a new solution. With the customisation of other peoples work it is often difficult to understand why things are as they are and difficult to gain the extra functionality required.	**Yes**
Microsoft Access Database	This would give the freedom to create a solution with all of the functions required and with its easy to create forms for entering data it would be possible to create an attractive and personal solution. This solution how ever wouldn't be suitable for many multiple users. Also using internet technologies may prove difficult with access.	**Yes**
Web-based Solution	This would give the freedom to create a solution that has the functionality required. One draw back is that the PC will always have to be on or always have access to the internet which just isn't practical for FFF.	**No**

Microsoft SQL Server Database	This again causes the problem that a server would be needed to run the solution. A server would cost FFF to much money. It could however be run on FFFs PC. Multi user appeal would not be needed for an FFF solution. However the cost of Microsoft SQL Server is far grater than the budget available.	**No**
Spreadsheet-based Solution	It would be difficult to incorporate working practices into a spreadsheet. The spreadsheet would soon become too large for all the information. Once a spreadsheet gets over a certain size and contains many macros they slow both the PC and the software down. This would not be a good solution.	**No**

4.5 Other Issues

Whilst the solution addressed the needs of FFF and their business issues, it was also important to address other issues such as ethical, safety and legal as these can have an effect on the system and its success.

a. Ethical issues

The legal issues surrounding the development and use of an IT solution were those such as ensuring that the staff did not feel replaced and that they felt they were part of the new system and it was in fact a tool for them to use rather than a replacement.

b. Safety issues

The safety issues surrounding the development and use of an IT solution were those such as ensuring that the PC or laptop was in a secure place away from water. Wires must be tidied away so no one may trip over them. Health issues regarding the use of PC s and laptops over long periods of time, such as Repetitive Strain Injury (RSI) and eye- strain and other ergonomic problems. This should not have been an issue as they already had a laptop in place and they were aware of the issues.

c. Legal issues

The legal issues surrounding the development and use of an IT solution are those such as ensuring that the software used had all of the correct licenses.

4.6 Chosen Solution

The chosen solution for the project was a self designed and implemented Microsoft Access system. It was chosen over the ACCess TO GO solution because with the developer designing the solution it was possible to design in the functionality needed rather than trying to customise an already built system. ACCess TO GO would have also been too costly once the required modules were purchased; FFF also already had Access on their system so the solution would not cost FFF. MS access provides a very good form building tool that allowed the developer to design and implement a consistent user interface; it would also allow the developer to change sections

around easily on forms as the user required. Its report creating features also made it a good choice for a solution as with this the developer would be able to implement all the reports that were required by the user.

Chapter 5: Design

5.1 Introduction

This chapter includes the approach used for the design of the FFF system [16]. This chapter is subdivided into two main sections: “data” and “user interface and acceptance”. The first explains the way in which the data is stored and organised. This is illustrated through an entity relationship diagram and normalisation. The user interface section will include menu design and discusses the role that human computer interaction (HCI) and user acceptance will play.

5.2 Data

Two different data modelling techniques were used to obtain the structure for the FFF database. An entity relationship diagram was used to obtain the overall structure of the system. Normalisation is then used to make sure that the structure of the database is accurate by ensuring that there is no duplication of data. These two were used as they complement each other as the entity relationship gives a visual representation of the data which helps with implementation and normalisation helps with defining the private and public keys.

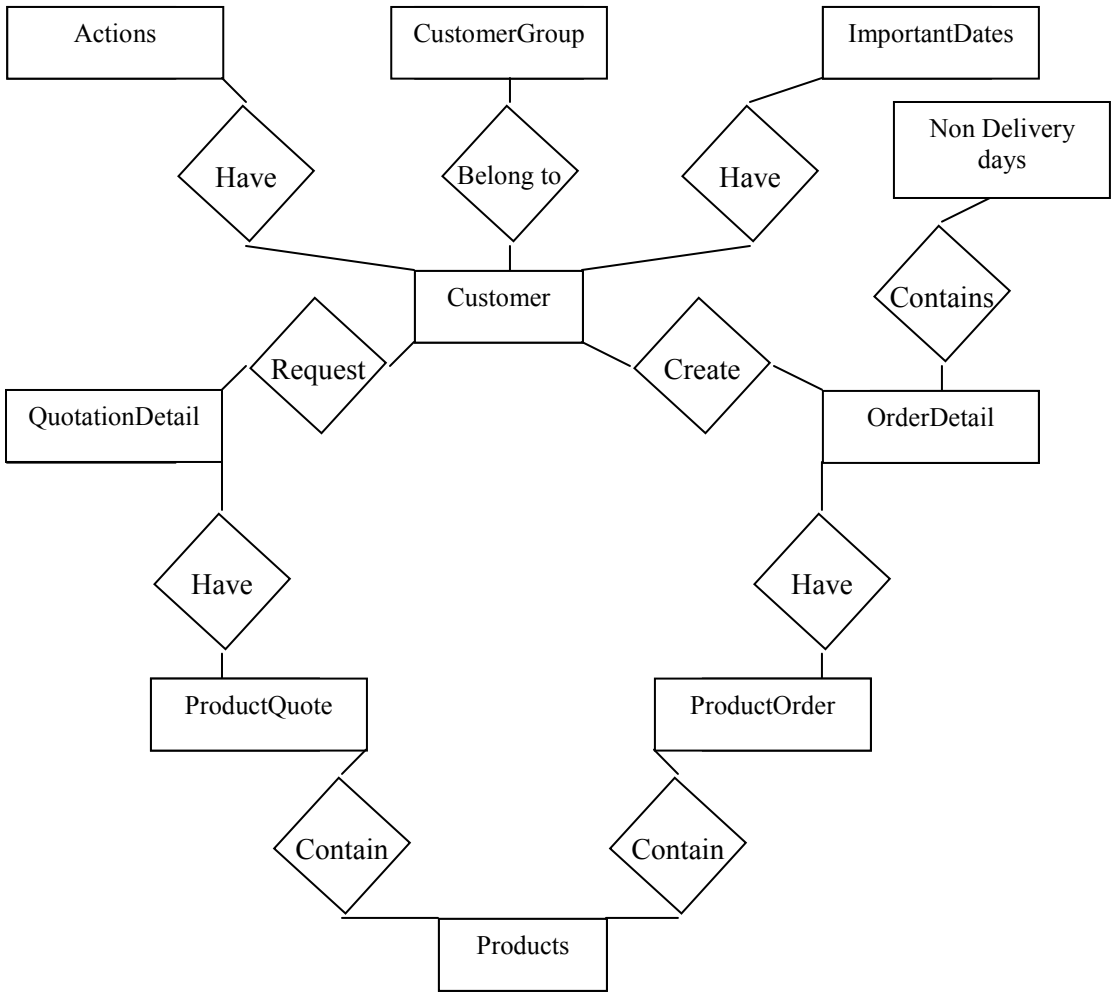
5.2.1 Entity Relationship Diagram

An entity relationship diagram consists of four key elements entities, attributes, identifiers and relationships. An entity is defined as “anything real or abstract about which we want to store data” [17]. Such examples are a person which is physical or conceptual such as a university course. An attribute in ER diagrams are “a characteristic common to all or most instances of a particular entity” [17]. For example the characteristics for the entity customer could be name, address and telephone.

Entities should contain identifiers, which are “attributes that name, or identify entities” [18], such as CustomerID, CustomerName or CustomerTelephone. Identifiers can either be unique or non-unique. A unique identifier will only identify one entity instance, such an example of this is CustomerID, and no two customers will have the same ID. A non-unique identifier is something which can identify more than one entity instance, such as CustomerName, as two customers could share a common name. Finally entities are associated with each other by a relationship. Relationships are split into three different types these are: one to one (1:1), one to many (1:N) and many to many (N:M). A 1:1 relationship is when a single entity X is related to a single entity Y. E.g. a book only has one ISBN number and an ISBN number only belongs to one book. A 1:N relationship is when a single entity X is related to many instances of Y. E.g. a customer can have

many orders but an order belongs to one customer. An N:M relationship is when many instances of entity X is related to many instances of entity Y. E.g. a customer can order many products and products can be ordered by many customers.

The diagram below indicates the entity relationship diagram for new system:



Attributes for each Entity

CUSTOMER [Customer Number, Title, First name, Last name, Address1, Address2, Address 3, Town, County/City, Postal Code, Company Name, Phone, Work phone, Mobile phone, Fax Number, Email, Notes, Credit Number, Security Digit, Created on]

CUSTOMERGROUP [Group name, Description]

ACTION [Action, Create Date, Due date, Completed]

IMPORTANTDATES [Description, Date]

NONDELDAYS [Non delivery name, Non delivery date, Reason]

PRODUCTS [Product Name, Product description, Minimum Price, Picture, Teleflorist Code]
ORDERDETAIL [Order Number, Create date, Delivery date, Delivery time1, Delivery time2, Delivery Address, DeliveryNotes, Paid, Paid how, Total price, Completed, Delivery charge]
QUOTEDETAIL [Quote Number, Create date, Notes, Total price, Delivery charge]
PRODUCTORDER [Qty, Price per item, Total price, Description, Card]
PRODUCTQUOTE [Qty, Price per item, Total price, Description, Card]

5.2.1.1 Explanation of the Entity Relational Diagram

There are 9 tables shown in the diagram. All of these are related via a 1:M relationship, for instance the Customer table has a 1:M relationship with the Order table. This means that one customer can be associated with many orders. The Order table is related to a Product table via a 1:M relationship. This means that an order can have many products associated with it. The alternative would have been to have ProductID, OrderID and CustomerID in the same table but this would lead to design issues as a customer would order a product under one order number but often would order many products in that one instance. Having the order, customer and product ID's in the same table would mean that the customer would only be able to order one product under each order number. If the tables were kept in this design the only other way would be to hold many instances of product in the Order table, this would be poor database design and this would also mean that a customer would be limited to a set number of products on any one order which would also be an issue for the system. To solve this the table Orderdetail was added this split up the three ID's and meant a customer could be associated with many orders and each order could be associated with many products. Doing this solved the issues noted above and was also the correct solution for the quotation tables as this was also an issue so the Quotedetail table was added to the final design. The action table is linked to the customer table in a 1:M relationship this means that one customer can have many actions against it; this is also the same with the important date's table.

5.2.2 Normalisation

"The normalisation process as first proposed by Codd takes a relational schema through a series of tests to certify whether it satisfies a certain normal form"[19]. Once the schema moves into higher normal forms then the schema should become free of redundant data. Testing against redundant data is important because if for example the two tables in the FFF system Customer and Order, they both contain the attributes CustomerName and CustomerTelephone. If the customer changes their number, the user would have to manually change both CustomerTelephone fields in both tables. This could result in data inconsistency and redundancy

as the user may forget to update both tables or update one of the tables incorrectly. With a normalised system maintenance should be easier and the speed in which queries are processed should be improved. Although several higher normal forms have been defined such as fourth and fifth normal form [19] it is regarded that normalising data to third normal form is often sufficient therefore the data will be normalised to third normal form. This can be seen in Appendix H

5.2.3 Integrity Constraints

The tables in the database are related together with the use of primary and foreign keys. A primary key is required to uniquely identify a record. For example, if customer name was used as a tables primary key this would not uniquely identify a customer as mentioned before two or more customers could share a common name. It is common for a table to contain a numeric field often called ID, this will be a unique number for each instance of customer and acts as the primary key. A foreign key is a primary key from another table, for example the primary key in the Customer table, CustomerID is linked to the Order table's foreign key also called CustomerID. The reason for this is that it allows it to be able to view for any particular instance of order the instance of customer that belongs to it. If the keys are defined correctly this will ensure that referential and entity integrity exists.

Chapple [20] defines referential integrity as a concept that *"*ensures that relationships between tables remain consistent*"*. This means that if a table contains a foreign key from another table, it is a violation to add a record to that table unless there is a matching record in the linked table. Two techniques cascading update and cascading delete are used to make sure that any changes made in the foreign key table are reflected in that of the primary and vice versa. An example of this is if there is a Customer table and an Order table. The Order table has a foreign key from the Customer table called CustomerID. Referential integrity enforces that no record can be added to the Order table unless the CustomerID field has a match in the Customer table. The use of cascading update ensures that if the primary key of the Customer table changes this will be updated in the Order table. Additionally, if a record from the Customer table is deleted all related records in the Order table are deleted using cascading delete. Entity integrity ensures that the primary key of a table is never null. This is important because a violation of this constraint would result in information being useless. For example, if the CustomerID on the Customer table was null, then there would be no way of knowing which order belongs to which customer. Entity integrity also ensures that the primary key is able to identify each record in table; this means that there are no two records with the same primary key within any given table; therefore this will prevent the duplication of data.

Two other main types of constraints are state constraints and transition constraints [19]. A state constraint is a constraint that defines a valid state of the database that must be satisfied. For example in an employee database "the salary of an employee should not exceed the salary of the employee's supervisor" [19]. A transition constraint is such as the products in the FFF system the price of a product can only go above a minimum price and not below it.

5.3 Human Computer Interaction and Acceptance

With this project having a user centred approach it is very important that the user interface and usability of the system are at the forefront during the design process. This was especially important for this project as the users of the system were by there own admission not very computer literate. So the user interface is important as they have to be able to use it, this is also the same for the acceptance of the system. To ensure the final design was correct the development of the design had interaction with the user. This was so that their feedback could be taken and the correct characteristics for the system could be selected. User acceptance of the system is also an important area of study that was considered before designing the interface. If a system has all of the required function but is difficult to work the user will not accept the system and will stop using it. On the other hand if the system is easy to use and pick up but does not have the required functions it again will not be accepted. This means that a balance needs to be made between having all the functionality and ease of use. If either of these two scenarios took place it would result in the system being a failure under interaction and expectation failure. [21]

5.3.1 Human Computer Interaction

Human computer interaction (HCI) is concerned with the "design, implementation, and evaluation of interactive computer-based systems, as well as with the multidisciplinary study of various issues affecting this interaction" [22]. For this project the main focus was on the design of the user interface and according to Ben Shneiderman [23] there are five measurable human factors that are central to the evaluation of a user interface. These are the time to learn, speed of performance, rate of errors by the user, retention over time and the subjective satisfaction. These can be measure by interviews with the end user or by watching the users use the system. The ideal situation would be to succeed in every category but a trade off was needed between the factors, as the number of errors has to be kept low the speed may have to be sacrificed for this. In the FFF system trades off were such that in order to reduce errors the speed of entry was increased. These are such errors as accidental delete or update of the wrong records, data being incorrectly added. The navigation screens were used to guide the user between table records, this

was a trade of to speed as with out these the user could go directly to a table but errors would be prone and would make the system too complicated for the systems level of user. The interface on the system needs to be efficient to use so it does not impede speed too greatly, as efficiency is also a major point in usability [24].

A user's short term memory also is something to take into account when designing an interface. The Short term memory is used to remember details to carry out every day tasks. The capacity of a user's memory is very limited and people can usually remember 7 ± 2 facts [25]. It is important that a system does not rely on the user's short term memory very much in order to function. For example, they should not have to remember information from one page to complete the next. If this was not the case it would mean a user would have to flick between pages if the information is forgotten and this could slow down the task. However, it is important that a page does not become cluttered with information that the user cannot possibly store enough of the information in their short term memory to be able to complete the task. An example in the project were this has been reduced is the ordering form has a button that imports the customers home address into the delivery address thus reducing the need to flick between forms. This is also aid one of the users at FFF who has dyslexia, by reducing the number of time information has to be entered the possibility of an error is reduced.

The user's computer skill level is such that they can use standard Microsoft packages and can navigate around a screen and use a mouse. With this knowledge it is important that the systems navigation is as clear as possible and any outcomes of actions are not unexpected. If results of an action appear unexpected it would add a layer of complexity to the system and make the system seem complicated and uneasy to use. So having clear results to any action will make the system seem simple and straight forward which is needed because of the users' computing skills.

5.3.1.1 Nielsen Points of Usability

Nielsens suggested heuristics are normally suitable for websites; however their versatility means that they can be adapted to apply to general IS applications. Nielsen suggests ten key points, which will create a system that is both technically efficient and highly usable if they are all met. (please see Appendix I for Nielsens ten points). In the FFF system the main heuristics focused on are:

- Match between system and the real world: The FFF system reflects the real world in the language it uses. It uses where possible phrases and processes they are already familiar with, thus they can operate the system without learning new terminology.
- User control and freedom: The FFF system has a main menu button in the same position on each form; this enables them to escape any mistakes made. Having this increases their confidence in a system.
- Flexibility and efficiency of use: The FFF systems accommodate both novice and technical users for example the order details will be listed and by selecting the required order and by pressing a button it will take the user to that order, but also by double clicking on the required order this will take the user to order as well.

Nielsen [26] suggests that a usability test should occur early on in the design stage, as feedback will be easier to implement than at the end. This involves evaluating the system against Nielsen's ten key points. Doing this will also create user interaction in the design process. Three prototype user interfaces for the customer form where created, these designs included Nielsen's heuristics. These where then shown to the user and asked what they liked about each of the forms and from this feedback a design could be established that was the best match for the users at FFF.

5.3.1.2 Form Design

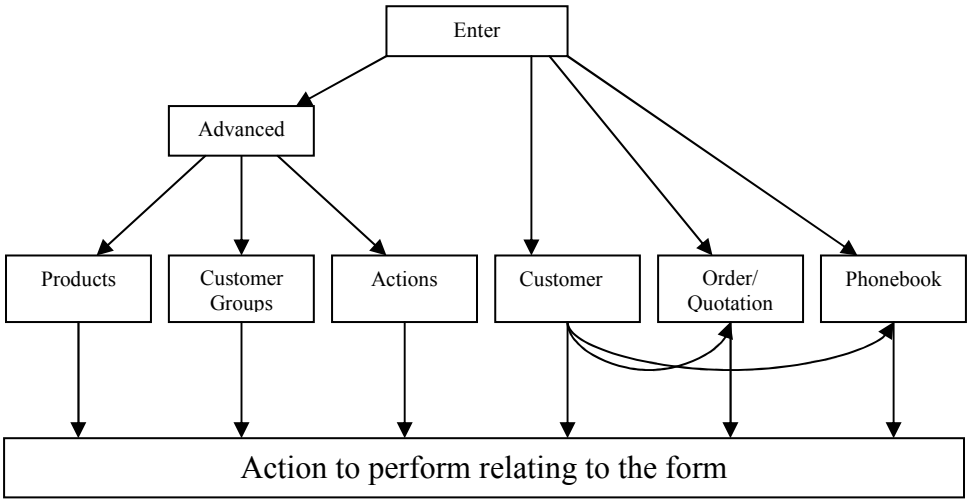
In order to continue the user centric approach the end user was included with form design process. Three prototype design where created of the customer input interface and from these the users were able to give feedback on each design. The users were encouraged to give opinions on individual aspects of the design as parts from each design could be brought together to make a new design. The three designs and the user annotation can be seen in Appendix J.

The chosen aspects of the design will be used through out the system, for instance the main menu return button is in the same place on each interface to keep familiarity. It was not possible to design every interface this way, as it was a time consuming exercise.

Buttons will be used where ever they can as to avoid raw text input this is because the FFF managers wanted the system to have as little data input as possible, as one of their staff is dyslexic so they wanted to avoid possible mistakes from spelling mistakes etc where ever possible.

5.3.1.3 Menu Design

The menu structure is depicted below. This menu structure has been designed to logically split the different functions into drill down menus with limited complexity; this is so the users may reach the action they wish to use in a maximum of three clicks. The navigation structure is also designed so that it follows the information flow of the user. Having an advanced section also allows features that will not be used as often to be hid out of the way so the menu isn't as cluttered.



5.3.1.4 Query and Report Design

The FFF system underlying data is stored in a database so queries are used to retrieve relevant data and reports are used to display the results of the queries in some instances. There for knowing this these could be designed before the implementation took place. The query design is done by using plain English and writing what data is needed from where and if there is any criteria for the data. The reports just had to show the data in a clear way apart from when a quotation is printed out, FFF wanted the quotation to look a certain way. In order to get this format correct the developer went to see the manger at FFF and agreed on a design. Samples of query and report design can be found in Appendix J

5.3.2 User Acceptance

User acceptance is an important aspect of the design section as if this is not looked into implementation could take place and the system wouldn't include what is required to be accepted and the system could fail. The system could be a success from an implementation point of view as it could have all of the required functionality but because this project is user centred it would be classed as a failure if the system was not accepted by the user. User acceptance is linked to

Nielsen's design principles as high usability allows for initial user acceptance and good functionality then keeps user acceptance.

A system not being accepted is because of something perceived by the user. Past IS research has shown that user adoption and usage of an IT system is determined by the beliefs and attitudes towards IT innovation [27] [28]. So before the IT system is introduced the users beliefs, attitudes and view towards the IT system should be evaluated. This way if there are negative attitudes towards the system being implemented, these can be addressed before the system goes live. This could be in the form of training or workshops to try and reduce the negativity towards innovation. The best solution for FFF (because of the size of the organisation) will be to train the managers in how to use the system and they then can show their other colleagues when needed. The system will also have a user manual included this will help reduce the negativity as instruction will be at hand.

If the system does indeed fail it will be useful "to differentiate between two broad categories of software defects: 1) defects in implementing specified user requirements due to design or coding errors, and 2) defects in the correctness of requirements due to discrepancies between *specified* user requirements and *true* user requirements."[29]. Doing this will allow the evaluation of the system to be done correctly and find the true reasons for which the system failed.

Chapter 6: Implementation

6.1 Introduction

This chapter outlines how the prototype was developed and how the design decisions were implemented. However it is not possible to illustrate how every aspect of the system was implemented, thus this section covers a range of the more advanced functions the system offers. Firstly the technical platform for the prototype will be discussed. The implementation of the prototype is then described, sectioned into the main functional areas; within each of these areas the functionality of the prototype will be discussed.

6.2 Technical Platform

The software used for the prototype creation was Microsoft Access. This is a database software application and provided the platform and for which the system was built using database tables. In order to add usability to the system the data entry and data viewing aspects were created using the software's form function. To add greater usability and enhancements to the prototype Microsoft Visual Basic was used, this is the underlying programming language for Access.

6.3 Implementation of Design

6.3.1 Tables

Each entity in the ER diagram in chapter 5 is mirrored as a table in the Access database. In Access the implementation of tables is made simple by using the tool for creating tables. For each table, the names of the attributes were entered into the Field Name column and the data type specified in the second column. Different data types can be assigned to each particular field. 'Text' was used most frequently in the system and was used for fields that contain text e.g. Surname. Text was also used for Telephone number instead of 'Number' this is because text allows brackets to be used which often used to separate area codes from the main number. 'Date/Time' data type was used on all fields that held a date e.g. DeliveryDate. If a field contains more than 255 characters, then the 'text' data type is not suitable. Instead the data type 'memo' is used as this allows 65,535 characters this was used for the Notes field. Each table has primary key, with the data type set to auto number, this means the primary key is incremented by 1 each time a new record is entered, thus uniquely identifying a record and ensuring entity integrity. Most tables also contained a foreign key allowing a relationship between two tables. Also constraints where applied to fields using the options available in the General tab an example was such that the CreateDate was automatically set to today's date. This was done using the inbuilt function of Date(). Example of the Customer table in Appendix K.

