E-MAIL FILTER WITH ATTACHMENT SCANNING PROTOTYPE

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ABSTRACT

The E-mail Filter is a mail client that retrieves mails from the Ms Outlook Express, which retrieves mails from POP3 server and categorizes them into different a category that has different level of priorities. Attachments in the incoming mails are scanned and sent to respective folders. These attachments will be stored in the personal computer for easy reference. Meanwhile, the automatic response system automatically replies the mails classified in the Appointments category using automatic response, which runs even when the e-mails are closed.

The E-mail Filter with Attachment Scanning Prototype is a stand-alone system. It has a user-friendly concept and has an interesting and simple to understand user interface. It gives the user more options to manage the mails that flow into the account. The objective of the system is to save time and cost of the user. This is because user does not have to open all folders to see what are the important folders and does not have to reply to most of the appointments by going through the manual planner. It is all done by the mail client and updated automatically. This helps to create a paperless environment.

The methodology used to develop this system is the 'V' Model and it will be developed using Microsoft Visual Basic 6.0, Ms Access 2000 on a Windows 2000 platform which runs from Ms Outlook Express. This system will be of a great help to reduce the burden of checking and replying mails for professional staff such as lecturers.

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This system has been successfully developed with plenty of help received from various individuals.

First word of gratitude goes to my supervisor. Prof. Madya Dr. P.Sellapan whose advise were very helpful throughout the development of the system.Also not forgetting En.Ibrahim Abu Bakar for his views on how to enhance this system.

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CHAPTER 1

INTRODUCTION

1.0 Introduction

1.1 Overview

The term "Electronic mail" is a well-known term, and it is already