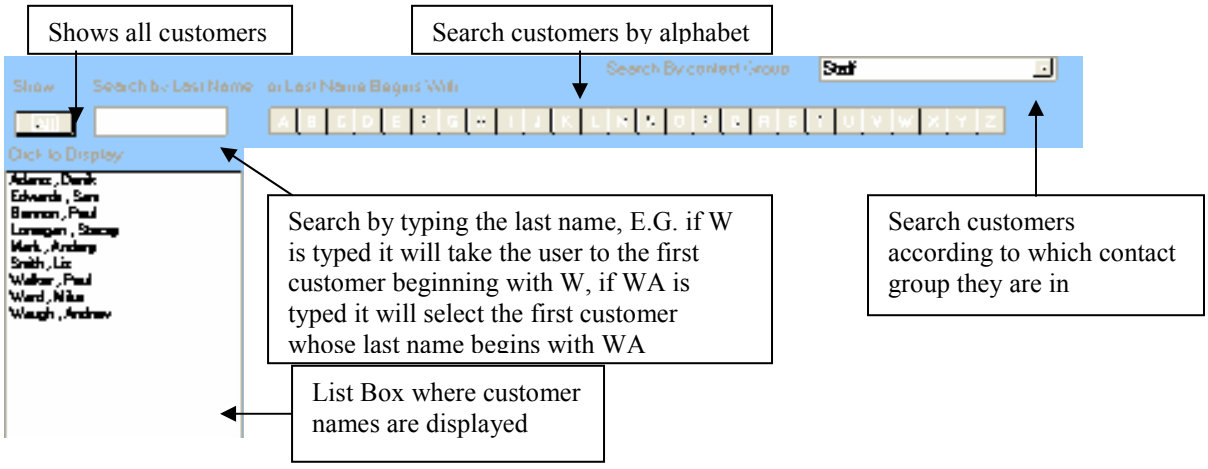
6.3.2 Relationships

The relationships between the tables were defined in 'Microsoft Access' under the 'Relationship' section. To define a relationship you must drag the primary key of a table onto a corresponding field on another table. If the corresponding field is a primary key, then it becomes 1:1 whilst if the corresponding field is a foreign key, then the relationship is 1:M. Once this is done an option to 'Enforce Referential Integrity' becomes available (as discussed in section 5.2.3), this was applied to all the tables. A screenshot of the relationships from Access can be found in Appendix K.

6.3.3 Form Implementation

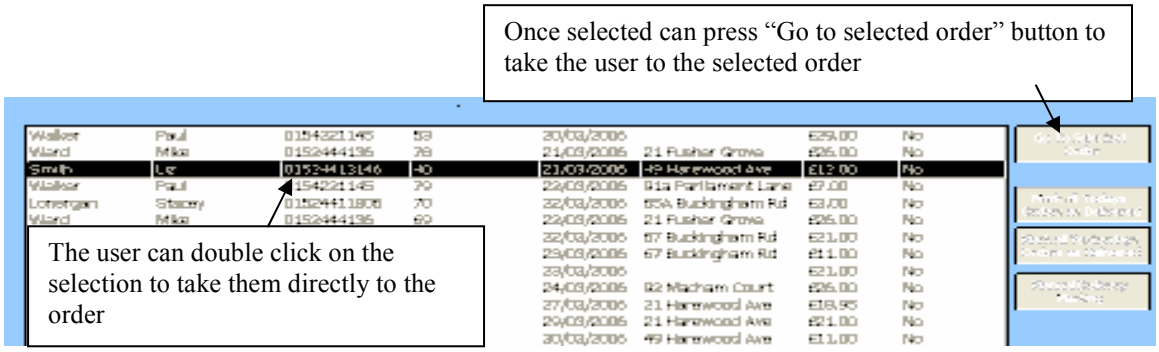
Forms are used to both show and modify the data but are also the basis for the navigational menus. The forms are split into two categories in the database forms starting with "frm" are the main forms and the sub forms start with "subfrm" this is so they are easily distinguishable and helped when writing the visual basic. The first form to be created was the customer form as this form seemed a logical place to start as its data is needed in most of the functions. The flow of information was then followed and the forms built in this order. Such forms as the Phonebook that provide the same data as other forms but just in a different format where built last. A screenshot of all the forms created for the prototype from Access can be found in Appendix K.

Forms such as the customer forms when initially opened show the first record from the customer table. All of the customer records in the database are displayed in a list box, queries are run on the underlying table to narrow done the customers in the list box. There are many queries available to the user to help find the required customer. These queries are triggered by buttons and text boxes at the top of the customer page. Example of the customer form and how the queries work below:



Form Navigation

The main menu is used to navigate between forms although there is direct navigation from one form to a linking form where information on the previous form is used on the next form. In order to allow the system to evolve with the user as they become more experienced with the system it was important to add shortcuts to improve the speed of navigation. For example in the section of the Order view form the user can select the order they wish to view and press the view order button but they can also double click on the order to take them to the order.



This double clicking method is used thought out the system to improve speed and efficiency.

Order Viewing

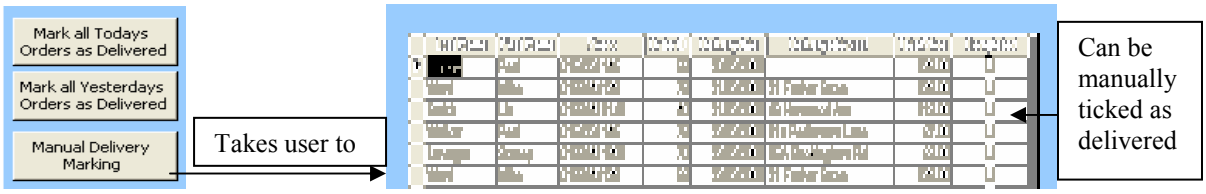
The frmOrderView as shown above is very similar to the frmQuoteview this keeps consistency for the user. This form is needed as it provides a way to view the orders all on one screen and allows the user to query the orders, for example a button can be pressed that will narrow down the orders to just today's, yesterdays or tomorrows orders it is also possible to type in a date to show the orders for that date. Example below:



The form also has toggle buttons this allows the user to either show orders that are both delivered and undelivered or just the undelivered orders. This is makes it easy for the user to see what they still have deliver on any particular day which is important to the business.

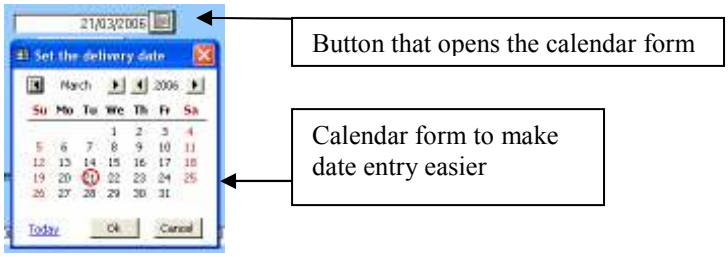
There are many possible ways for the user to mark deliveries as ordered, it can be individually done on the actual order form, there is also a button on the order view forms that takes the user to another form that looks similar to the Order View form but allows them to manually tick which order has been delivered. Also there are buttons on the Order View that can be pressed that will

automatically mark orders as delivered for all of the days orders or the days before orders. This is done via triggering an append query, queries will be further discussed later on in the chapter. The buttons and the manual screen shown below:



Forms used to Increase Usability

Forms where used to increase usability, this was done by layout, navigation shortcuts; drop down menus that reduced user error and the use of a calendar to make date entry easier. The calendar is a form that's data is linked to the required text box for the date. The calendar is opened by pressing a button that looks the same on each form this is to add familiarity so the user knows exactly what this button does on each form. Example of both below:



Sales Data Forms

To provide FFF with up to date sales data a pivot form and pivot chart form were implemented to enable the users to view all the past sales. The sales can be viewed yearly quarterly and all the way down to by day. They are able to see the data numerically but can also switch to a graphical view thus enabling them to see clearly which items are selling well and when. A screenshot of the sales form can be found in Appendix K.

6.3.4 Query Implementation

Queries are used through out the system; queries have been used to help the users narrow down their searches for information. They are used to provide reports with the required data, for instance in the system when a sales report needs creating for last weeks sales a query is run to find the sale for last week then the report shows the results of the query.

Queries are either closed and the user has no input or they can have criteria that the user selects these will be referred to as open queries. The closed queries are used for such processes that are defined and wont change for example in the system if today's orders wished to be viewed it

would be time consuming for the user to type in today's date every time. Where as open queries have a criteria that can change each time it is run, the criteria is given the source or where the criteria will come from this can be anything from a textbox, combo-box and even toggle results. For example in the system if the user wishes to view the orders by date they are able to enter in the specific date and the query will return the results for this query. Each query needs to be triggered in different ways as if a button had to be pressed each time this would slow down the user, queries are triggered after a textbox is updated, after enter is pressed or if a certain aspect of the system gets the curser focus.

There are two types of queries used in the FFF system; one is the standard result query that retrieves information for the reports and forms to show. The second is an update/append query this updates the results of the query. This is used in the FFF system to mark orders as delivered the query brings back the orders for the day and updates the delivered field with yes, so it is marked as delivered. The queries that have been created for the prototype are shown in Appendix K.

6.3.5 Reports Implementation

Some documents have been identified and must be created by the system; these are printed out and used by the delivery driver, managers and given to customers. The main document needed by FFF is the deliveries that are due on that day. This report is populated from the data by a query that's results are all of the orders for that day. The report is sorted by time of delivery so it is in chronological order. The report only shows the information from the order that is required by the driver (Delivery Address, Order Number, Products Ordered, and Delivery Time).

Other reports that add functionality to the system are such as Quotation report, Sales Reports and Customer Account reports. The quotation report is used to send a customer the cost of a quotation in writing. The report uses the results of a query that matches the Quotation number and brings back the customer information and quotation detail from this number. These are displayed firstly on the screen and then they can be printed out. For the purpose of the prototype only one sales report was created as the query and format would be the same just with different date ranges. This report details all of the products sold in a week and totals up the products price. The total is worked out in the report footer and is a sum of information in the report. Again this report can be viewed on screen or printed out. The customer account report displays which orders have not been marked as paid and also for each individual customer a report can be created that displays all of the orders they haven't paid and a grand total for these.

6.3.6 Visual Basic Implementation

Visual basic has been used through out the system in many different ways. It is used to add customisation to forms, navigation between forms, retrieving pictures, linking to other applications and increasing the speed of data entry.

Visual basic has added customisation by allowing one area of a form to show different data. For example in the Customer form buttons are pressed and once pressed trigger VB code that changes the subform to a different subform. VB is used to search the data in the list box, the VB performs a SQL statement then uses this to navigate the user to the correct record and displays that record. The SQL statement uses the SearchBox as part of its criteria; the SearchBox value is passed as part of the SQL statement. This code is shown in Appendix L.

The navigation between forms is done by double clicking on data or by the pressing of a button. The new form will either open at the first record or on a specific record the code is very similar for each method, the only difference is an extra parameter is passed when finding a specific record. The code for navigation is the same through out the system the only difference is the name of the form which is to be opened. This can be seen in Appendix L.

In the system the user can store pictures of the products in which they are selling, these pictures can be recalled on the ordering form in case they need to show a customer the product or describe it. The actual system does not store the actual picture just the location of the picture on the system. This reduces the size of the underlying database and there fore keeping the speed of the system to a maximum. When adding a picture the system opens up the Office File Open dialog and filters the files so that only .jpg and .bmp can be selected, it also sets it so only one image can be selected at a time. VB is used to retrieve the pictures and display a message when there is no picture attached to a specific record. It is also used to change the picture on a record. The code that performs these actions can be seen in Appendix L.

Visual basic allowed the developer to link the system to other application and using data from the system to perform tasks. These are such as emailing a contact, a button is pressed that triggers VB to open up and empty Outlook email and add the current customers email address and the subject as “Fone For Flowers”. The system also allows the user to search for a customer’s postcode this is done by triggering VB that opens up Internet explorer and accesses Multi map and passes the

users postcode to find the location. The code that performs these actions can be seen in Appendix L.

In order to increase the speed of data entry and reduce the need for the user to flick between forms and remember data VB was used. In the Order form the delivery address is often the same as the customers address so a piece of VB code was created that contained an SQL statement that found the customers home address in the system and entered that in the delivery address section. FFF mainly give customers the option to have their products delivered in either the morning of the afternoon, because of this two button where created AM and PM, these two buttons input the delivery time and set it to either before or after in the time choice thus saving the user time. This same principle is also used with the delivery cost. The cost starts at £1.50 and goes up in +£0.50, the cost can also be £3.95 for postal delivery so buttons have been created that use VB that set the cost to both £1.50 and £3.95 and add £0.50 on each time it is pressed. The code that performs these actions can be seen in Appendix L.

6.3.7 Security

Security is an important aspect of implementation as the system will store customer details and it would effect FFF reputation if these where stolen and used maliciously. FFF already store customer details in paper format so they are aware of the data protection act and all the precautions they need to take to keep data safe in this format. The main area of concentration was on making the actual system secure, this was done by using Access in built security feature the database can only be opened by providing a password that will be set by the manger of FFF. Access' inbuilt security was used as being part of a well used piece of software will be fully tested and secure, this was more secure than the developer trying to create their own.

Chapter 7: Testing, User Training and Manual

7.1 Introduction

For the system to be successfully handed over to the end user it had to go through rigorous testing to make sure the prototype is in full working order. This chapter describes the importance of testing and training to obtain necessary feedback and the training method used before the end users took control of the system. Firstly developer testing and the end user testing are described. This includes the end users use of the prototype and how this use is not only valuable for feedback but also a very good form of testing. Before final handover of the system was achieved the importance of and how the user documentation was created for an audience with limited technical knowledge is described. Finally the handover method used to handover ownership of the system is described.

7.2 Developer Testing and the Need for End User Testing

Before the prototype can undergo end user testing and be used to gather feedback, it must undergo testing by the developer this is done to make sure that the prototype is in full working order as far as the developer is concerned. End user testing is an important stage however as testing by the developer will mainly be to ensure that the prototype works correctly. However the users' use of the prototype may return different errors from use that was unforeseen by the developer. The users may use the system differently as the developer has good Access knowledge and is aware how data should be entered and in what order processes should be done. Where as the user is unfamiliar with the workings of Access and may use the prototype in unforeseen ways and find weaknesses and errors from this.

The test plan aimed to test the prototype firstly against areas such as smooth traversing and correct display of menus and forms, correct printing of required documents and correct use of constraints on fields of all forms to match business rules and data type. A summary of the results from each of the areas is given below.

- **Smooth Traversing and Correct Display of Menus and Forms**

Smooth traversing of the system is managed by having a central menu structure and by making sure forms close after a new one is opened this allows the user to know what needs to be done next and can makes the screen less cluttered. Forms take a maximum of two seconds to load. The only form that has taken longer is the product form and depending on the size of the picture of the product this time can vary but once opened for the first time in a session, it then opens faster the second time. All pop up forms opened as expected and all subforms opened up with the correct

linking information and in the required space on the form. Forms that open as a result of double clicking or pressing on a button in another form, for example the Show Order button on the Order View form open on the correct record and close the previous form once opened. The return to menu button worked as designed in each form. The forms are displayed in maximized format to fill the full window apart from the menus and pop up forms which are displayed in the restored state. Reports are shown in the restored format and do not close the form which triggered them to open. Reports should open to display a preview of what is to be printed out, all if the reports did this correctly.

- **Correct Printing of Required Documents**

All documents that need to be printed were checked to ensure that they were first previewed then printed correctly, and that the information contained within them matched the information displayed. The reports were checked to make sure information was not cut off accidentally. Spelling errors could not be checked as the information generated in the reports were from data records, so the users need to enter information correctly in order for the reports to not contain spelling errors. The reports displayed information as expected, however in reports that contained description fields the report field need lengthening to allow all the data to fit on. The reports where also checked to make sure they made the best use of space and information was not spaced to far apart.

- **Correct use of Constraints**

Most of the constraints on the forms were derived directly from the table design, such as could not be null or had to be in date format. For date fields input masks where used to make sure the date was in the correct format. To add greater user ability, fields that cannot be null turn red and a message is displayed telling the user to fill the required fields. All constraint performed as expected when erroneous or unexpected data was entered. Business rules implemented into the system performed as expected. Example is that a non delivery date cannot be selected for a delivery date.

All the problems found during the developer s testing were fixed before the users were shown the prototype.

7.3 Importance of Training and Training Method Used

Training the users so that they may use and evaluate the prototype is an important part of the testing of the prototype. It is important that the system is used in the way that it would be used in a real life work situation; this gains significant user feedback and identifies any problems with the prototype.

The approach taken to train the users to make full use of the system before giving feedback is a mixture of both demonstration and instruction. To do this two laptops where used, this enabled the user to follow the steps taken by the demonstrator on their own machine and actually get a feel for the system themselves whilst watching the demonstrator perform tasks. After the demonstration the user was left to use the system on there own so they felt they could click or press anything. Then to finish role play scenarios were used so the users could practice using the prototype and to use it as they would in a normal working environment.

7.4 Use of prototype and End User Testing

Following the user training, the users where left to use the system on there own. This session also doubled up as end user testing, and anomalies, errors or wrongly implemented requirements that occurred could be rectified before the system went live. Feedback was then received and gave problems to be fixed if another iteration of the prototype was undertaken.

7.5 Final Prototype Changes

There were a number of points and functionalities that needed to be considered following the end users feedback if another iteration of the system was going to take place:

- The number of orders for each customer may become very large for some customers. A way to clear out old orders would be needed.
- Non delivery days are not needed as with the way delivery date is selected the weekends are obvious and the staff no exactly when they are open.
- The order view screen shows all orders as default; it would be more convenient if it showed just today's orders.
- Phone book shows a message saying there are no records if a letter is selected and there are no customer surnames. Would be quicker if this didn't show up.

The first issue mentioned was that orders would need to be deleted so customer orders can be easily viewed, quotations would also have this same problem. This could be done by periodically deleting the orders using a query that deletes records using the delivery date or created date field. A problem with this method is that the sales report uses this information so deleting them would mean that past sales are lost. To get around this the query that returns the matching orders in the customer screen can be adjusted to only show orders from the last 3 months. The managers at FFF say they only require sales data from the last year, so a yearly deletion can take place, this would run a query that removed all orders that were created before 2 years ago. The removal of

the Non delivery day function is simply done by deleting the non delivery table, forms and any relating code. Another way to do this may be to just delete the links so if it is needed in the future it can be easily turned back on. The third issue is easily changed by setting the default value to show the query that shows the orders for that day. The final issue can be changed by deleting the code in the macro that calls the message box.

7.6 User Documentation

The system is not yet to be handed over to the end user, but it is still important to provide documentation to support the system as the fundamentals of the system will not change. The documentation needs to support the users' level of IT knowledge. From previous chapters it was found that the users' level of IT is very limited and that they are able to use standard Microsoft packages. Knowing this the user manual should start from the very beginning with how to install and setup the system from disc being first. It should also include a detailed glossary and a troubleshooting section to aid the users as much as possible, as well as explain and describe how to use all the functionalities of the system. The user manual will concentrate on the functionality and take the user through an example following the normal business process. Detail screen shots are also included so they can match the system to what the user manual is describing. Extracts of the user manual are included in Appendix M.

7.7 System handover

The handover of the system and user manual is planned to take place in August 2006 through a final meeting with FFF managers. This date is chosen as it is a quiet time for the business so more attention can be given to the handover. This will also allow for the prototype to undergo further iterations before the live date. A CD of the system with a copy of the user manual as a PDF file will be given to the managers along with a hard copy of the user manual. The system will be used simultaneously with the old process in case any unforeseen errors occurred that would lead to the loss of orders. The developer of the system will then spend the morning with FFF to answer any questions and help them if they become stuck.

Chapter 8: Evaluation

8.1 Introduction

This chapter focuses on gathering feedback to assess the value of the prototype and the user manual provided to FFF. Firstly the method of the evaluation is discussed. Secondly the criteria in which both deliverables to FFF are to be assessed against along with the evaluation of the process taken to achieve the end result will be evaluated. Finally comparison to other solutions and possible enhancements are discussed.

8.2 Evaluation Criteria

Evaluation criteria provide a frame in which the system can be assessed against in order to provide an overall conclusion to whether it has been a success. The Criteria will focus on: the user requirements, minimum requirements, usability issues, effectiveness of the methodology, primary research, technology, and finally testing used.

8.2.1 User requirements

The user requirements/ systems specification, which are documented (section 4) are what the user wants to be included into the system, and were agreed early on in the system life cycle by the user and developer. It is fair to assume that if all these are met then the system can be considered to be a success in achieving what the user wants. There were 5 requirements areas Ordering, Customer Accounts Management, Products, Delivery and Functionality.

The developer used a precise specification document and FFF had a descriptive document so that they had a clear and concise view of the requirements. This decreased the probability that the user and developer may misunderstand the user requirements. All essential requirements from the prioritorised specification have been developed in the prototype. Out of ten possible requirements to be implemented six were completed, one was partially completed and three were not possible to complete, one because of time scale, another because it required the FFF ecommerce website to be up an running but at the time of implementation this was not the case and another which wasn't required in the end. These results show that the prototype passes the minimum specification and exceeds the user needs. Testing Document can be seen in Appendix N.

Ordering: All specifications were achieved; the system was able to store all ordering information. The orders can be viewed on screen and printed out and the orders can be easily searched.

Customer Accounts management: The system achieved all of the customer accounts specification including the ability to store actions against customers. Usability was added to this section by allowing customers to be grouped and adding various ways to search for a customer.

Products: All specifications were achieved; the system was able to store all required product details including pictures of the products.

Delivery: The system achieved all of the delivery specification; this included many reports to show delivery schedule. The ability to plan a route on the system was not able to be implemented in the time scale but the postcode finder was.

Functionality: All essential specification was implemented but only two possible specifications were implemented out of five. The system was only partly able to produce reports of the data stored and not all data as in the specification. The system didn't require remote access via the internet so this was not implemented. It was also not possible to connect to the website as because it is not fully created a method to connect to the FFF system could not be implemented.

8.2.2 Aim objectives min requirements

It can be assumed that if the objectives of the project are met then the aim is also satisfied. All six objectives were met, for instance the user was kept informed of the progress of the system throughout the project and the user was incorporated were possible. Additionally, the use of Nielsen's points of usability has helped to 'create a clear and consistent Graphical User interface'. It can also be argued that if the project meets all of the minimum requirements then again the aim will be met. All minimum requirements were met:

A document containing the results for the analysis of FFF current working practices containing the organisations requirements for an IT solution: This was produced in the analysis stage of the methodology, this ensured that all of the analysis undertaken and was well documented and could be referred to easily throughout the project.

A feasibility study into the possible solutions to the problems with the organisations working practices: The feasibility report was created and brought together the analysis and defined the specification for the system. This helped document what was needed and also what was feasible for the FFF business.

A set of requirements and specification of the future product agreed and signed by FFF: This was a product of the feasibility study and helped put the requirements in a format that was usable for the developer; this also provided a document for FFF to agree to the system specification and understand what the system would provide.

A formal design of the system including user interface and data design: This was achieved in the design section of the methodology. The user interface was designed with the help of FFF and

the underlying data design was achieved by using such techniques as normalisation and an ER diagram.

A system core with a basic user interface: The system is a functional relational database at the core and has a sophisticated user interface so this requirement has been exceeded.

A prototype that includes functionality such as: Booking orders, changing orders and customer account. All of these must be able to be viewed, searched and suitable reports created to provide FFF with the information they need: The prototype included all of the above functionality. The system had many reporting features that offered FFF up to date sales and order information. All data can be viewed on screen and searched.

8.2.3 Enhancements

The following five enhancements were included which contributed as a measure of success and as an additional improvement to usability.

Complex user interface offering greater usability: Neilsons Points of usability was the framework used when designing the interface, this ensured that the developer produced a system that was not only aesthetically pleasing but also extremely usable. The use of Visual basic allowed for greater complex in all areas of the interface to increase usability.

A user manual: A user manual was created that offered assistance to the users. As because the users are of a non technical nature the user manual is aimed to offer step by step help on how to use the system. The manual is image based and utilises screen shots with minimal text for simpler understanding.

Linking of the system to other relevant applications: The system is linked to Microsoft Outlook so email address stored in the system can be emailed with out having to manually open Outlook and copy the address into a new message. The system also linked to internet explorer to help FFF find postcode locations.

Demonstrate the new system with a small number of people from the company and improve areas where feedback suggests: This was conducted via a small focus group, which allowed the developer to understand what the users thought of the system and then add any improvements needed.

Management reporting – offering such information as yearly sales by product: This was achieved by using charts and tables to format the data by years, months, weeks and by products. This allows FFF to view the information in a way that will help them with management decisions.

8.2.4 Business Saving – Quantative evaluation

As with most businesses the success of a system is often viewed from the amount of cost saving it provides. This view maybe flawed as often systems provide more than just cost savings, but it is essential to view the system from this viewpoint to fully evaluate it.

Paper saving: The system reduces the need for FFF to have order documents. They currently buy six boxes every four months at a cost of £208 so for a year the system will create a saving of £624. Quotation forms are also used which cost FFF £196 a year as they are used less frequently. This brings a total saving of £820

Time saving: The time it takes to fill out an order for a new customer is no different from before the system; the main saving comes from creating orders for existing customers as the details don't have to be repeated. This will save approximately 90 seconds per an order. Time is also saved in the creation of the delivery schedule as it is automatically done by the system; this is a saving of about 30 minutes a day.

On average FFF receive 20 repeat orders a day thus saving 30 minutes a day. So on average an hour a day is saved by the system. The lowest paid employee receives £5 an hour. This means in a year the shop will save £1300 if the shop is open for 260 days a year. So the system provides a total cost saving of £2120 a year to FFF.

8.2.5 Effectiveness of gathering information

Information was gathered using an ethnographic approach to gain a clear insight into the work practices and user abilities. The use of UML and such tools as CATWOE enabled the developer to understand both the needs of the users and any potential problems that may be faced when converting to the new system. Interviews were conducted with FFF to clarify and confirm requirements. Informal work shops also took place to allow the developer to get feedback interactively from the user for the interface design.

8.2.6 Effectiveness of Technologies used

Microsoft Access was used to create the system, visual basic was then used to add further usability and increase the systems performance. Microsoft Access enabled the core database to be built quickly and allow the constraints needed to be built at table level. Some of the developers' fears were that Microsoft Access could be unpredictable and unreliable. Having designed and implemented the system he found this not to be the case and had no problems with Access. A

simple user interface was able to be built quickly with out much trouble, but for a non technical user this would not have been an easy to use product. Microsoft Access supports visual basic so with this and Access' inbuilt features a complex interface was built that would provide FFF with the usability and simple to use system they required. Visual basic provided the developer with the ability to link the system with other applications, this meant that time was saved as the user would not have to open up applications and copy and paste data from the system. Although Microsoft Access and visual basic offers all the functionality needed and allows for the system to be linked to other applications, it may however not be enough for the future. If FFF decided to expand and open up extra shops they may require a central ordering system and because Access is not run on a server the system could not support this need. However the database design from this system could be transferred to MYSQL, but a new interface would need to be built.

8.2.7 Effectiveness of Testing

Although there are many different testing criteria available, due to time constraints only two were conducted. These were developer and end user testing, both of which were very useful in locating errors and also determining if the user's requirements were met. Developer testing was used to gather an overall idea of the errors in the system, but by the time the developer testing commenced, most errors were actually already fixed in the implementation stage and therefore only a few unknown errors were found. The end user was involved through out the whole systems life cycle but it is particularly important in the testing stage. End user testing was used to make sure that all the minimum requirements were met and to make sure the technical abilities of the user were catered for. The users highlighted problems with the system and these will be fixed if a final iteration was to take place. These can be seen in section 7.5.

However if more time were available it would be beneficial to carry out a few more tests, integration testing could take place and also more in depth user testing may be worth while. By using a broad range of tests the developer can have greater confidence that unknown errors will most likely be found, thus making the system more usable and error free. With the use of only two different tests, the developer cannot guarantee that the system will be error free. However as the planned conversion method is to be parallel if any errors do occur it will not affect FFF work flow so much as the previous manual system will be running simultaneously.

8.2.8 User Evaluation / Feedback

The system is planned to be fully handed over in August 2006 but it is important for the evaluation process to gather user feedback for the prototype. A final interview with the managers to discuss the prototype and the user manual developed took place on April 12th 2006; this

involved a series of questions to gain the mangers views of the new system. The questions asked and a summary of the user feedback obtained are described below.

1. Do you feel that your needs for ordering and customer management have been well met?

"We found the customer management very easy to use and is a great way of storing are customer details"

"The in built phonebook is very helpful as we can get to the information we need quickly"

"Orders are quick and easy to make"

"It would be better if a customer could belong to more than one customer group as this is often the case"

"When issuing an order a confirmation screen summarising the order would be useful, as this could be read back to the customer"

2. Are you pleased with the layout and structure of the prototype?

"The system is easy to move through and the different tasks to do are ordered in a clear way."

"The way the menu is split up is a good idea"

"The layout looks very good and is just how we thought it would look from the design meeting we did"

"The way the product pictures can be brought up hopefully will be very useful"

3. Are you pleased with the presentation of the documents that are produced?

"The presentation of the documents produced are clear and professional."

"All the information can be read and found easily within the documents."

"The delivery driver is very pleased with how quickly his list can be created"

4. How easy have you found it to get used to using the prototype?

"Entering information becomes quick and easy once you get the hang of clicking in the fields properly"

"The drop down menus are very quick and easy"

"The short cut buttons are helpful in the order screen"

"The message boxes that are displayed when something goes wrong have helped us not to make the same mistake twice."

"Would be nice to be able to add a product with out having to go out of an order"

5. Is there anything in the prototype you did not understand?

"No everything was labeled clearly"

"Took a while to get used to the sales report"

6. Are you confident in following the steps described in the user manual? Are they explained in enough detail for you to be able to use them?

"The user manual seems very thorough in its description of the things that can be done with the system."

"The step by step guide to creating an order etc are very good indeed"

"There is not very much in the trouble shooting sections- just hope that nothing much goes wrong!"

7. Do you believe that you will make use of the system after the final handover?

"Yeah, were looking forward to using it"

"Paper work saving enough is a good reason to use it"

8. Do you feel that there is adequate security available?

"Yeah the security looks fine; it looks more secure than what we do at the moment!"

By observing the users trying to use the prototype also provided indirect user feedback. The technique used was that firstly the users were left to use the system with out any intervention or help from the developer. This gave a true feel of how it would be used in reality and this could be documented, this also provided a good way to evaluate the user manual as the user had this with them and could use it if they became stuck.

8.2.9 Usability

The interface of a system is as important as a system which is functionally complete, and meets all the user requirements A system will fail unless there is an appropriate interface. Nielsen's points of usability was utilised and directly contributed to the interface of the system. Involving the user in the interface design was also a technique to create greater usability in the system, as if the user is familiar with the interface and feel they have had an input when they first see the interface it will not feel as alien to them. The system used Nielsen's points of usability as a framework whilst designing the system. Even though these heuristics are designed for websites they are easily transferable to any system and where easily adapted to the FFF system. For example the look of the system is consistent though out, the users have the ability to escape from all forms, as the return to menu is present on all pages. There is a match with the real world with the wording and phrases that are used in the system.

The system could be criticised as it is based around one framework. It may be more beneficial for the usability of the system if more theories and frameworks were used in conjunction with Nielsen's, thus providing a broader influence with regards to the usability of the system. Many features of the system were specifically added to aid usability. For instance, the feature that when a field has not been filled in but is needed to continue an error message is displayed informing the

user which field/fields are missing and the fields are then turned red. This makes it easier for the user to know where the mistakes have been made so they can be rectified.

Another feature which improves usability is the search functions in the customer management section. It allows the user to search for a customer in many different ways, they can search by typing in the surname or part of, customer group and by alphabet buttons to find a customer. The users like this feature as they said "*it allows us to quickly find any customer we need"*. Another feature that adds usability and the users were impressed with was that in the ordering section the quick buttons that input a customer address into the delivery section and also the delivery time buttons *"these will save us time as it means less typing"*. They felt that the system had succeeded in making the system have as little information input as possible, as with a member of staff having dyslexia they preferred a system that had more button pressing than raw data input. As often with typing in information it could be prone to errors e.g. incorrect spelling etc.

Usability was also at the forefront when designing and implementing the interface to view the orders in the system. The form initially shows today's orders; this was changed from showing all the orders after receiving feedback during the testing stage. This interface allows the user to search and view all of there orders both delivered and non delivered in an easy to use screen. The users stated *"this screen is really easy to see what has to be done on any day…… with out this it would have been difficult to manage orders"*

8.2.10 Prototype Evaluation Outcome

There are a number of outcomes that have been derived from the evaluation of the prototype from all the criteria and the data gathered from user feedback. The out come of the evaluation against the requirements was very successful all essential requirements where implemented along with the majority of the possible ones. The user feedback was positive and by including the user through out the process FFF were aware of what parts of the system would look like and what exactly it would do so they were not unpleasantly surprised by what they saw in the prototype. The usability of the prototype also impressed the end user as they where able to use the system with out much direction and the user manual was able to provide information and help when needed, so from this point of view the system was seen as a success.

8.2.11 User Manual Evaluation Outcome

The user manual was evaluated in terms of its clarity and helpfulness. It was used by the FFF managers and staff. The staff were asked to use the system with the user manual and follow the

instructions to see if they could perform the tasks. This was also done by the developers' mother who it is believed has the same level of knowledge of terms and experience of Microsoft Access as the managers. The outcomes of the evaluation feedback gathered are as follows:

Help information: It was concluded that the user manual offered enough help and direction with how to perform tasks. The use of diagrams and step by step instructions helped clarify each step. It was indicated however that the troubleshooting was limited in its provision of help when things go wrong.

Layout: Detailed descriptions of how to enter and manipulate certain objects, although tedious to the advanced user, were a seen as very valuable for the FFF users. The user manual being split into tasks were considered very useful for the user. A draw back was that the manual did not show all of the possible ways to perform a task in the diagrammatic form. This was actually intentional as the manual may have been to large if all features had a diagram with it and thus but people off from reading it.

Real world: It was concluded that the user manual effectively used real world terms and descriptions throughout. A glossary also provided information on words that may be unfamiliar or more technical. The functions of the system were described in familiar terms to aid the understanding of the purpose of the functions.

Comments were also made in regards to the final system and the user manual and how they actually reflect each other. The developers mother commented that overall it is a good representation of the system, however it has limited information if something unexpected happens and what the user should do and also if the user escapes a task there is no information to what this means if whether the task is deleted, cancelled or remains in the system.

8.2.12 Effectiveness of Methodology

By using a methodology that is combination of several methodologies it allowed the project to be adapted specifically to the FFF problem. The use of prototyping was very advantageous as it ensured that the system was constantly being assessed against the problem. So when the system entered the evaluation stage most, if not all, potential problems had been fixed. The use of ethnographic techniques helped in both the understanding of the working practices and usability of the prototype and enabled the developer to gain a greater understanding of the problem faced by FFF. It also helped bring user involvement to the project which was essential if the system was going to be a success. The use of a feasibility study helped the developer understand what a possible solution was for FFF and also helped understand issues that the user will face. It also helped provide a detailed picture in the mind of the developer and this in turn would reduce the

need to keep referring to the analysis during the design of the possible solutions as the current practices would be well known.

8.3 Comparison to Other Products

In the feasibility chapter, there was a section discussing what products where available in the market. This discussion highlighted the advantages and disadvantages of these systems. The new system will be evaluated against these products.

CSA Customer order processing

This product offers nearly all of the functionality that the FFF system offers plus more. The reason why this product was not used was that it was too comprehensive and expensive. It offers very good management information and sale data but does not offer the ability to store pictures of the products like the new system. With the product being very comprehensive it may not offer the tailored usability that the new system offers.

Visual Ticket MicroFlorist Floral Management Systems, Florist Point of Sale Software

This again is too large as it offers an EPOS system which is not needed by FFF. The system would require FFF to change their working practices where as the new FFF system is designed to work with their current practices. This system does come with the ability to add feature which would be beneficial if FFF where to expand. It also does not seem to be able to create quotations unlike the new FFF system.

florist2florist

This offers similar functionality such as on screen pictures and can store and print card details. But it does not provide a customer management function or the ability to handle quotations. It offers a relay service but this is not needed by FFF as they already have one, so the new FFF has more functionality that is needed by FFF.

Orderwise

Orderwise offers stock control which the new system does not. They both have the ability to change orders in to quotations and edit and change existing orders. Orderwise does not have the ability to store pictures but does have modules that can be added on and one of these may allow pictures to be added. The new system also offers customer management which Orderwise does not offer. Orderwise also has an EPOS integration as part of the system which is not needed by FFF.

Access To Go

This offers similar functionality to the new system if both Order and Customer management modules where connected. It would allow orders to be created, modified and deleted. Customer

can be added and grouped. It does not support pictures or have the reporting functions that the new system has. Access to go also does not support quotations unlike the new FFF system.

All of these solutions do not offer suitable training, the FFF system provided a days training which turned out to be very useful. Furthermore prototyping meant that users were accustomed to the system before it was completed.

8.4 Possible Improvements

There are a number of opportunities for further work to be conducted in relation to this project:

- Alteration of the scope to include the other activities of the organisation such as the stock management and supplier ordering so that quantities of flowers needed for arrangements are calculated by the system.
- Extensions to the system to link to FFFs future Ecommerce website so that alterations to the product database in the system would up date the website.
- Extensions to the system to link to FFFs future Ecommerce website so that orders placed on the website would feed the FFF system.
- Development of a full accounting system for the organisation to eliminate their reliance on an external accountant.
- A critical evaluation of the use of the system over a year to determine how well the solution produced aids the managers.
- Further analysis of other Flower business' to extend the system into a generic package that may be useful for many organisations.
- Link the system to an EPOS system and ticketing machine to print receipts once an order is placed.
- Extensions to the system to allow the organisation to create its own reports.

References

[1] Project Management Nation: Tools, techniques and goals for the new and practicing IT project manager, Jason Charvet.

[2] Information Systems Development: Methodologies, Techniques and Tools, D. E. Avison and G. Fitzgerald

[3] O. Wilson, IS11 Lecture Notes: Lecture 12- Information Systems Development:

[4] J. Matravers, IN11 Lecture Notes: Lecture 3- Introduction to Information Systems Development: From Software Engineering Approaches to the IS Development Life Cycle, 2002.

[5] Center for technology in government, A Survey of System Development Process Models

URL: **http://www.ctg.albany.edu/publications/reports/survey_of_sysdev?chapter=5**

[Accessed: 28th November 2005]

[6] P.H Jesty, SE22 Lecture Notes: Lecture 05- Life Cycles:

[7] Standish Group Chaos Report (1995) report available at:

URL: **http://www.standishgroup.com/sample_research/PDFpages/chaos1994.pdf**

[Accessed: 27th November 2005]

[8] The Prototyping Methodology, Kenneth E. Lantz report partly available at:

URL: **http://www.manageknowledge.com/prototyp.html**

[Accessed: 29th November 2005]

[9] Designing Human Systems, The ETHICS Method, Enid Mumford

URL**: http://www.enid.u-net.com/C1book1.htm**

[Accessed: 29th November 2005]

[10] Soft Systems Methodology, University of Calgery.

URL: **http://sern.ucalgary.ca/courses/seng/613/F97/grp4/ssmfinal.html#ABSTRACT**

[Accessed: 05th December 2005]

[11] L.Lau IS33 lecture Notes : Lecture 2 Week 4 – SSM

[12] Jason Burke and Andrea Kirk, *Ethnographic Methods*, 2001

URL:**http://www.otal.umd.edu/hci-rm/ethno.html**

[Accessed: 25th November 2005]

[13] James Matson, *The Cooperative Feasibility Study Process* Revised 2001

URL: **http://www.agecon.uga.edu/~gacoops/info34.htm**

[Accessed: 3rd December 2005]

[14] Milwaukee School of Engineering, *EE407 Feasibility Study Report Format*, August 2002.

URL: **http://www.msoe.edu/eecs/ee/seniordesign/EE407ReportFormat.pdf**

[Accessed: 21st January 2006]

[15] Christine McMullin, *The Feasibility Report*, Assignment #6 of the course English 202D at Pennsylvania State University USA, 2005
URL: **http://www.personal.psu.edu/faculty/c/v/cvm115/freport/feasassign.htm**
[Accessed: 21stJanuary 2006]
[16] Bringing Design to Software, Winograd. T, Addison-Wesley, Inc., Reading, MA, 1996.
[17] Developing Entity Relationship Diagrams, Central Queensland University.
URL:**http://infocom.cqu.edu.au/Courses/spr2000/95169/Extra_Examples/ERD.htm**
[Accessed: 01st February 2006]
[18] Database Processing. Seventh ed. Kroenke, D., 2000: Prentice Hall.
[19] Fundamentals of Database Systems fourth edition, Elmasri and Navathe, Addison-Wesley, 2004
[20] Chapple, M. Referential Integrity.
URL: **http://databases.about.com/cs/administration/g/refintegrity.htm.**
[Accessed: 01st February 2006]
[21] L.Lau IS33 lecture Notes : Lecture 2 Week 1 – IS Failure Case Studies
[22] User interfaces for all : concepts, methods, and tools**,** Constantine Stephanidis, Mahwah, NJ ; London : Lawrence Erlbaum Associates, c2001
[23] Designing the User Interface**:** strategies for effective human-computer interaction, Ben Sneiderman, Reading, Mass ; Harlow : Addison Wesley Longman, c1998, 3rd edition
[24]Interaction Design, beyond human-computer interaction, Preece, Rogers and Sharp, New York ; Chichester : Wiley, c2002.
[25] Dix, A., Finlay, J. and Abowd, G.D. 1998. *Human-Computer Interaction*, Second Edition. Prentice-Hall Europe.
[26] Nielsen, J., Designing Web Usability. First ed. 1999: New Riders Publishing.
[27]Davis, F. D. "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology," MIS Quarterly (13:3), 1989, pp. 319-339.
[28]Taylor, S., and Todd, P. A. "Understanding Information Technology Usage: A Test of Competing Models," Information Systems Research (6:2), 1995, pp. 144-176.
[29]Davis, F. D. "Toward Preprototype User Acceptance Testing of New Information Systems: Implications for Software Project Management," IEEE Transactions on Engineering Management, (51:1), 2004, pp. 31-46.

Appendix A – User Reflection

Although the project was a lot of hard work and parts stressful, the project has been extremely interesting and enjoyable to create. It has been the first major project that I have done on my own, and it is very rewarding to look back on what I have achieved. Many lessons were learnt along the way; these are stated below and may be helpful to future final year students as some I wished I had known before I undertook my final year project.

The first lesson would be to do something you think you will enjoy, as the project takes up the majority of your life especially in the second semester and by doing something you find interesting all the background reading and work on the project will not seem as much of a chore. For me doing a project that was a real world problem rather than a research one was more appealing. I am glad of this decision as the project was fascinating on many levels, it gave me a real insight to how a consultant may work and the difficulties the IS industry faces with end users. Also real world problem kept me stimulated and maintained my interest as I felt I was making a difference and a good solution could make a real positive change for the business. This is also the only real chance in my university career that I have been able to undertake something I really wanted to do and do something I feel will help my future career in the IS industry, so my advice to any one is go for it explore an area they are interested in.

The second lesson I have learnt and so possibly has every other student doing a final year project was time management. If I was to undertake my final year again I would take 50 credits in the first semester to allow myself more time in the second semester as the write up takes many hours to complete. Another important part of time management in the project is to use the gaps in module commitment to progress, as even just 20 minutes background reading is 20 minutes that will not have to be done when the deadline is getting closer. This has probably also been my biggest weakness in the project as I found it often difficult to get motivated. I found out towards the end of the project by having my schedule printed out and the milestones dated to when they need to be finished this gave me something to aim for. If only I had know this at the start I may have had more sleep while doing my mid project report.

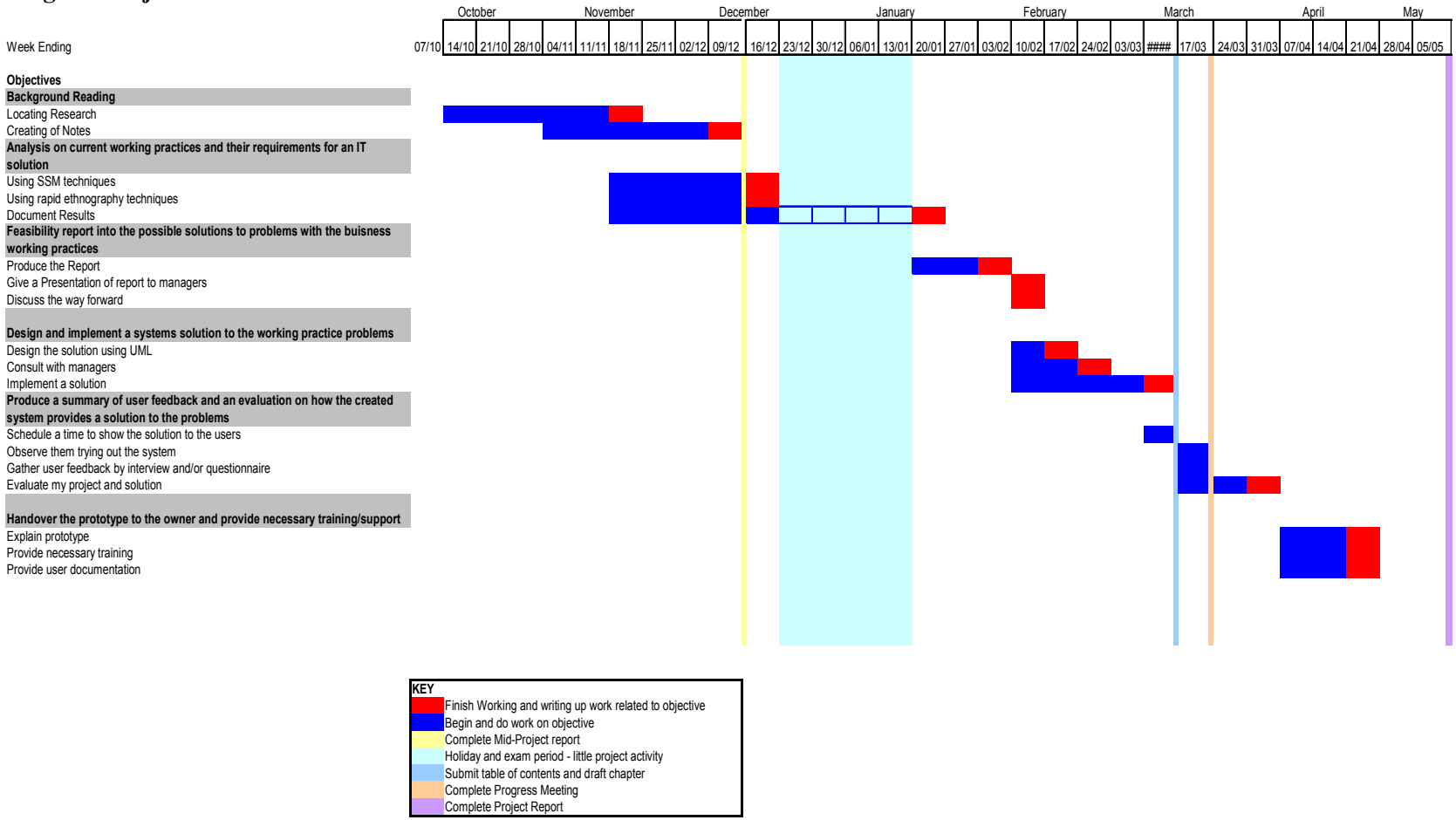
Third lesson would be users users users. The users are the most important part of this project. I tried to involve them as often as I could but because they were based in Morecambe it often made it difficult to see them. This had both positives and negatives as with having to plan when to go

see them it acted as a mile stone so it gave me something to work towards. It was also difficult as some things could not be explained over the phone. If the user was more IT literate a solution could be to use groupware or video conferencing to increase user involvement. Another important lesson when dealing with users is to honest from the start let them know what you can achieve your self and what you want to achieve. Doing this the users will not have a false view of what the system will be and will offer greater support in interviews and workshops.

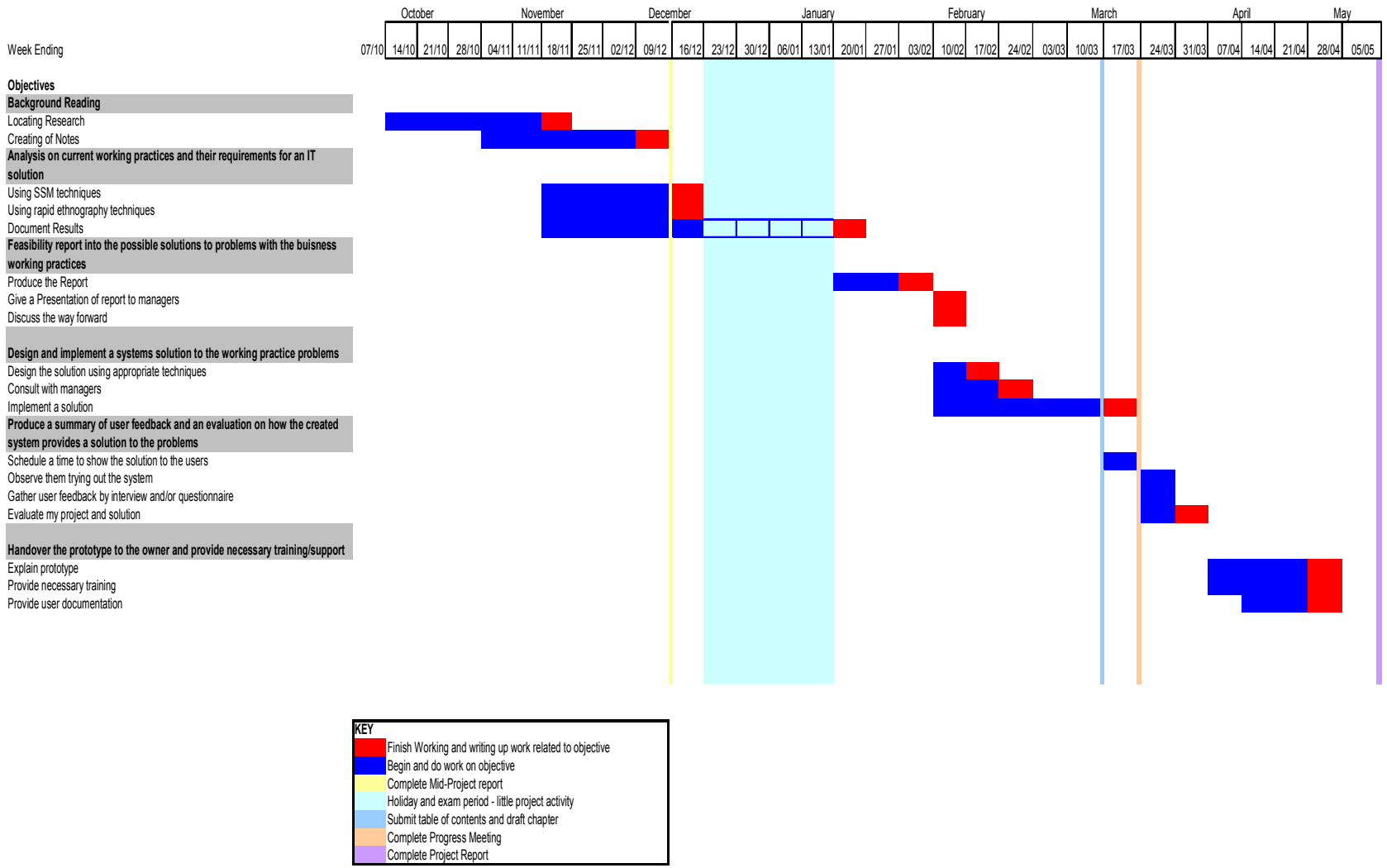
So finally the main lessons are, plan well, involve your users and do something you won't mind spending 500 hours doing, then like me you will have something that you can be very proud of.

Appendix B – Original Project Schedule & Revised Schedule

Original Project Schedule



Revised Schedule



Appendix C – Analysis Report

Analysis report

1. Introduction

This document in intended to show the procedures used and the results of the ethnography analysis of the day to day running of fone for flowers.

2. Structure of document

This document intends to analyse the data collected during the interviews with the staff and the ethnography sessions held at the florist. The processes, or work practices have first been identified and analysed to consider the documents, intangible information and people involved in each process. The nature and information held within the documents has then been analysed and documented. The information from the interview of problems that they currently face will be documented and analysed. The people involved have then been described and considered in terms of the importance and nature of their involvement within the working practices.

2.1 Dates and times

The ethnography session took place on Saturday 19th November. A semi formal interview with the staff took place on this day also.

3. Process identification

The table below aims to show the processes identified and analysed as a result of the ethnography session, the documents and other information related to that process and the people involved during that process.

Process No.	Process Name	Process Description	Documents Involved	Intangible Information Involved	People Involved
1. Front End process					
1.1	Customer Order (Standard)	Customer either comes into the shop to place an order, ring the shop to place it or a fax is received. In the future they hope to receive orders from their web site. The customer will choose a particular item, e.g. hand tied bouquet or aqua pack. They will state a price they wish to pay from the range given buy the shop. For example bouquets may start from twenty pound and go up to as high as fifty. The customer may also specify flower type and colour that they would prefer. The customer will also state if they want the Item delivered or if they will pick it up from the shop, they will specify a day for pick up or delivery.	Flower Order form	Flower type, colour often spoken to the florist and not noted down.	Shop assistant, Florist, customer
1.2	Customer Order (Wedding)	Customer will come into the shop to place this type of order. The customer will choose the particular items they would like for their day. These are split up into sections: Brides Bouquet, Bridesmaids Bouquet, Corsages, Button holes, The delivery address etc is also taken. Colour variety style will also be taken.	Wedding order form	Style colour scheme may be noted down but not on the actual form.	Shop assistant, Florist, customer
1.3	Customer	Customer will come into the shop to place this type of order. The	Flower Order	Change of time or colour	Shop

	Order (With sympathy)	customer will choose the particular items they would like for the day. These are then written on the normal order pad. The address and time of the service is taken. Colour etc is also stated	form	may be phoned in and not noted down with the order.	assistant, Florist, customer
2. Back End Process					
2.1	Daily order preparation	The order slips are placed into bulldog clips according to the day the order is for. They only have seven clips on for each day of the week. So after a day is over the orders for the following week are taken out of the order pending file and put into the days clip. E.g. at the end of a Friday the following Fridays orders are put into Fridays bulldog clip.	All order forms	The orders have to be found and put into order. This seems to be time consuming.	All staff
2.2	Flower purchase order	The flowers are ordered over the phone with there supplier. They use there own knowledge on how many flowers to order.			Managers
2.3	Customer accounts	Their larger customers have accounts with the shop and are billed every month. The orders have to be filed and gathered together and added up at the end of the month to bill a customer. Some customers are billed by monthly or on ad hoc basis.	Flower Order form		Managers
2.4	Amending orders	If an order needs changing e.g. the date of delivery or time. The order has to be found either in the pending tray or in the day bulldog clip and manually changed.	Flower Order form		All staff
2.5	Order delivery arrangement	The orders are made in the order they are required. This is done by putting the orders into order by delivery time and then worked through. They are then delivered when needed. The order details are copied from the order form to a plane piece of paper. Often the address is unknown to the driver so it has to be looked up in the local A-Z.	Flower Order form	This can be time consuming and requires the orders to be in the correct order.	All staff
2.6	Customer order	When a new order is taken it needs to be inserted into the correct bulldog clip and into the correct place where its delivery time sits.	Flower Order form	This can be prone to mistakes	All staff
2.7	Filling old forms	Once a order book is complete they file the booklets that have customer details on	Flower Order form		All staff

4. Document definition

Document	Definition
Flower Order form	This is the main order form for the business. It is paper based and has spaces for the name, address, order, card, delivery address, date and time. The information is non-formatted although with everyone working as a team for so long they do appear very similar and information is more or less in the same place on every form. Some abbreviations are used for flowers types and these are all known by the team. Each form is in 3 parts the store keeps one copy the customer receives another and a copy is kept in the pad.
Wedding order form	This is a larger version of the flower order form as there is more choice and more detail is needed. The forms consists of sections, these are titled Brides Bouquet, Bridesmaids Bouquet, Corsages and Button holes the details of the required flowers and colour scheme are taken and wrote down on this form.
Delivery order form	This is a manual form that is created for the driver so he knows what order to drop the products off at.

5. Business rules

Rule name	Definition
Delivery	• Deliveries are Monday to Saturday between 8-6. • Customers can select a delivery time either at, before, after or between times. • They have non-ordering days such as Christmas day.

6. People definition

The people involved with the day to day running of the business and the business as a whole have been identified below in terms of the individuals, organisations and groups.

6.1 Individuals

Manager

The managers are the key members within all the business processes. They are involved in all items of the business and the business paperwork. They take an active role in dealing with customers and also preparing flowers.

Florist

The florists make the arrangements from the orders. They prepare the flowers in the order they are required. They will also deal with customers and take orders over the phone on quieter days.

Shop assistant

The job of the shop assistant is to deal with customers that come into the shop and also answer the phone to customers. They will fill in the order forms and file them in the correct place.

Delivery driver

The delivery driver gathers together the completed orders and delivers them in the order required. He has to search through the orders and create his own list of orders and addresses so he doesn't have to keep searching in the vehicle for addresses.

6.2 Groups

Staff members

As a hole the staff members job is to make sure the shop runs smoothly and with out error. They help within the setting (premises) to take customer orders and solve customer queries. They will take orders over the phone and over the counter. The paperwork they are involved with is the flower order form; they will create and amend orders when needed.

6.3 Organisations

Teleflorist

Fone for flowers is part of Teleflorist which is part of a worldwide organisation of quality florists called Teleflor International. They are one of the largest and most popular gift services in the world. They are associated with 2,500 florists in the UK and Ireland. They offer certain guarantees so FFF need to adhere to these guarantees to stay as part of the organisation, the guarantees are flowers will be fresh, flowers will be prepared and arranged by a professional florist; they will be delivered to the address given and deliver on a specific date.

7. CATWOE

CATWOE analysis of the Fone For Flowers business. This is used to identify the problem and to prompt thinking about what I am really trying to achieve. When implementing the solution it will also help me consider the impact on the people involved, this is important because of the user centric approach I am undertaking.

Client/ Customers:

- Person buying flowers
- Business buying flowers
- Flower suppliers

Actor:

- Manager
- Florist
- Shop assistant
- Delivery driver
- Supplier

Transformation:

- Customer orders get processed and the flowers are arranged in the type style and with the flowers chosen by the customer.
- Orders of the businesses are added up and invoiced to the business.

World:

- Small flower shop on a high street in Morecambe, they are part of Teleflorist which is a national chain. They are in competition with other local shops so there deliveries have to be on time and the flowers how the customer requested and to a high standard.

Owner:

- Manager of Fone For Flowers.

Environment:

- Small staff base
- Shop is split into two areas, there is a large shop front where the flowers are on display and a large working area in the back where the flowers are arranged and prepared.
- If customers are unhappy with any aspect of the service there are plenty of other local florists in competition so the service needs to be very good to keep repeat custom.

8. Stakeholders

I am now able to generate a list of stakeholders for the system. These will be needed during the specification stage.
The stake holders are:

- Managers
- Delivery driver
- Florists
- Shop assistant
- Supplier
- Teleflorist

9. Summary of interview

Questions Asked

1. What would you consider to be the main things that happen at the business?
    a. what tools do you use at the moment to help you.

b. what processes do you run through every day week.

2. Who are the different people involved in the running of Fone for flowers?
3. What changes would you like to see?

Results of Interview

These are results of the interview that couldn't be expressed in the other sections of this report.

Customer management

One statement they get from customers a lot is when they are giving their details they say "you will already have my details on your system" they have to then explain they don't have a system and take the details off the customer again. They stated they would like to be able to store the details of the customers to cut down on repeated work. They also stated they would love something that could send emails that will remind people of birthdays and anniversaries; this would hopefully help them increase sales and be a good advertisement tool.

Order forms

One problem they often face is that some of the staff handwriting isn't very neat so when someone comes to read it again they have difficulty. In some cases they have had to ring back a customer because they could not work out the delivery address or types of flowers required.

Quotations

They also said that sometimes wedding customers ask for quotations and this can sometimes be time consuming getting all of their prices together for a customer and maybe not receiving any work from it.

Ease of use

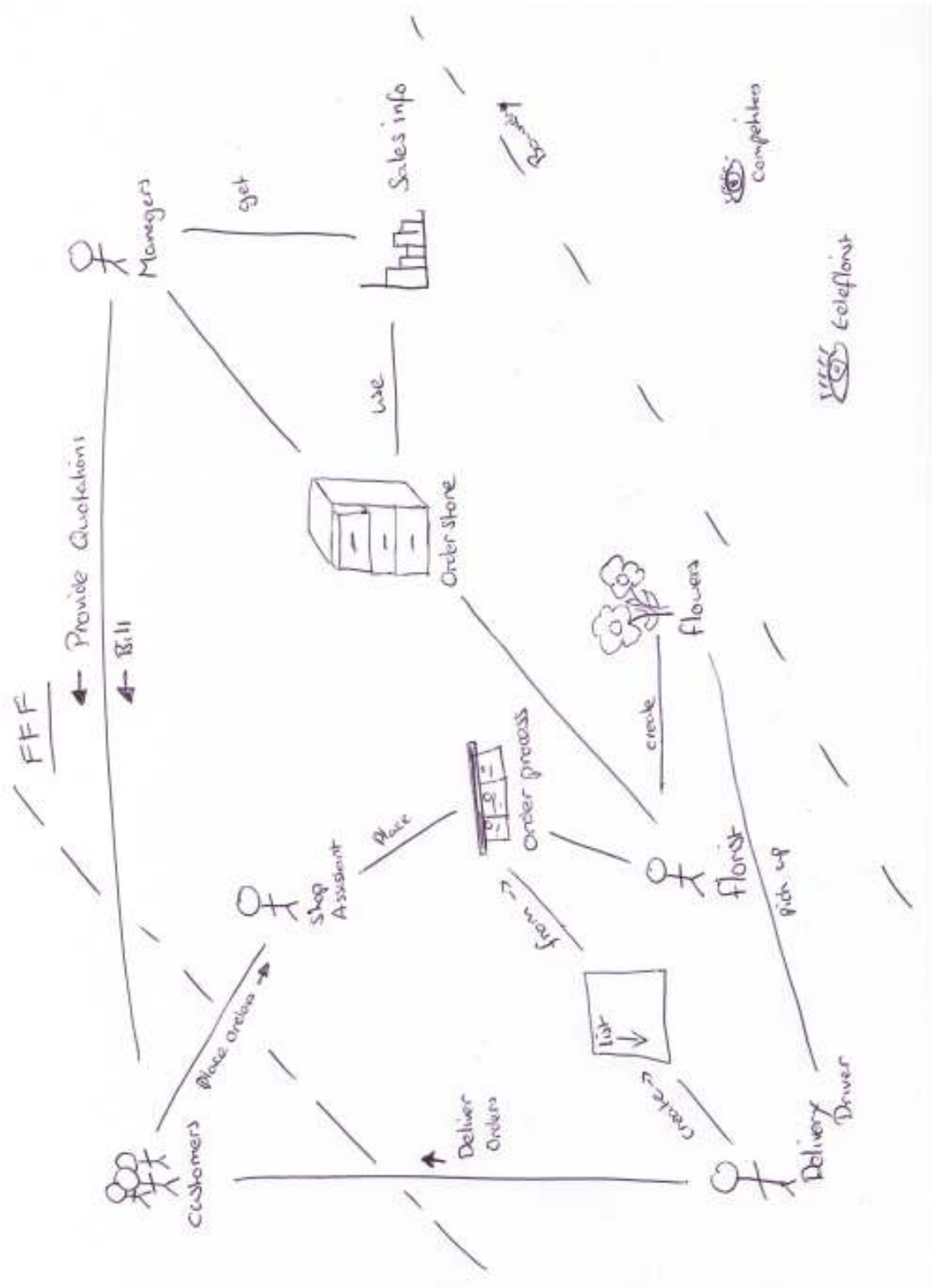
They where aware that an IT system will possibly be the solution to the current paper based systems. So stated how they where worried about that if they had an IT system it needs to be easy

to use as there staff are not very IT literate and them themselves are only familiar with standard desk top packages.

Web orders

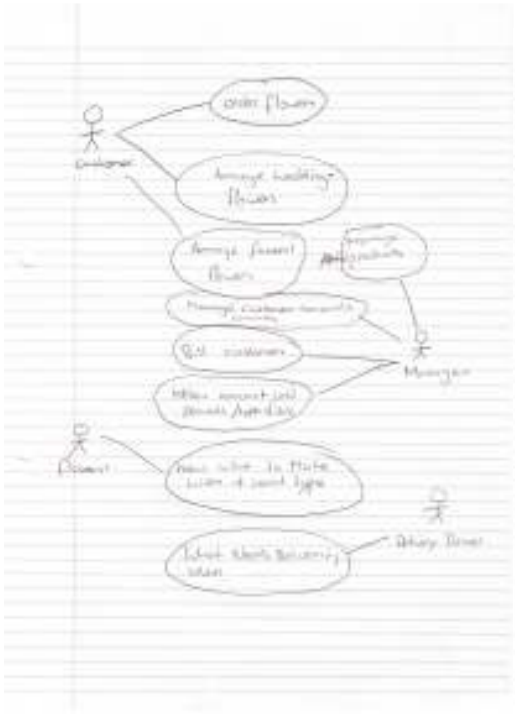
Currently their webpage is only simple but hopefully they will be getting a new one that could transmit orders. So the solution may needs to at some point be able to deal with orders coming from over the web.

Appendix D – Rich Picture and Use Case

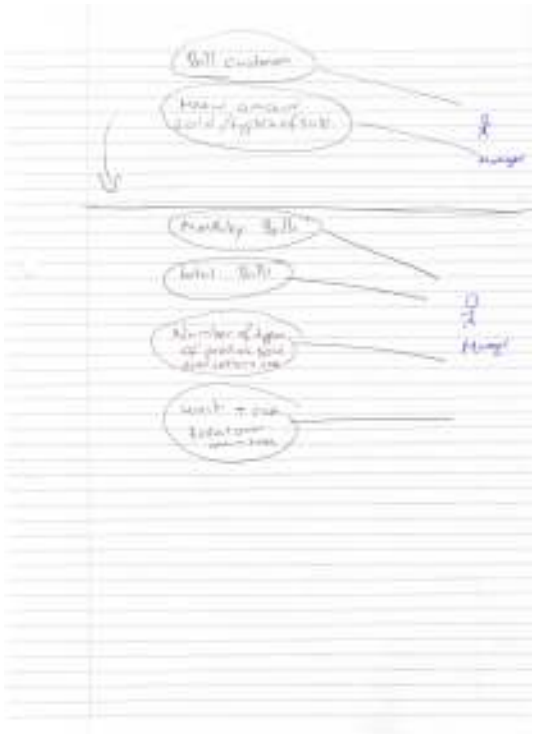


Use case diagrams

Use case diagrams from the ethnography session with FFF







Appendix E – Feasibility Study

An Information System for "Fone For Flowers"

Feasibility report

Date: 03/02/06
Created By: Andrew Waugh

Contents of report

Executive summary

1. Project description
2. Development of problem statement (requirements assessment)
    2.1 Initial Problem
    2.2Research on Problem – An Ethnographical Analysis of the Current Situation
        2.21 Requirements Identified from Analysis
        2.2.1a Analysis of the Business Processes
        2.2.1b Analysis of Documents
        2.2.1c Analysis of Interview
    2.3 Assumptions
3. Project Specification
4. Possible solutions
    4.1 Existing Alternatives
    4.2 Generated solutions
        4.2.1 Microsoft Access Database
        4.2.2 Web-based Solution
        4.2.3 Microsoft SQL Server Database
        4.2.4 Spreadsheet-based Solution
5. Evaluation of solutions
6. Chosen Solution
7. Other issues to be addressed
8. References

Executive Summary

This report assesses the feasibility of providing a solution to the problems presented by the current paper based system of Fone For Flowers. The problems concerning the paper based system and the amount of work involved in maintaining it are considered, and a problem statement is developed. These problems provide the basis for creating goals and requirements that the ideal solution should meet.

Existing solutions are then explained and evaluated in terms of their technical, economic, legal, social and economic feasibility. The feasible solutions from the evaluation are then explained and considered in more detail in terms of how well they meet the goals and requirements of the ideal solution and the expected costs and tasks that must be accomplished to implement that solution. A solution will then be recommended taking into account all of the analysis and other factors involved. Further justification will then be provided of how well the recommended solution meets the ideal goals and requirements.

A time schedule and list of issues to be addressed when implementing the chosen solution will also be detailed. The report concludes with an identification of the accomplishments made so far and the major hurdles remaining to be passed to make the project successful

1. Project Description

The project is to analyse design and implement an IT solution that will solve the problems with the current paper based system at Fone For Flowers. (FFF) The analysis will be on the current ordering processes and how they manage customer accounts. Other improvements to do with what they would ideally like there IT solution to achieve will also be investigated. The IT solutions aim is help improve efficiently thus saving time and effort on the behalf of the staff at FFF and also on the behalf of the customers involved in the ordering process. The project has to make use of current technology and systems available as there is no budget available.

2. Development of Problem Statement (Requirements Assessment)

2.1 Initial Problem

Fone For Flowers have several issues with there current paper based ordering and customer management system. The problems are such as data integrity as with the manual system duplication can occur and important data can be missed due to human error. Such human errors such as eligibility of hand writing can also occur, which cause problems when the data is being read again. Another problem is that of efficiency, a lot of the forms are double handled if not more, which if avoided could save time. Also data is often reproduced, this maybe exact copying of data or reproducing it in different format, if this could be avoided it would save time and improve efficiency.

2.2 Research on the Problem – An Ethnographical Analysis of the Current Situation

The research undertaken was by an ethnography session and an interview.

2.2.1 Requirements Identified from Analysis

2.2.1a Analysis of the Business Processes

Analysis of the business processes seen in the analysis report has led to the identification of a number of potential business process problems. These problems and the processes they relate to are described below.

Problem ID	Problem	Related processes	Problem Implications
P1	Incorrect date/time on order form.	1.1,1.2,1.3	• The agreed delivery date/ time may be missed. • Flowers may be made to early and may have to be thrown away.
P2	Incorrect arrangement type on order form.	1.1,1.2,1.3	• Incorrect flower arrangement may be made e.g. a customer may wish to have a hand tied bouquet but receive a aqua pack
P3	Incorrect or illegible delivery address on order form.	1.1,1.2,1.3	• This would either lead to the staff guessing at what it might be which could leave to the item being delivered incorrectly • They may have to call the customer back; this

			isn't good service and could be a nuisance. It is also time consuming
P4	No formal rules for how the form should be filled in	1.1,1.2,1.3	• This can mean people searching the form for information, which can take time • People may use abbreviations that other staffs are not aware of so they have to be asked. Which again isn't efficient
P5	Flowers order form is used for with sympathy arrangements	1.3	• This can lead to the order going onto to two separate sheets, which if one is lost so is half the order. This can cause confusion • There is no order for these sorts of arrangements on this form, so the information can be dispersed so the staffs have to look through the whole form. So again this isn't efficient.
P6	Wrong price given at point of order	1.1	• There is a minimum price for each product and if a staff member is unsure of it there is no way to protect against them writing a price that is to low.
P7	Problem keeping daily system in order.	2.1,2.6	• Deliveries could be missed • Takes time to reorder and insert new orders
P8	Amending orders	2.4	• Orders have to be found and re ordered • No space to write amendments on the form
P9	Storing old order forms	2.7	• If stolen would have all customer credit details on • Take up allot of room
P10	No sales history	2.2	• They have no sales history of each type of product they have sold. They use there own experience for ordering
P11	Delivery order creation	2.5	• The delivery sheet has to manually fill in with the details off the order forms. This is time consuming and can be prone to error if the order forms are not all together. • The sheet can become messy and un organised
P12	Customer accounts difficult to bring together	2.3	• This could lead to incorrect billing in which they would lose money • It is very time consuming and take one person may hours.
P13	Delivery Address	2.5	• This takes time to look up an address. • If new streets are created their A-Z isn't up to date so could have difficulty finding the address

2.2.1b Analysis of Documents

Analysis of the documents seen in the analysis report has led to the identification of a number of potential business problems. These problems are described below.

Problem	Problem	Problem Implications

ID		
D1	Duplicated information	• Information updated on one part of the order form isn't updated on the others. This may result in incorrect billing
D2	Documents are hand written	• Not everyone may be able to read the handwriting • Handwriting documents is time consuming • Handwritten documents can seem messy and disorganised
D3	No backup of documents in the event of fire/burglary	• Documents are completely lost and managers have to start from scratch • Business could not continue without the documents
D4	Time consuming	• Producing and maintaining documents especially for account purposes is meaning the managers have to take there work home with them
D5	Not immediately apparent what information is exactly required in the documents	• A new staff member would have to be shown how to use the forms and what information is needed and where to put it.
D6	No formal way of dealing with "with sympathy arrangement"	• More than one form may be needed which may get lost • Details may be missed as not enough space on the form

2.2.1c Analysis of interview

Information provided from interviews and noted during the ethnography session led to the generation of a rich picture depicting the current situation. Potential problems arising from these are described below.

.

Problem ID	Problem	Problem Implications
IN1	Customer perception	• Customers have to give their details over and over again.
IN2	Ease of use	• They are concerned that if a system is implemented they and some of their staff will have issues in using a system. *(this area will be dealt with in more detail later as I feel it is important)*
IN3	Hand writing (D2)	• Covered in D2
IN4	No way of managing customer details	• Not able to do things they would like to be able to do • Have to repeat work
IN5	No quick way of giving quotations	• Have to be hand wrote • Can take a while to bring together • A lot of work for possibly nothing
IN6	Forgetting to write things down/forgetting to do things	• Could mean wrong type or style of arrangement is made • Late delivery • Not good for company image

2.3 Assumptions

These are the assumptions I have made relating to the problem and also the solution,

- There is no budget available for the project
- The staff are willing to learn how to use the solution and improve there computer skills.
- They have access to a desktop PC
- They have access to an internet connection
- The managers are willing to change business processes in order to fit in with the solution.

3. Project specifications

Allocation	No.	DESCRIPTION	STAKEHOLDERS					
Related groups of Stakeholder Needs	Reference Number	Description of the Stakeholder Need	Managers	Florists	Shop Assistant	Delivery Driver	Supplier	Teleflorist
Ordering		*This is all of the needs to do with the ordering of goods*						
	1.1	The system shall allow standard flower orders to be created	**Y**	**Y**	**Y**	**Y**		**Y**
	1.2	The system shall allow wedding orders to be created	**Y**	**Y**	**Y**	**Y**		**Y**
	1.3	The system shall allow with sympathy flower orders to be created	**Y**	**Y**	**Y**	**Y**		**Y**
	1.4	The system shall allow orders to be amended if they are not complete	**Y**	**Y**	**Y**	**Y**		
	1.5	The system shall allow orders to be placed for Monday to Saturday delivery	**Y**	**Y**	**Y**	**Y**		
	1.6	The system shall allow orders to be placed between 8-6 for delivery		**Y**	**Y**	**Y**		
	1.7	The system shall allow for non delivery days to be set.	**Y**	**Y**	**Y**	**Y**		
	1.8	The system shall allow for delivery times to be set either at before, after or between a certain times.		**Y**	**Y**	**Y**		

	1.9	The system shall allow orders to be viewed on screen or printed out	**Y**	**Y**	**Y**				
	1.10	The system shall make it possible for the user to know what orders they have for any day.							
	1.11	The system shall allow for each type of product to be ordered		**Y**	**Y**				
	1.12	The system shall allow store the card message for the order.		**Y**	**Y**				
	1.13	The system shall automatically add on the delivery charge.	**Y**	**Y**	**Y**				
	1.14	The system shall allow multiple orders for a customer to be created	**Y**						
Customer Account Management		*This is all of the needs to do with the customer detail management side*							
	2.1	The system shall record the customer details	**Y**		**Y**				
	2.2	The system shall allow the customer details to be viewed on screen and printed out.	**Y**		**Y**				
	2.3	The system shall allow customer details to be amended and deleted	**Y**		**Y**				
	2.4	The system shall record customer dates, e.g. Birthdays	**Y**		**Y**				
	2.5	The system shall allow customers to be grouped	**Y**		**Y**				
	2.6	The system shall produce invoices each month for the customers who have accounts	**Y**						
	2.7	The system shall tell the user at any time who owes the user money and how much and for which customers.	**Y**						
	2.8	The system shall produce invoices for the customers who have accounts at any time.	**Y**						
	2.9	The system shall allow actions to be created against customers	**Y**	**Y**					
Products		*This section is to do with the products and there details*							
	3.1	The system shall store product details	**Y**						
	3.2	The system shall allow a minimum price to be entered for products	**Y**						
	3.3	The system shall allow product details to be amended or deleted	**Y**						
	3.4	The system shall allow the product details to be viewed on screen and	**Y**						

		printed out.							
	3.5	The system shall store product pictures	**Y**						
Delivery		*This section is all needs to do with delivery*							
	4.1	The system shall allow all the deliveries to be viewed on screen and printed out.	**Y**		**Y**	**Y**			
	4.2	The system shall allow all the deliveries for a certain day to be viewed on screen or printed out.	**Y**		**Y**	**Y**			
	4.3	The system shall allow all the deliveries for a certain time period to be viewed on screen or printed.	**Y**		**Y**	**Y**			
	4.4	The system shall organise the deliveries in chronological order	**Y**		**Y**	**Y**			
	4.5	The system shall plan a route of a delivery if the location is unknown	**Y**		**Y**	**Y**			
	4.6	The system shall find a delivery location if unknown	**Y**		**Y**	**Y**			
Functionality		*This section is all needs to do with functionality*							
	5.1	The system shall allow the user to adjust delivery prices	**Y**	**Y**	**Y**	**Y**			
	5.2	The system shall offer help while in use.	**Y**	**Y**	**Y**	**Y**			
	5.3	The system shall allow convenient searching for records/ data	**Y**	**Y**	**Y**	**Y**			
	5.4	The system shall produce formatted printed documents for all stored data	**Y**						
	5.5	The system shall have an appropriate backup in case of data corruption/loss. E.g. copy DB to a CD	**Y**						
	5.6	The system shall be secured against unauthorised access	**Y**						
	5.7	The system shall report by any time scale number of products bought and their type	**Y**				**Y**		
	5.8	The system shall allow remote access via Internet connection	**Y**						
	5.9	The system shall be able to produce quotations for all products	**Y**						
	5.10	The system shall automatically retrieve orders from the website	**Y**						
	5.11	The system shall allow emails to be sent to customers	**Y**						
Non Functionality									
	6.1	The system shall be easy to use.	**Y**	**Y**	**Y**	**Y**			
	6.2	Real time updating	**Y**	**Y**	**Y**	**Y**			

4. Possible solutions

There are a number of existing products available that use technology to help with the running of a business only a few how ever are specially designed for the flower industry. Below is a list of these products with a brief description of the functions that they provide which would help in the running of FFF. Also a number of bespoke solutions will also be included that will take into account the business problem in there design.

4.1 Existing Alternatives

CSA Customer order processing

CSA customer order processing is created by CSA data solution some of the functions they include are:

- Customers can be retrieved by account number, name, zip code, phone number, or city.
- New customers can be added to the system during order entry.
- Existing customers can have their account information displayed and changed as part of the order taking process.
- Retrieves all open orders for a customer.
- Allows previous sales information for a customer to be displayed.
- Items can be retrieved by item number, description, manufacturer's item number, or customer item number.
- Displays the extended sales description for a product upon request.
- Processes cash advances with the order.
- Comprehensive Sales Analysis Module
- Allows invoices to either be generated individually and included with the shipment, or generated as a batch and mailed to the customer.
- Supports customer contract pricing
- Maintains separate price list for each customer type.

Visual Ticket MicroFlorist Floral Management Systems, Florist Point of Sale Software

Visual Ticket MicroFlorist Floral Management Systems, Florist Point of Sale Software is created by floral systems some of the features are:

- Visual Ticket is time tested tough.
- Visual Ticket is one of the first Windows-based florist software systems in the floral industry and now boasts over a thousand users.
- Each System is individually configured for the shop needs.
- Features can be added
- Print Invoices or Statements in Seconds by clicking a few buttons.
- Map your deliveries automatically
- Each item can have a Regular Price and an Adjusted Price.
- Record and play back both Video and Audio for customer messages on enclosure cards, production instructions, etc.
- Agents run in the background and do chores that otherwise you would have to wait for them to execute.

florist2florist

Florist2florist is an online business that offers an alternative to Teleflorist and Interflora. The ordering system is preliminary for florist to florist transactions but has the capabilities to be used as a customer ordering system. Functionality includes:

- It offers a relay service between florists
- Orders paid before delivery
- Full relay returns printed and sent to you
- Orders passed to the executing shop for you
- Florist makes 20% on all orders sent
- Nice big buttons make it easy to follow
- On screen pictures.
- The program will re-size the pictures if own are added
- Enter the card message and the f2f program will print the cards for you

Orderwise

Orderwise stock control and order processing software is sage integrated business solution. Some of it functionality is:

- Comprehensive User Manual
- Quick Key Reference
- Implementation Note Paper
- Vast module add ons
- POS system
- Locate customer records
- Create new Sales Orders
- Quotations
- Previous order details can be displayed and edited
- Quotations converted into orders and customer pricing checked.

ACCess To Go

ACCess To Go offers a range of ready made databases and modules for use with Microsoft Access. Some of these are Simple Sales Orders & Invoices Database and contact relationship manger. Functionality of these are:

- Variable tax rates per product item.
- Straight forward order entry; select a customer or enter a new one, list the items and issue the invoice, optionally print a delivery note as well.
- No stock or price lists to maintain; it remembers items you have entered on previous orders and offers them again in the pick list with the last price and tax rate you charged, select or enter a new item.
- Optionally record payment received against invoices issued.
- View customer records on screen with basic contact details and information about invoices issued, payments received and items ordered.
- So simple to use for single or multiple users to share.
- Fully customisable, you can add your own additional functionality (the database is not locked, so you can change or add whatever you need
- Record actions against contacts; actions you have taken or that need to be taken. Assign them to yourself or another user for action by a due date
- Record actions against contacts; actions you have taken or that need to be taken. Assign them to yourself or another user for action by a due date

4.2 Generated solutions

4.2.1 Microsoft Access Database

Microsoft Access is a simple to use database application. Its main points are:

- Can be used to store, process, and maintain information.
- Can be used everyday and will run on the shops PC.
- Forms can make data entry simple.
- Report function in access could be used to generate reports about any data that is held in the database. E.g. products, sales, orders and contact details
- Compatibility with other Microsoft products

4.2.2 Web-based Solution

A web-based solution will involve the development of an underlying database and be accessed by such technologies as ASP. Main points about solutions are:

- Work can be done online from any location
- Requires a server (could be a PC but would need to be always on)
- The server needs to be always connected to the internet
- Requires joining of two technologies e.g. My SQL and ASP

4.2.3 Microsoft SQL Server Database

Microsoft SQL is a similar solution to Microsoft Access; however it has more functions and allows greater freedom in design. Solutions main points:

- Interfaced designed separately from database.
- Information could be held on a network PC and accessed remotely
- Can be accessed by many users simultaneously
- Freedom of database design
- Can be run on a desktop PC or a server.

4.2.4 Spreadsheet-based Solution

A spreadsheet solution using such software as Microsoft Excel could be an option for the solution. Main points of this solution are:

- Contains a variety of functions
- Produce charts and graphs easily
- Macros can be used to help automation
- Can handle calculation easily
- Can be used on a desktop PC

5. Evaluation of solutions

Solution	Evaluation	Possible solution
CSA Customer order processing	This product offers a lot of the needed functionality that is required for the specification but I feel its offers to many functions that are not needed for this solution. Having many function may mean that the ones required by FFF may not be easy to use and it will add added complexity which is the opposite of what they require. The cost of this product is too expensive to be a worth while solution.	**No**
Visual Ticket MicroFlorist Floral Management Systems, Florist Point of Sale Software	This offers a full IT solution for a flower company from point of sale through to customer details processing. This would be a good solution if they where starting from scratch. They already have EPOS infrastructure in the shop so this solution again would be too large for their FFF. The cost of this solution is also too great for the company.	**No**
florist2florist	This would be a good solution if FF was not already part of Teleflorist. The actual ordering a customer management side isn't the main use of the program so it doesn't offer the functionality needed for the ideal solution.	**No**
Orderwise	This again has the same issues as CSA	**No**
ACCess To Go	This is a good solution it isn't to expensive but a least two modules would be required to cover some functionality required so this would increase costs. Large amounts of customisation would be needed and the modules would need joining together. What at first looks like a good solution would require a lot of work which could be greater than creating a new solution. With the customisation of other peoples work it is often difficult to understand why things are as they are and difficult to gain extra functionality required.	**Yes**
Microsoft Access Database	This would give the freedom to create a solution with all of the functions required and with its easy to create forms for entering data it would be possible to create an attractive and personal solution. This solution how ever wouldn't be suitable for	**Yes**

	many multiple users. Also using internet technologies may prove difficult with access.	
Web-based Solution	This would give the freedom to create a solution that has the functionality required. One draw back is that the PC will always have to be on or always have access to the internet which just isn't practical for FFF.	**No**
Microsoft SQL Server Database	This again causes the problem that a server would be needed to run the solution. A server would cost FFF to much money. It could however be run on FFF's PC. Multi user appeal would not be needed for an FFF solution. However the cost of Microsoft SQL Server id far grater than the budget available.	**No**
Spreadsheet-based Solution	It would be difficult to incorporate working practices into a spreadsheet. The spreadsheet would soon become too large for all the information. Once a spreadsheet gets over a certain size and contains many macros they slow both the PC and the software down. This would not be a good solution.	**No**

6. Chosen Solution

The chosen solution for this project will be a self designed and implemented Microsoft Access system. I have chosen this over the ACCess TO GO solution because by designing the solution myself I will be able to design in the functionality needed rather than trying to customise an already built system. ACCess TO GO would also be too costly once the required modules were purchased. MS access provides a very good form building tool that will allow me to design and implement a good user interface, it will also allow me to change sections around easily on forms as the user requires. Its report creating features also make it a good choice for a solution as with this I will be able to implement all the reports that are required by the user.

7. Other issues to be addressed

d. Ethical issues

The legal issues surrounding the development and use of an IT solution are those such as ensuring that the staff do not feel replaced and that they feel they are part of the new system and it will infact be a tool for them to use rather than a replacement.

e. Safety issues

The safety issues surrounding the development and use of an IT solution are those such as ensuring that the PC or laptop is in a secure place away from water. Wires must be tidied away so no one may trip over them. Health issues regarding the use of PC s and laptops over long periods of time, such as Repetitive Strain Injury (RSI) and eye- strain and other ergonomic problems. This should not an issue as they already have a laptop in place.

f. Legal issues

The legal issues surrounding the development and use of an IT solution are those such as ensuring that the software used has all of the correct licenses.

8. References

Existing solutions:

CSA Customer order processing
URL: **http://www.csadata.com/fr_cp.html/** [Accessed: 28th January 2005]
Visual Ticket MicroFlorist Floral Management Systems, Florist Point of Sale Software
URL: **http://floralsystems.com/pages/881394/index.htm** [Accessed: 28th January 2005]
florist2florist
URL: **http://www.florist2florist.com/software.php** [Accessed: 6th February 2005]
Orderwise
URL: **http://www.orderwise.co.uk/stock_control_pricing.htm** [Accessed: 6th February 2005]
ACCess To Go
URL: **http://www.accesstogo.org.uk/SimpleSalesOrders.html** [Accessed: 6th February 2005]

Appendix F – Prioritorised Specification

Prioritisation of specification

Allocation	No.	DESCRIPTION	STAKEHOLDERS					
Related groups of Stakeholder Needs	Reference Number	Description of the Stakeholder Need	Essential (E), Possible (P), Not be implemented (N) Managers	Florists	Shop Assistant	Delivery Driver	Supplier	Teleflorist

Ordering		*This is all of the needs to do with the ordering of goods*							
	1.1	The system shall allow standard flower orders to be created	**E**	**Y**	**Y**	**Y**	**Y**		**Y**
	1.2	The system shall allow wedding orders to be created	**E**	**Y**	**Y**	**Y**	**Y**		**Y**
	1.3	The system shall allow with sympathy flower orders to be created	**E**	**Y**	**Y**	**Y**	**Y**		**Y**
	1.4	The system shall allow orders to be amended if they are not complete	**E**	**Y**	**Y**	**Y**	**Y**		
	1.5	The system shall allow orders to be placed for Monday to Saturday delivery	**E**	**Y**	**Y**	**Y**	**Y**		
	1.6	The system shall allow orders to be placed between 8-6 for delivery	**E**		**Y**	**Y**	**Y**		
	1.7	The system shall allow for non delivery days to be set.	**E**	**Y**	**Y**	**Y**	**Y**		
	1.8	The system shall allow for delivery times to be set either at before, after or between a certain times.	**E**		**Y**	**Y**	**Y**		
	1.9	The system shall allow orders to be viewed on screen or printed out	**E**	**Y**	**Y**	**Y**			
	1.10	The system shall make it possible for the user to know what orders they have for any day.	**E**						
	1.11	The system shall allow for each type of product to be ordered	**E**		**Y**	**Y**			
	1.12	The system shall allow store the card message for the order.	**E**		**Y**	**Y**			
	1.13	The system shall automatically add on the delivery charge.	**E**	**Y**	**Y**	**Y**			
	1.14	The system shall allow multiple orders for a customer to be created	**E**	**Y**					
Customer Account Management		*This is all of the needs to do with the customer detail management side*							
	2.1	The system shall record the customer details	**E**	**Y**		**Y**			
	2.2	The system shall allow the customer details to be viewed on screen and printed out.	**E**	**Y**		**Y**			
	2.3	The system shall allow customer details to be amended and deleted	**E**	**Y**		**Y**			
	2.4	The system shall record customer dates, e.g. Birthdays	**E**	**Y**		**Y**			
	2.5	The system shall allow customers to be grouped	**E**	**Y**		**Y**			

	2.6	The system shall produce invoices each month for the customers who have accounts	**E**	**Y**						
	2.7	The system shall tell the user at any time who owes the user money and how much and for which customers.	**E**	**Y**						
	2.8	The system shall produce invoices for the customers who have accounts at any time.	**E**	**Y**						
	2.9	The system shall allow actions to be created against customers	**P**	**Y**						
Products		*This section is to do with the products and there details*								
	3.1	The system shall store product details	**E**	**Y**						
	3.2	The system shall allow a minimum price to be entered for products	**E**	**Y**						
	3.3	The system shall allow product details to be amended or deleted	**E**	**Y**						
	3.4	The system shall allow the product details to be viewed on screen and printed out.	**E**	**Y**						
	3.5	The system shall store product pictures	**P**	**Y**						
Delivery		*This section is all needs to do with delivery*								
	4.1	The system shall allow all the deliveries to be viewed on screen and printed out.	**E**	**Y**		**Y**	**Y**			
	4.2	The system shall allow all the deliveries for a certain day to be viewed on screen or printed out.	**E**	**Y**		**Y**	**Y**			
	4.3	The system shall allow all the deliveries for a certain time period to be viewed on screen or printed.	**E**	**Y**		**Y**	**Y**			
	4.4	The system shall organise the deliveries in chronological order	**E**	**Y**		**Y**	**Y**			
	4.5	The system shall plan a route of a delivery if the location is unknown	**P**	**Y**		**Y**	**Y**			
	4.6	The system shall find a delivery location if unknown	**P**	**Y**						
Functionality		*This section is all needs to do with functionality*								
	5.1	The system shall allow the user to adjust delivery prices	**E**	**Y**	**Y**	**Y**	**Y**			
	5.2	The system shall offer help while in use.	**N**	**Y**	**Y**	**Y**	**Y**			

	5.3	The system shall allow convenient searching for records/ data	**E**	**Y**	**Y**	**Y**	**Y**			
	5.4	The system shall produce formatted printed documents for all stored data	**P**	**Y**						
	5.5	The system shall have an appropriate backup in case of data corruption/loss. E.g. copy DB to a CD	**E**	**Y**						
	5.6	The system shall be secured against unauthorised access	**P**	**Y**						
	5.7	The system shall report by any time scale number of products bought and their type	**E**	**Y**				**Y**		
	5.8	The system shall allow remote access via Internet connection	**P**	**Y**						
	5.9	The system shall be able to produce quotations for all products	**E**	**Y**						
	5.10	The system shall automatically retrieve orders from the website	**P**							
	5.11	The system shall allow emails to be sent to customers	**P**							
Non Functionality		*This section is for non functional needs*								
	6.1	The system shall be easy to use.	**E**	**Y**	**Y**	**Y**	**Y**			
	6.2	Real time updating	**E**	**Y**	**Y**	**Y**	**Y**			

Appendix G – Descriptive Specification

Signed of by FFF

Fone For Flowers

Information System Specification

Ordering:

- The system shall handle all of the orders that take place in the shop.
- It will allow non delivery days to be set and delivery times.
- Delivery times will be entered as either between after or before a time given.
- Orders will be able to be viewed on screen or printed out.
- Card details will be stored.
- Orders can be searched and reports created detailing orders for any day given.

Customer Accounts Management:

- Customer details will be recorded
- The system shall allow customer information to be viewed searched and grouped.
- Invoices will be able to be produced.
- System shall record money owed, paid and out standing.
- Special dates can be recorded against customer information

Products:

- Product detail shall be stored on the system
- The details can be viewed searched and amended
- It will hold details such as Teleflorist code, minimum price etc

Delivery:

- Delivery detail shall be stored, searched and viewed on screen and printed out.
- A day's delivery can be viewed or any other future day.
- Deliveries shall be viewed in the order they are required.

Functionality

- The system shall be easy to use
- Offer sales reports of products ordered
- Create quotations for customers

I accept this specification  Date 17/02/06

Appendix H – Normalisation
Normalisation

Below shows the initial un-normalised form as well as the finalised third normal form. In order to go from un-normalised to third normal form the elations had to go through two other normal forms; first and second normal form. In order to move from un-normalised to first normal form, a table must contain no repeating attributes or groups of attributes. For example, the un-normalised form could contain multiple orders made by one customer; therefore this is removed and placed in a new table called Order. This is repeated until there are no repeating attributes in the Customer table. The Customer table's primary key is also inserted as a foreign key to the newly created relations, so that they are linked to the Customer table.

All attributes in an entity must be functionally dependent with the primary key for second normal form. The primary key must be able to uniquely identify each attribute; if this is not the case then the attributes must be placed in a new table. For example, the customer detail would not be uniquely identified by the Order table's primary key as a customer may have more than one order; therefore it is removed from the table and placed in its own table. This process is repeated so that each attribute in the table can be identified by the table's primary key. Again the primary key is also inserted as a foreign key to the newly created relations.

The third and final normal form requires that there is no 'non- key dependencies'. If there are any, then the attributes are placed in a new table. For example the product in any particular order is dependent on the OrderID and not on the CustomerID, therefore this is placed in a new table called ProductOrder. This process is repeated on all tables to ensure that there are no functional dependencies existing between attributes.

Un-Normalised Form

CUSTOMER (CustomerID, CustomerGroupID, Title, Firstname, Lastname, Address1, Address2, Address 3, Town, County/City, PostalCode, CompanyName, Phone, Workphone, Mobilephone, FaxNumber, Email, Notes, CreditNumber, SecurityDigit,
Createdate, Deliverydate, Timetype, Deliverytime1, Deliverytime2, DeliveryAddress1, DeliveryAddress2, DeliveryAddress3, Deliverytown, Deliverycounty/city, DeliveryPosatalcode, DeliveryNotes, Paid, Paidhow, Totalprice, Completed, Deliverycharge**,** QuoteID, CustomerID, Createdate, Notes, Totalprice, Deliverycharge, Createdon, CustomerGroupID, Groupname,

Description**,** ActionID, CustomerID, Action, CreateDate, Duedate, Completed, ImportantID, CustomerID, Description, Date, NondelID, Nondeliveryname, Nondeliverydate, Reason, ProductID, ProductName, Productdescription, MinimumPrice, Picture, TelefloristCode, OrderID, CustomerID, OrderID, ProductID, Qty, Priceperitem, Totalprice, Description, Card, QuotationID, ProductID, Qty, Priceperitem, Totalprice, Description, Card)

Third Normal Form (3NF)

CUSTOMER (CustomerID, CustomerGroupID, Title, Firstname, Lastname, Address1, Address2, Address 3, Town, County/City, PostalCode, CompanyName, Phone, Workphone, Mobilephone, FaxNumber, Email, Notes, CreditNumber, SecurityDigit, Createdon)
CUSTOMERGROUP (CustomerGroupID, Groupname, Description)
ACTION (ActionID, CustomerID, Action, CreateDate, Duedate, Completed)
IMPORTANTDATES (ImportantID, CustomerID, Description, Date)
NONDELDAYS (NondelID, Nondeliveryname, Nondeliverydate, Reason)
PRODUCTS (ProductID, ProductName, Productdescription, MinimumPrice, Picture, TelefloristCode)
ORDERDETAIL (OrderID, CustomerID, Createdate, Deliverydate, Timetype, Deliverytime1, Deliverytime2, DeliveryAddress1, DeliveryAddress2, DeliveryAddress3, Deliverytown, Deliverycounty/city, DeliveryPosatalcode, DeliveryNotes, Paid, Paidhow, Totalprice, Completed, Deliverycharge)
QUOTEDETAIL (QuoteID, CustomerID, Createdate, Notes, Totalprice, Deliverycharge)
PRODUCTORDER (OrderID, ProductID, Qty, Priceperitem, Totalprice, Description, Card)
PRODUCTQUOTE (QuotationID, ProductID, Qty, Priceperitem, Totalprice, Description, Card)

Appendix I - Usability

Nielsen's points of usability

There are ten Points of Usability which Nielsen claims will create a system that is both technically efficient and highly usable if they are all met:

1. Visibility of system status: The user should always be informed of what the system is doing, for example if the website searching for a building plan the user should be informed that the system is checking for the specific data instead of viewing a blank screen.

2. Match between system and the real world: The system should reflect the real world as much as possible. In particular language needs to resemble the terms and phrases of the user, instead of technical jargon, thus they can operate the system without learning new terminology.

3. User control and freedom: The user should always feel comfortable that they would be able to escape any mistakes made as this increases their confidence in a system.

4. Consistency and standards: The website should follow convention so that the user does not have to guess if certain words do certain actions, for example 'check-out' means to complete a purchase.

5. Error prevention: Although difficult to accomplish, an ideal scenario is where a system is carefully designed to prevent a problems from arising.

6. Recognition rather than recall: The user should not have to remember information from one place of the system to another, instead it should be visible to aid recognition.

7. Flexibility and efficiency of use: The system should accommodate both novice and technical users. Flexibility ensures that the novice has complete comprehension whilst the technical user is not frustrated.

8. Aesthetic and minimal design: Dialog messages should only contain essential information. This increases efficient problem solving as too much information may faze a user.

9. Help users recognize, diagnose, and recover from errors: Error messages should be in precise language whereby the solution should be comprehensible to the user rather than in code. This will aid novice users, as it develops their understanding where they went wrong and avoid future repetition.

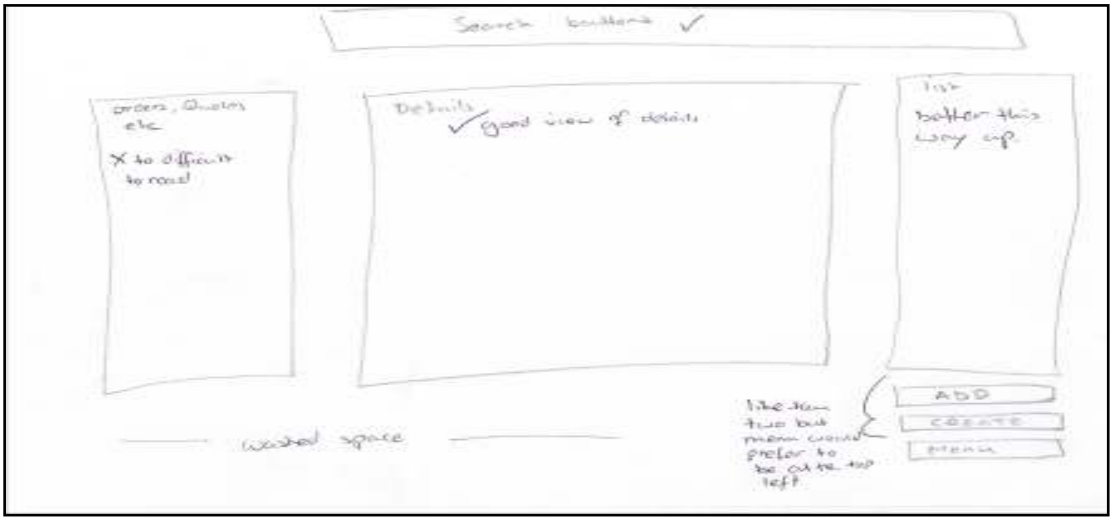
10. Help and documentation: There should be a help section that is fully searchable and is accessible by all levels of technical ability.

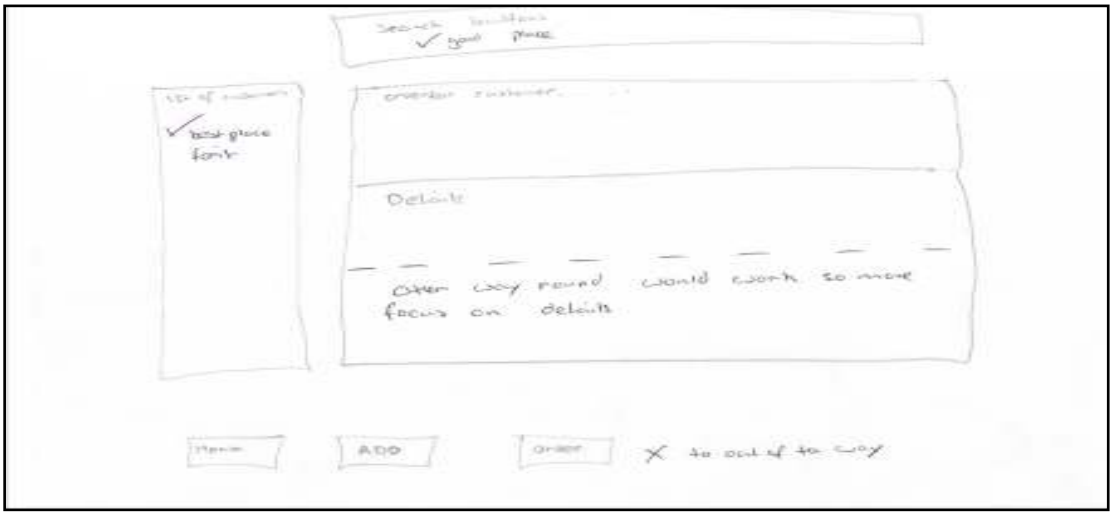
Appendix J – Form, Query and Report Design

Form Design

Rough sketches taking from the meeting when agreeing upon a finished design:







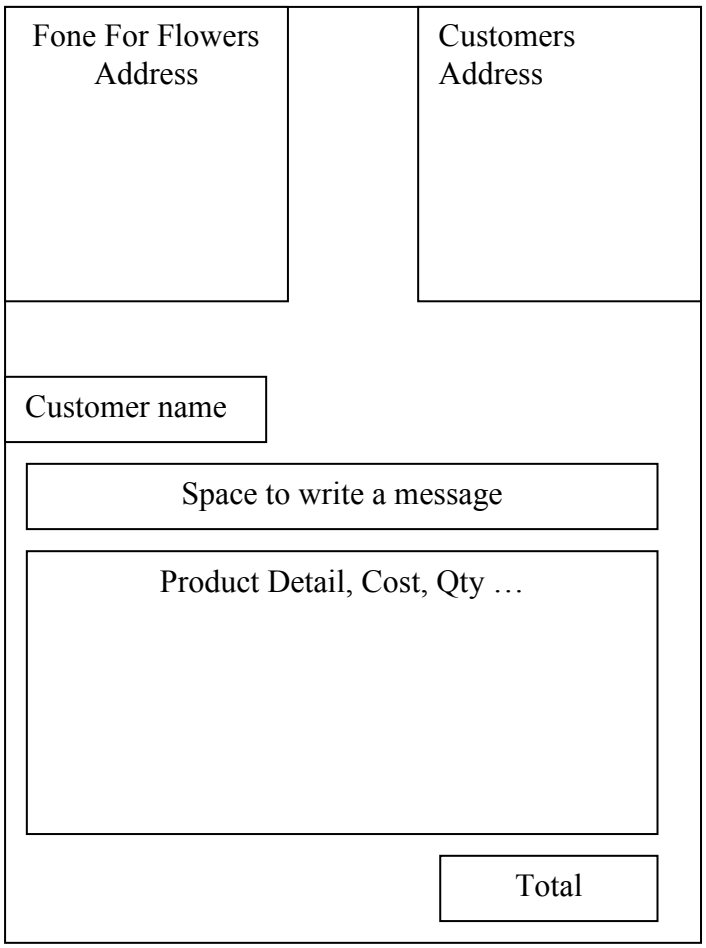
Query Design

Quotation report Query:

Select the customerID, customer name, address, quotationID, productID, product, name, qty, price,cost from the customer table and linking to the Quotation detail linking to the productquote table where the customerID and quoteID match the selected Qoutation.

Sales report Query:
Select orderedID. Createddate, productID, product name, Qty, Price, Cost from the Order detail and the product order table linking on the ordered primary and foreign key where the created date is with in the time range given.

Report Design
Quotation report layout:



Appendix K – Tables, Relationships, Forms, Reports, and Queries

Tables

Example of customer table created for the prototype:

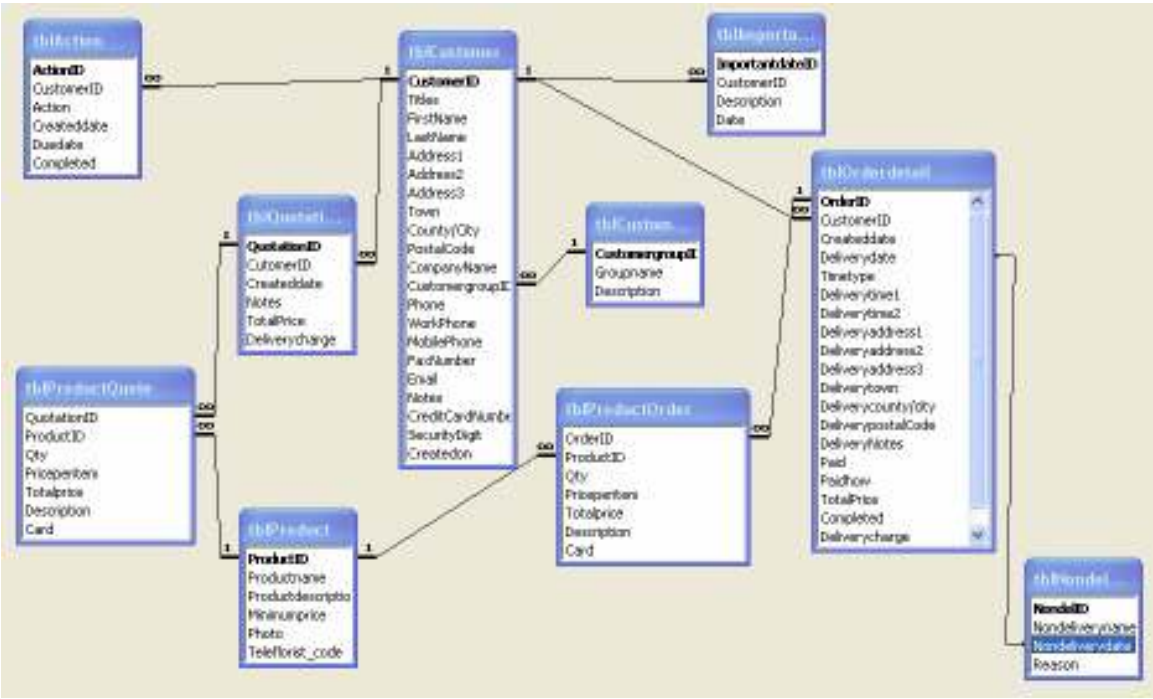
	Field Name	Data Type	
🔑	CustomerID	AutoNumber	Primary key
	Titles	Text	
	FirstName	Text	
	LastName	Text	Cannot be Null
	Address1	Text	
	Address2	Text	
	Address3	Text	
	Town	Text	
	County/City	Text	
	PostalCode	Text	
	CompanyName	Text	
	CustomergroupID	Number	Linked to customer group table
	Phone	Text	
	WorkPhone	Text	Text field incase () are needed
	MobilePhone	Text	Text field incase () are needed
	FaxNumber	Text	Text field incase () are needed
	Email	Text	
	Notes	Memo	Memo as text is to short
	CreditCardNumber	Text	
	SecurityDigit	Text	
	Createdon	Date/Time	default value date()

General | Lookup

Field Size	Long Integer
New Values	Increment
Format	
Caption	CustomerID
Indexed	Yes (No Duplicates)

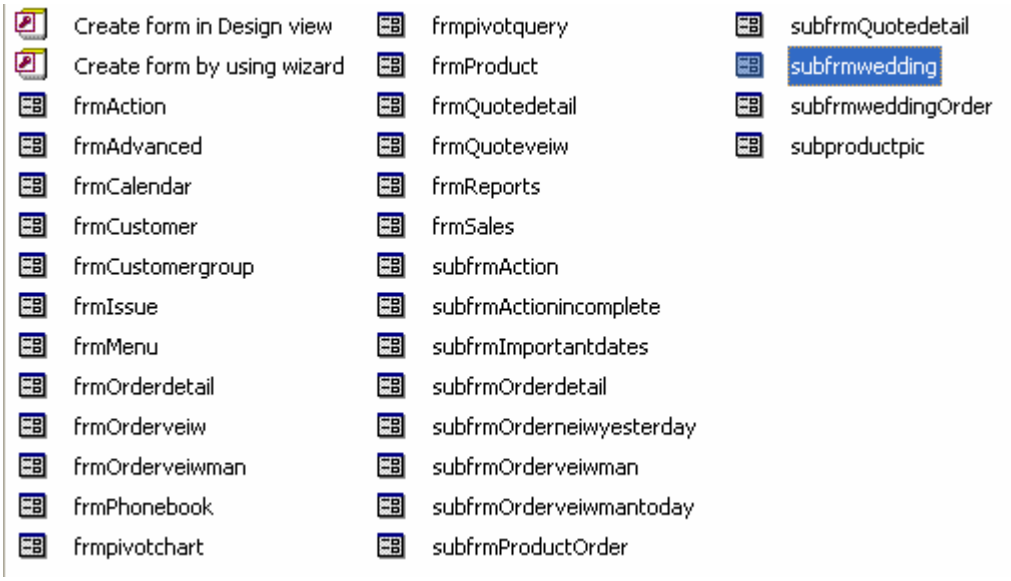
Relationships

A Screen shot of the relationships shown in Access.

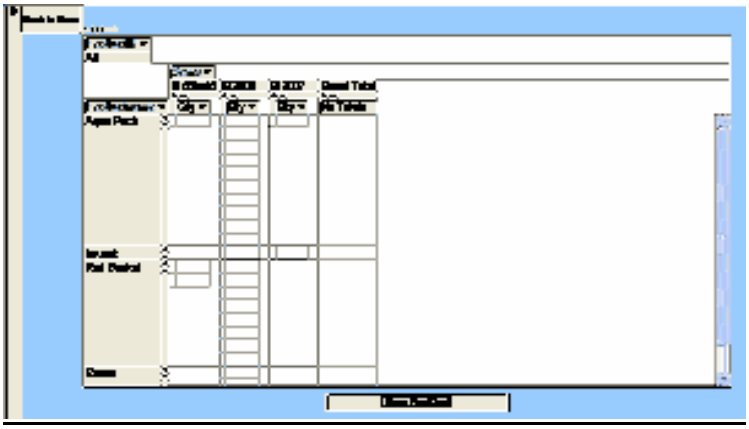


Forms

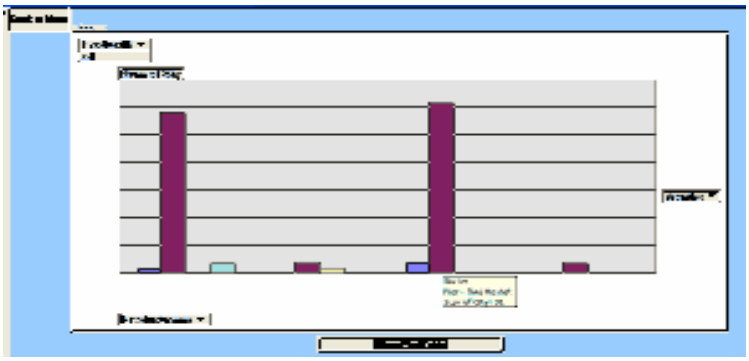
A screenshot of all the forms created for the prototype below:



Sales form

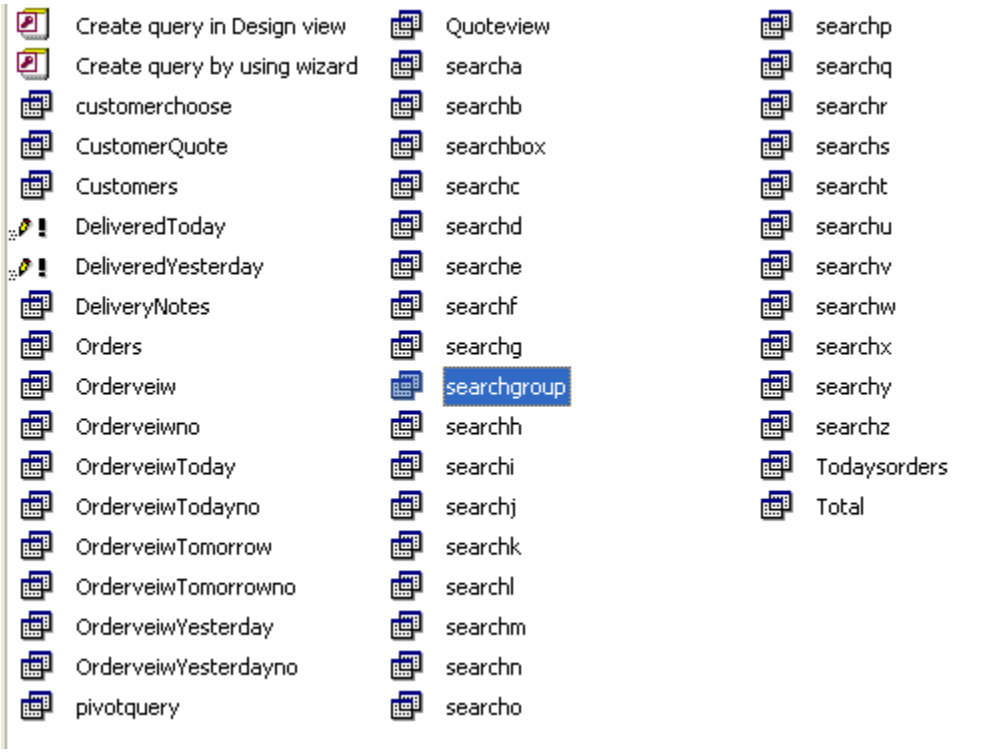


Numerical view, press of a button changes to the view below.



Queries

All of the queries created for the prototype, there are both update and result queries.



Appendix L - Visual Basic Code

Changing of the subform code:

```
Private Sub specialdates_Click()
[Customer Subform].SourceObject = "subfrmImportantdates"
End Sub
```

Search Box – Customer Form :

```
Private Sub searchbox_Change()
'Uses SQL to query the database and find the correct record
Dim strSQL As String
   strSQL = "SELECT * FROM tblCustomer WHERE (tblCustomer.LastName Like '" &
Me.searchbox.Text & "*') ORDER BY tblCustomer.LastName"
   Set db = OpenDatabase(CurrentDb.Name)
   Set rs = db.OpenRecordset(strSQL, dbOpenSnapshot)

   If rs.RecordCount > 0 Then
      rs.MoveFirst
   Customers = rs!CustomerID
   End If

   Dim rs2 As Object
   Set rs2 = Me.Recordset.Clone
   rs2.FindFirst "[CustomerID] = " & Str(Nz(Me![Customers], 0))
   If Not rs2.EOF Then Me.Bookmark = rs2.Bookmark
```

Navigation between forms:

```
Private Sub Notes_DblClick(Cancel As Integer)
'Navigates the user to various forms

   Dim stDocName As String
   Dim stLinkCriteria As String

   stDocName = "frmQuotedetail"

   stLinkCriteria = "[QuotationID]=" & Me![QuotationID]
   DoCmd.Close
   DoCmd.OpenForm stDocName, , , stLinkCriteria

Exit_Create_Order_Click:
   Exit Sub

Err_Create_Order_Click:
   MsgBox Err.Description
   Resume Exit_Create_Order_Click
End Sub
```

Name of form navigating to

Setting a variable to be passed once the new form is opened, this is so the form shows the correct record.

Passing of the variable

Pictures – retrieval, storing, displaying and error message.

```
Private Sub Form_Current()
' Display the picture for the current employee record if the image
   ' exists.  If the file name no longer exists or the file name was blank
   ' for the current employee, set the errormsg label caption to the
   ' appropriate message.

   Dim res As Boolean
   Dim fName As String

   path = CurrentProject.path
   On Error Resume Next
      errormsg.Visible = False
      If Not IsNull(Me!Photo) Then
         res = IsRelative(Me!Photo)
         fName = Me![ImagePath]
         If (res = True) Then
            fName = path & "\" & fName
         End If

         Me![ImageFrame].Picture = fName
         showImageFrame
         Me.PaintPalette = Me![ImageFrame].ObjectPalette
         If (Me![ImageFrame].Picture <> fName) Then
            hideImageFrame
            errormsg.Caption = "Picture not found"
            errormsg.Visible = True
         End If
      Else
         hideImageFrame
         errormsg.Caption = "Click Add/Change to add picture"
         errormsg.Visible = True
      End If

End Sub
```

```
Sub getFileName()
   ' Displays the Office File Open dialog to choose a file name
   ' for the current product record.  If the user selects a file
   ' display it in the image control.
   Dim fileName As String
   Dim result As Integer
   With Application.FileDialog(msoFileDialogFilePicker)
      .Title = "Select Product Picture"
      .Filters.Add "All Files", "*.*"
      .Filters.Add "JPEGs", "*.jpg"
      .Filters.Add "Bitmaps", "*.bmp"
      .FilterIndex = 3
      .AllowMultiSelect = False
      .InitialFileName = CurrentProject.path
```

```
        result = .Show
        If (result <> 0) Then
            fileName = Trim(.SelectedItems.Item(1))
            Me![ImagePath].Visible = True
            Me![ImagePath].SetFocus
            Me![ImagePath].Text = fileName
            Me![Productname].SetFocus
            Me![ImagePath].Visible = False
        End If
    End With
End Sub
```

```
Private Sub ImagePath_AfterUpdate()
    ' After selecting an image for the employee, display it.
    On Error Resume Next
        showErrorMessage
        showImageFrame
        If (IsRelative(Me!ImagePath) = True) Then
            Me![ImageFrame].Picture = path & Me![ImagePath]
        Else
            Me![ImageFrame].Picture = Me![ImagePath]
        End If
End Sub
```

```
Sub showErrorMessage()
    ' Display the errormsg label if the image file is not available.
    If Not IsNull(Me!Photo) Then
        errormsg.Visible = False
    Else
        errormsg.Visible = True
    End If
End Sub
```

Using VB with applications

```
Private Sub EmailContact_Click()
  'Sending an Email
 Dim objOutlook As Outlook.Application
   Dim objOutlookMsg As Outlook.MailItem
   Dim objOutlookRecip As Outlook.Recipient
   Dim objOutlookAttach As Outlook.Attachment

   ' Create the Outlook session.
   Set objOutlook = CreateObject("Outlook.Application")

   ' Create the message.
   Set objOutlookMsg = objOutlook.CreateItem(olMailItem)
   If IsNull(Email) Then
    Email = "No email address for customer"
   End If
   With objOutlookMsg
```

```
        .To = Email
        .Subject = "Fone For Flowers"
     For Each objOutlookRecip In .Recipients
        objOutlookRecip.Resolve
        If Not objOutlookRecip.Resolve Then
        objOutlookMsg.Display
      End If

      Next
   End With
   Set objOutlookMsg = Nothing
   Set objOutlook = Nothing
End Sub
```

```
Private Sub map_Click()
  'Using Multimap
 Set ie = CreateObject("InternetExplorer.Application")
   ie.Visible = True
   ie.Navigate2 "http://www.multimap.com/map/browse.cgi?client=public&search_result=&db _
=pc&cidr_client=none&lang=&keepicon=true&pc=" & Me.PostalCode
End Sub
```

VB to speed up data entry.

```
Private Sub SameAddress_Click()

  Dim strSQL As String


  strSQL = "SELECT Address1, Address2, Address3, Town, [County/City], PostalCode FROM
tblCustomer WHERE CustomerID = " & Me.Customerchoose

    Set db = OpenDatabase(CurrentDb.Name)
    Set rs = db.OpenRecordset(strSQL)
    Deliveryaddress1.Value = rs.Fields(0).Value
    Deliveryaddress2.Value = rs.Fields(1).Value
    Deliveryaddress3.Value = rs.Fields(2).Value
    Deliverytown.Value = rs.Fields(3).Value
    [Deliverycounty/city].Value = rs.Fields(4).Value
     DeliverypostalCode.Value = rs.Fields(5).Value
```

```
Private Sub AM_Click()
Deliverytime1.Value = "12.00"
Timetype.Value = "1"
Forms!frmOrderdetail!Deliverytime2.Enabled = "False"
End Sub

Private Sub PM_Click()
Deliverytime1.Value = "12.00"
Timetype.Value = "2"
Forms!frmOrderdetail!Deliverytime2.Enabled = "False"
```

```
End Sub
```

```
Private Sub pound_Click()
Deliverycharge.Value = "£1.00"
End Sub

Private Sub Ctl3pound_Click()
Deliverycharge.Value = "£3.95"
End Sub

Private Sub plusfifty_Click()
I = Deliverycharge.Value
I = I + 0.5
Deliverycharge.Value = I
End Sub
```

Appendix M – User Manual

The user manual was produced for the technical abilities of FFF, because of the size of the user manual only extracts have been included. This includes the contents page and various other important sections.

Contents

Section 1 - Getting Started

Section 2 - Main Menu

Section 3 - Tasks

3.1 - Creating a Customer
3.2 - Creating an Order
3.3 - Creating a Quotation
3.4 - Viewing Orders
3.5 - Viewing Quotations
3.6 - Phone Book
3.7 - Reports

Section 4 – Advanced Menu

4.1 - Advanced Menu
4.2 - Adding a Product
4.3 - Contact Groups
4.4 - Actions

Section 5 – Customer Screen

5.1 - Searching
5.2 - Actions
5.3 - Special Dates
5.4 – Orders / Quotations

Section 6 – Order View Screen

6.1 – Searching Orders
6.2 – Marking as Delivered

Section 7– Quotation Viewing Screen

Section 8 – Quick Tips

Section 9 – Trouble Shooting

Section 1 - Getting Started

Opening and logging into the system

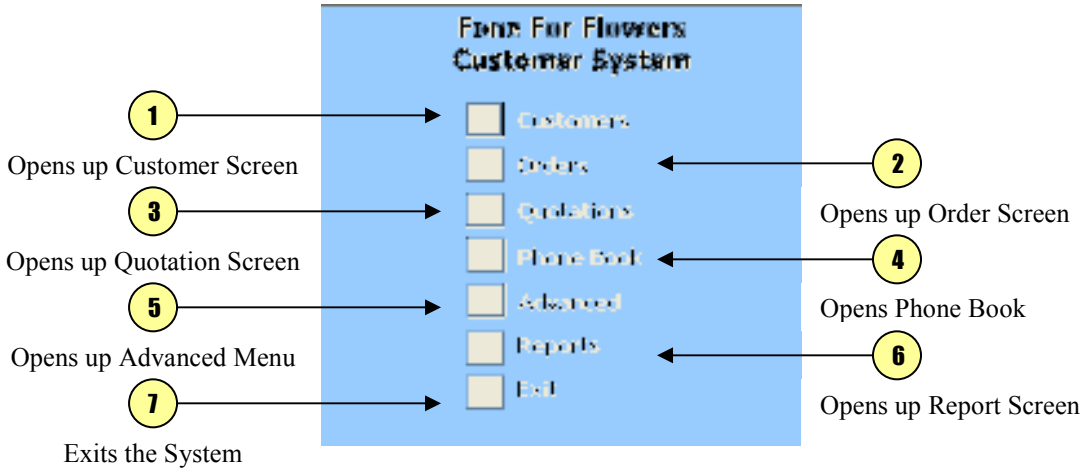




1. Double click on the desktop icon.
2. Enter Password and press OK.

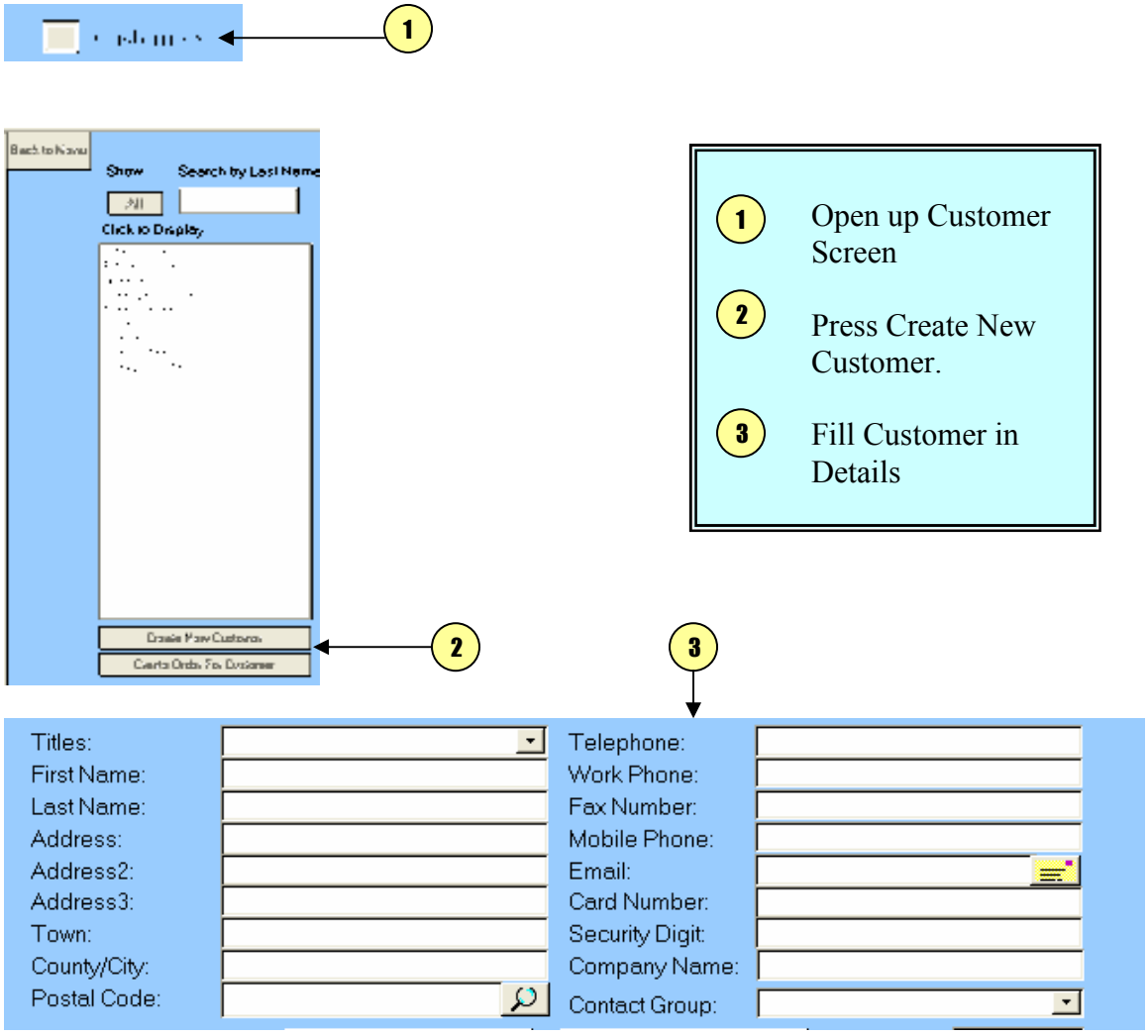
Section 2 - Main Menu

Main Menu Navigation



Section 3 - Tasks

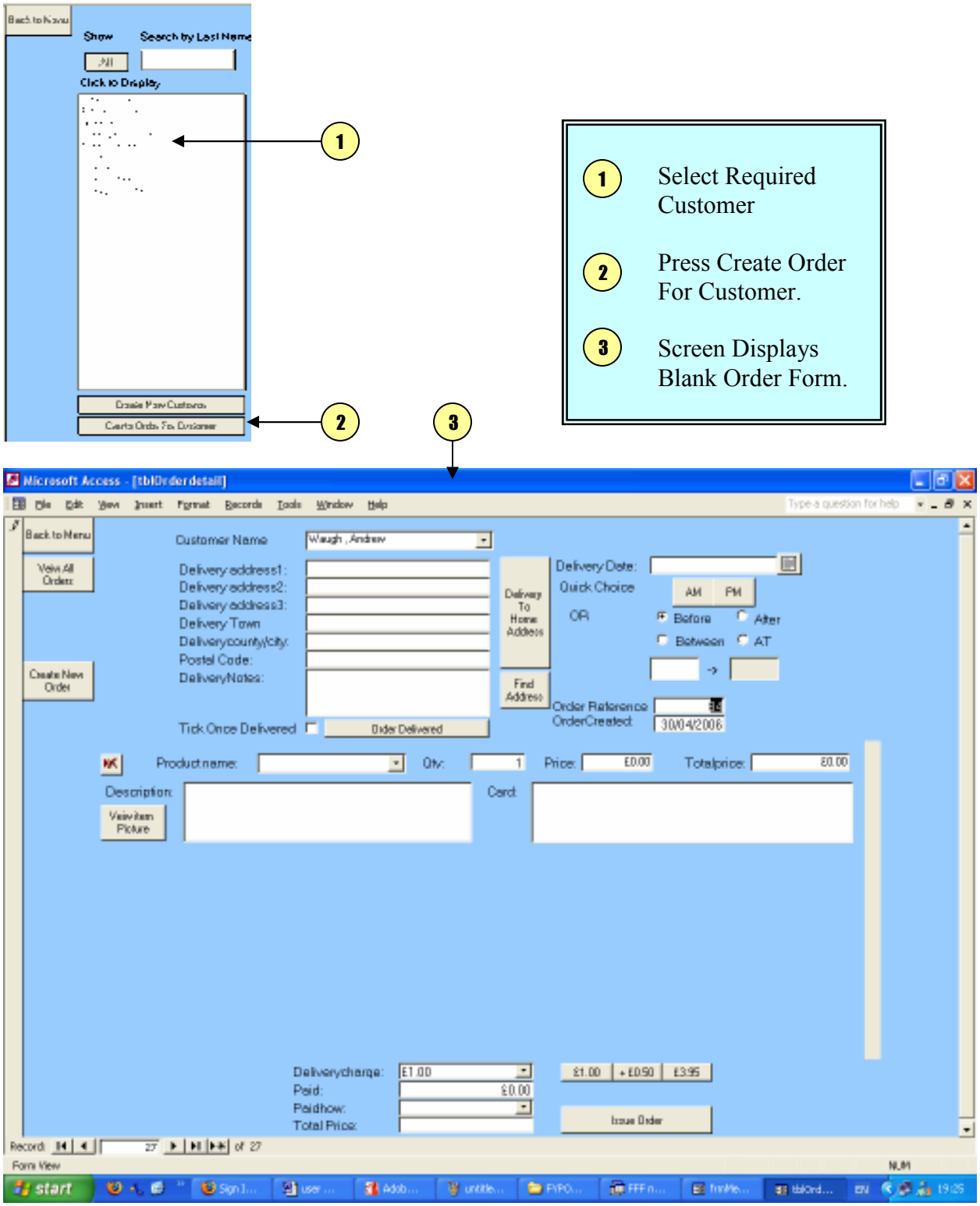
3.1 - Creating a Customer



1. Open up Customer Screen
2. Press Create New Customer.
3. Fill Customer in Details

3.2 - Creating an Order

Open up the customer screen as shown in section 3.1.



4 Fill in Delivery Address

5 To Insert Customers Address Press Deliver To Home Address Button

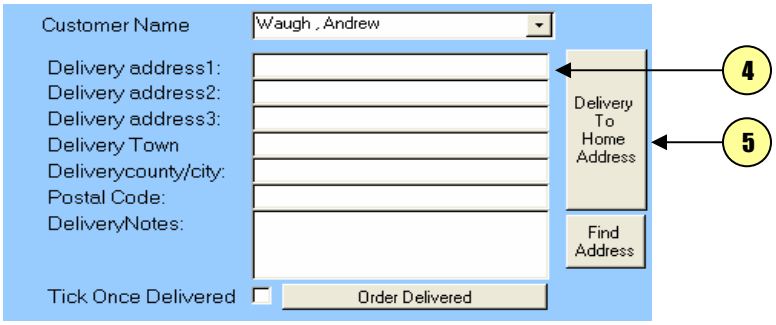
6 Fill in Delivery Time and Date.

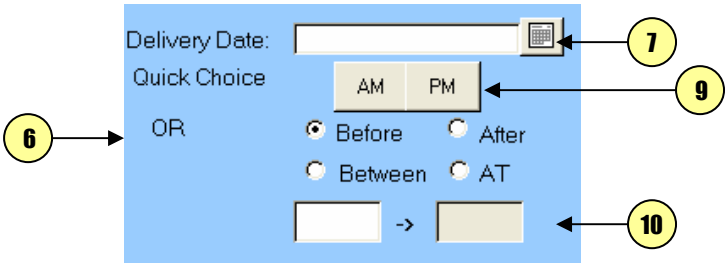
7 Press of the Button Opens Up Calendar

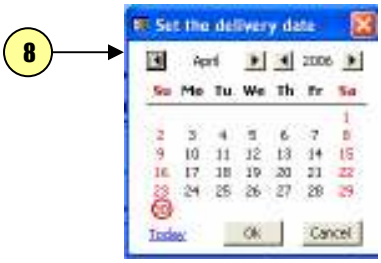
8 Select Date Using Calendar

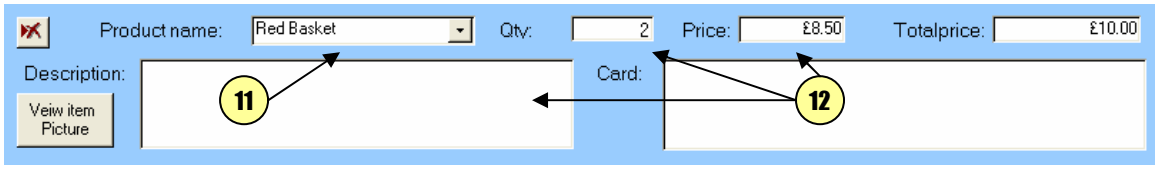
9 Press AM/PM and the Time Will be Filled in Accordingly

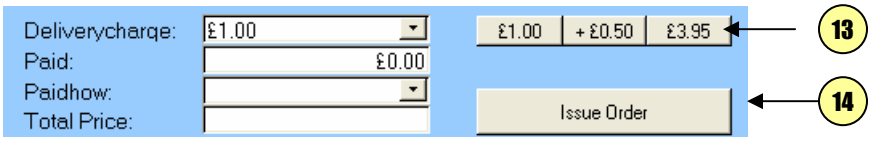
10 Or Fill in Manually











11 Select Product from List

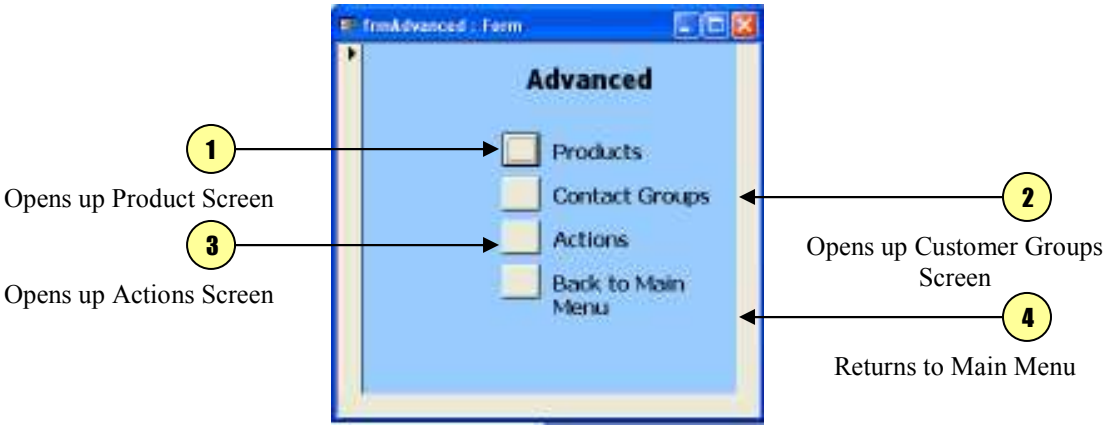
12 Fill in Price, Qty Description and Card

13 Add Delivery Cost

14 Once Order is Completed Press Issue Order.

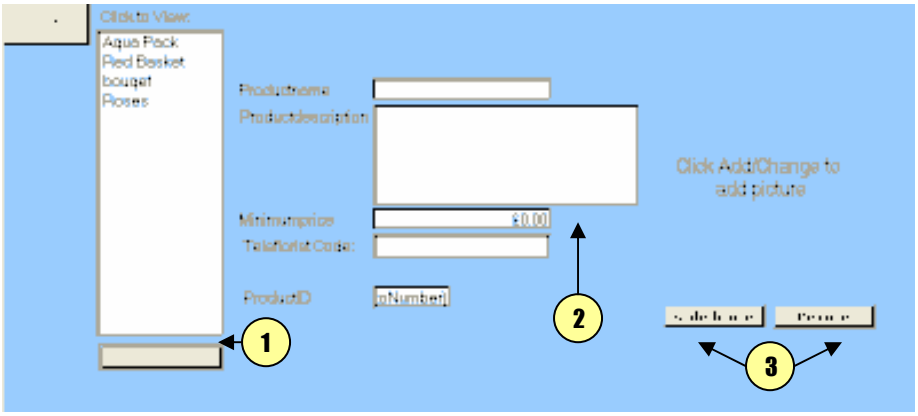
Section 4 – Advanced Menu

4.1 – Advanced Menu



4.2 – Adding a Product

Open the Product Screen by Pressing Products on the Advanced Menu



1. Press Create New Product
2. Add Details
3. To Add or Remove a Picture

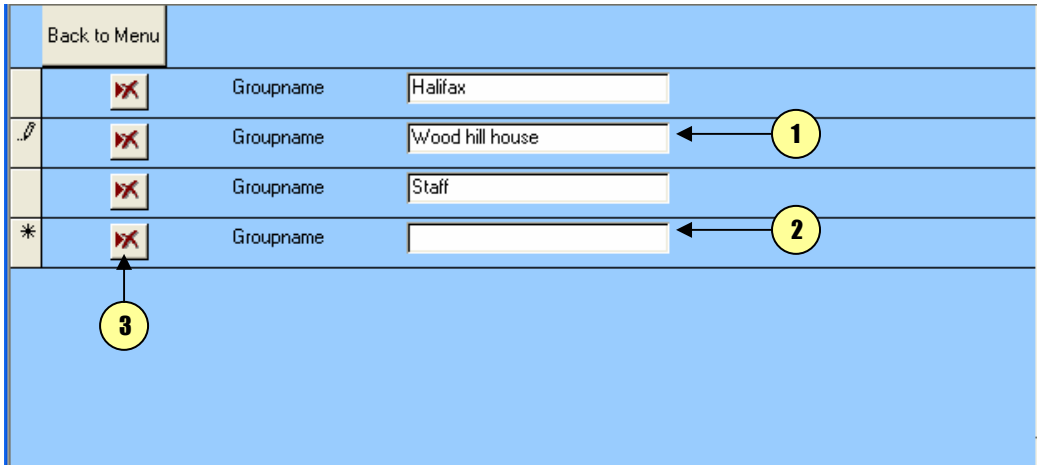
Adding a Picture

Once pressed, find and select picture, press ok and the picture will be stored against the product.



4.3 - Contact Groups

To access contact groups press Contact Groups on the Advanced Menu.

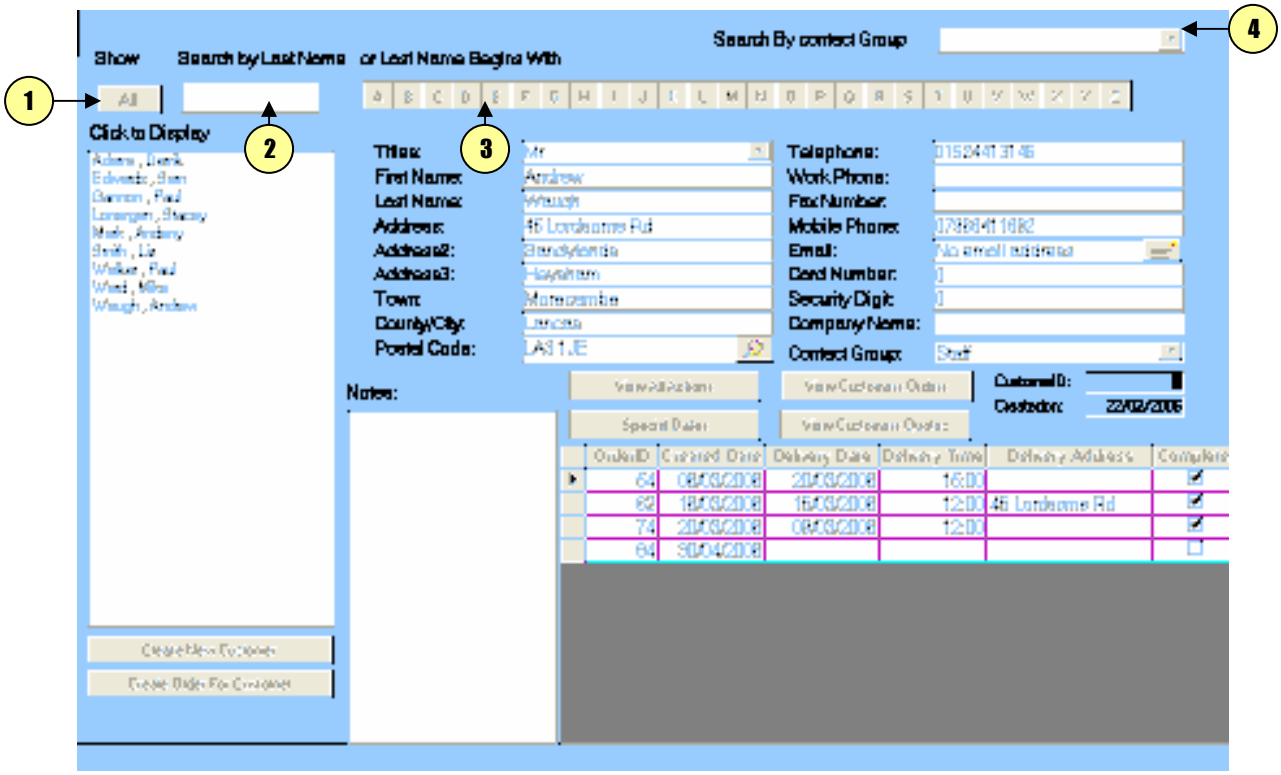


1. To Edit a Group Name Over Type what is Already in the Box
2. To Add a Group Type the Group Name into the Blank Space
3. To Delete a Group Press the Delete Button

Section 5 – Customer Screen

5.1 – Searching

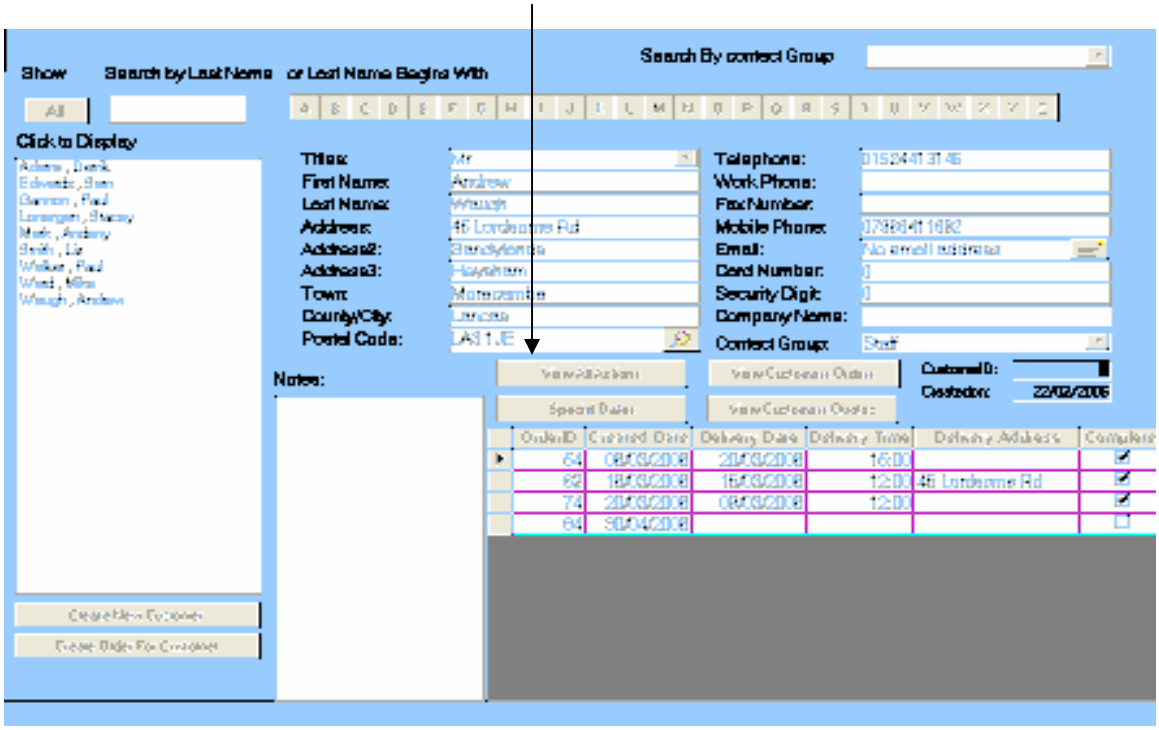
There are many ways to search for a customer; they all require the customer screen to be open. Open the customer screen from the main menu.



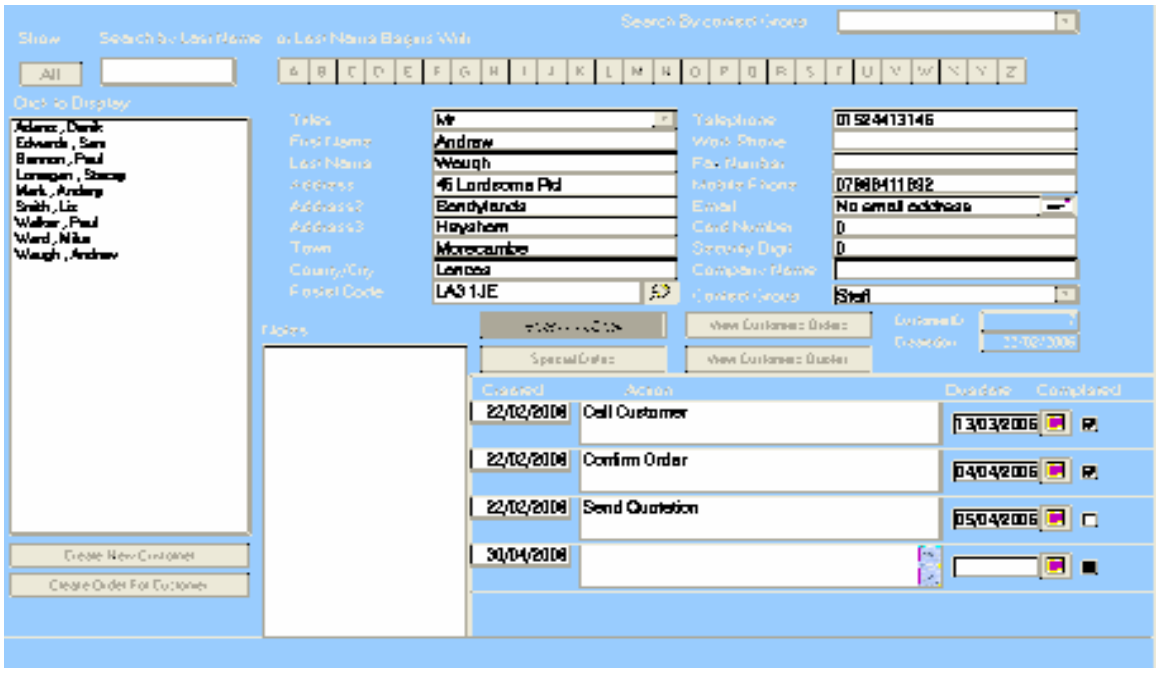
1	This button shows all Customers In the box below it.	2	Typing in part or all of a customers surname will navigate to that customer.
3	Press the require letter will display all customers whos last name begin with that letter	4	Selecting a customer group it will display all customers who belong to that group

5.2 – Actions

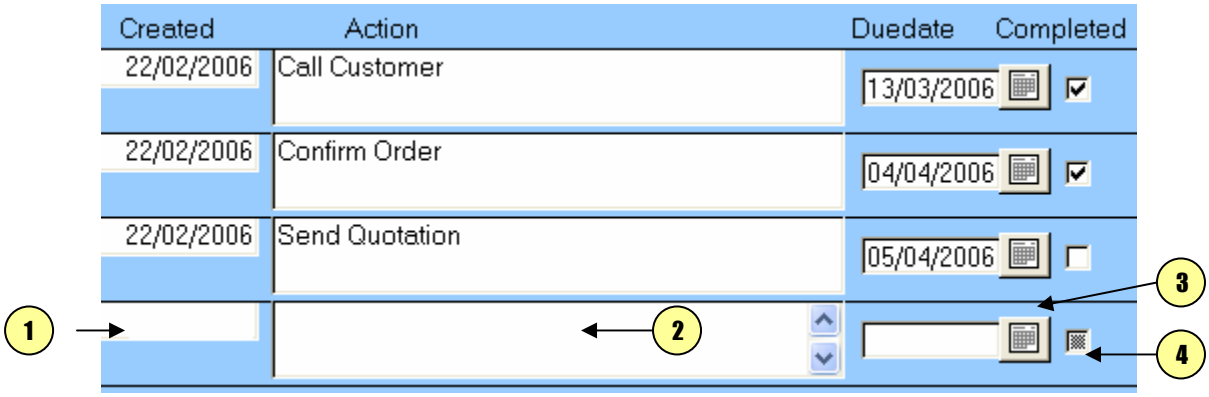
To store an Action against a customer the customers details must firstly be on screen. Once on screen press the "View All Actions" button.



The screen will then show the actions for that customer. As Shown below:



Creating a Action

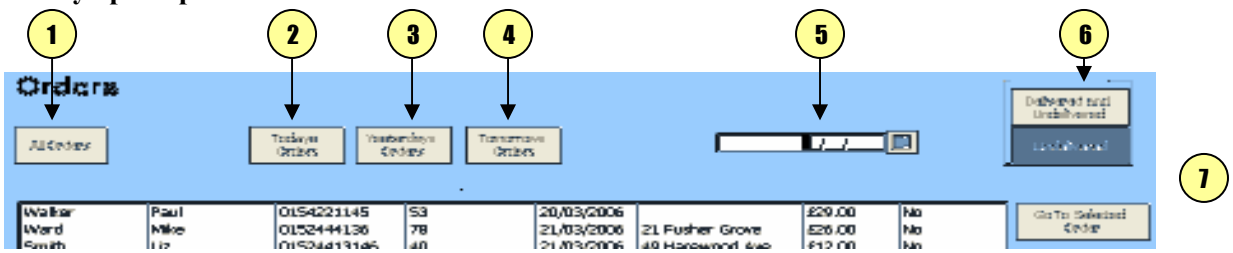


1. Created Date is automaticly filled in once type in description.
2. Decription of Action
3. Pressing brings up calendar to add a due date
4. Tick once action is completed

Section 6 – Order View Screen

6.1 – Searching For Orders

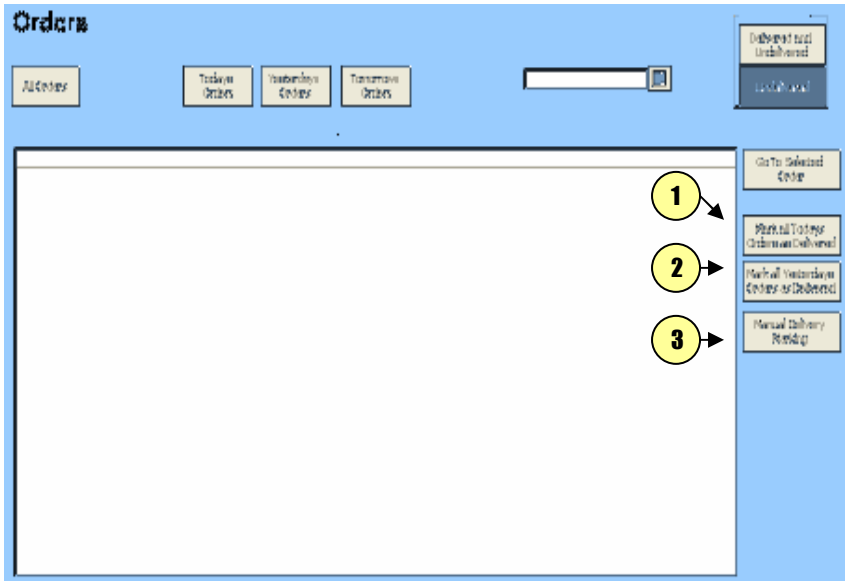
Firstly open up the Order View screen via the main menu.



1 Press to view all orders in the system	2 Shows todays orders only
3 Shows yesterdays orders only	4 Shows tomorrows orders only
5 Shows orders for the data type in	6 Toggle between showing just orders that have not been delivered or both delivered and undelivered.
7 Once order is found press go to selected order.	

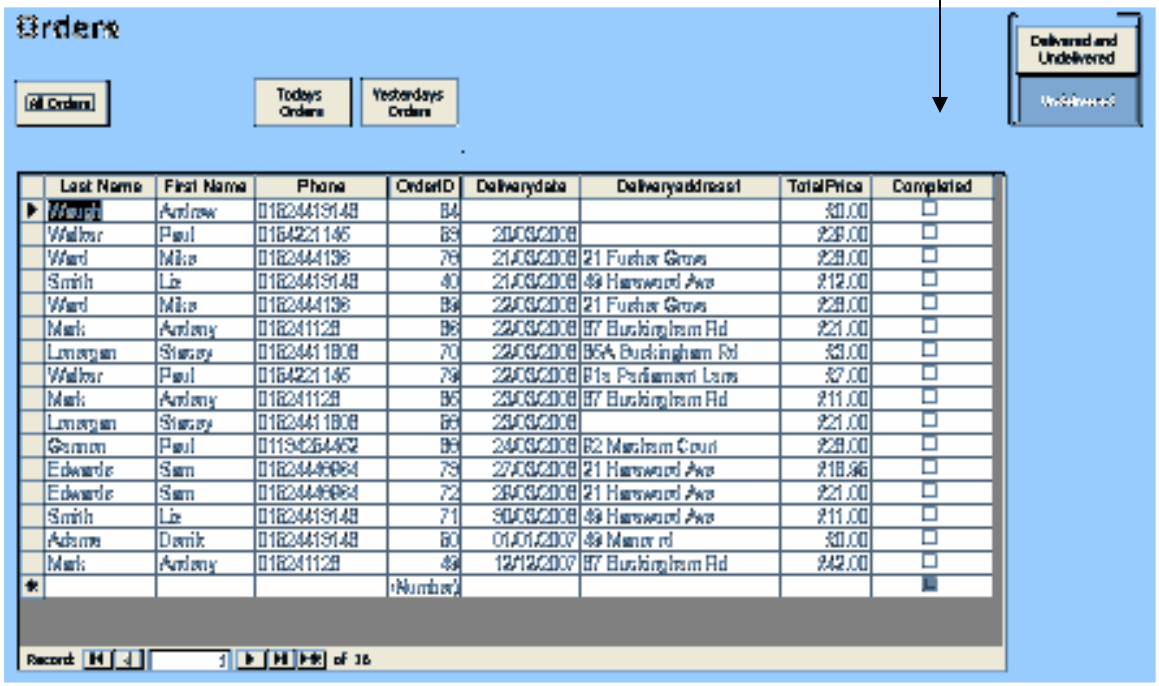
6.2 – Marking as Delivered

To mark an order as delivered, open up the order view screen.



1	Marks all todays orders as delivered
2	Marks all yesterdays orders as delivered
3	Press to manually mark orders

The manual screen can be searched and filtered like in 6.1. Once the correct order is found the delivered box can be ticked.



Section 8 – Quick Tips

- **To show an order, double click on the detail in either the Customer screen or the Order View screen.**
- **The Am and PM buttons automatically fill in the correct time for morning and afternoon orders.**
- **In the sales report press the plus sign next to the date to narrow down the detail to by month.**
- **Use to phone book to find a customers number quickly.**
- **Double click on a phone book entry to be taken to their customer record.**

Section 9 – Trouble Shooting

I can't gain access to the system. I have checked that I am spelling my password correctly into the system, but it still is not working.

Passwords are always case sensitive; make sure the Caps Lock is not on.

I can not find an order on the order view screen.

Make sure delivered and undelivered is toggled on and press view all orders. If it is not here it is not on the system.

All of the pictures on the system have disappeared!

The system does not store the pictures just where they are on your computer. Make sure you have not moved them.

When I press the find postcode button nothing happens.

Make sure you are connected to the internet as it requires an internet connection.

I am unable to issue an order.

Make sure all of the required fields have been entered these will be coloured red.

When I press deliver to customers address nothing happens

Make sure there is an address stored for this customer in the customer screen.

Appendix N – Evaluation Document against the Prioritisation of Specification

Allocation	No.	DESCRIPTION			
Related groups of Stakeholder Needs	Reference Number	Description of the Stakeholder Need	Essential (E), Possible (P), Not be implemented (N)	Completed In Prototype (Y) Yes (P) Partly (N) No	Notes

Ordering		*This is all of the needs to do with the ordering of goods*		
	1.1	The system shall allow standard flower orders to be created	**E**	**Y**
	1.2	The system shall allow wedding orders to be created	**E**	**Y**
	1.3	The system shall allow with sympathy flower orders to be created	**E**	**Y**
	1.4	The system shall allow orders to be amended if they are not complete	**E**	**Y**
	1.5	The system shall allow orders to be placed for Monday to Saturday delivery	**E**	**Y**
	1.6	The system shall allow orders to be placed between 8-6 for delivery	**E**	**Y**
	1.7	The system shall allow for non delivery days to be set.	**E**	**Y**
	1.8	The system shall allow for delivery times to be set either at before, after or between a certain times.	**E**	**Y**
	1.9	The system shall allow orders to be viewed on screen or printed out	**E**	**Y**
	1.10	The system shall make it possible for the user to know what orders they have for any day.	**E**	**Y**
	1.11	The system shall allow for each type of product to be ordered	**E**	**Y**
	1.12	The system shall allow store the card message for the order.	**E**	**Y**
	1.13	The system shall automatically add on the delivery charge.	**E**	**Y**
	1.14	The system shall allow multiple orders for a customer to be created	**E**	**Y**
Customer Account Management		*This is all of the needs to do with the customer detail management side*		
	2.1	The system shall record the customer details	**E**	**Y**
	2.2	The system shall allow the customer details to be viewed on screen and printed out.	**E**	**Y**
	2.3	The system shall allow customer details to be amended and deleted	**E**	**Y**
	2.4	The system shall record customer dates, e.g. Birthdays	**E**	**Y**
	2.5	The system shall allow customers to be grouped	**E**	**Y**

	2.6	The system shall produce invoices each month for the customers who have accounts	**E**	**Y**	
	2.7	The system shall tell the user at any time who owes the user money and how much and for which customers.	**E**	**Y**	
	2.8	The system shall produce invoices for the customers who have accounts at any time.	**E**	**Y**	
	2.9	The system shall allow actions to be created against customers	**P**	**Y**	
Products		*This section is to do with the products and there details*			
	3.1	The system shall store product details	**E**	**Y**	
	3.2	The system shall allow a minimum price to be entered for products	**E**	**Y**	
	3.3	The system shall allow product details to be amended or deleted	**E**	**Y**	
	3.4	The system shall allow the product details to be viewed on screen and printed out.	**E**	**Y**	
	3.5	The system shall store product pictures	**P**	**Y**	
Delivery		*This section is all needs to do with delivery*			
	4.1	The system shall allow all the deliveries to be viewed on screen and printed out.	**E**	**Y**	
	4.2	The system shall allow all the deliveries for a certain day to be viewed on screen or printed out.	**E**	**Y**	
	4.3	The system shall allow all the deliveries for a certain time period to be viewed on screen or printed.	**E**	**Y**	
	4.4	The system shall organise the deliveries in chronological order	**E**	**Y**	
	4.5	The system shall plan a route of a delivery if the location is unknown	**P**	**N**	**Not possible in the time scale**
	4.6	The system shall find a delivery location if unknown	**P**	**Y**	
Functionality		*This section is all needs to do with functionality*			
	5.1	The system shall allow the user to adjust delivery prices	**E**	**Y**	
	5.2	The system shall offer help while in use.	**N**		

	5.3	The system shall allow convenient searching for records/ data	**E**	**Y**	
	5.4	The system shall produce formatted printed documents for all stored data	**P**	**P**	**Not all data is needed to be viewed so only needed data can be printed**
	5.5	The system shall have an appropriate backup in case of data corruption/loss. E.g. copy DB to a CD	**E**	**Y**	
	5.6	The system shall be secured against unauthorised access	**P**	**Y**	
	5.7	The system shall report by any time scale number of products bought and their type	**E**	**Y**	
	5.8	The system shall allow remote access via Internet connection	**P**	**N**	**Not Needed**
	5.9	The system shall be able to produce quotations for all products	**E**	**Y**	
	5.10	The system shall automatically retrieve orders from the website	**P**	**N**	**Website is not a working ecommerce site while prototype was created**
	5.11	The system shall allow emails to be sent to customers	**P**	**Y**	
Non Functionality		*This section is for non functional needs*			
	6.1	The system shall be easy to use.	**E**	**Y**	**Users feedback will decide if this is passed**
	6.2	Real time updating	**E**	**Y**	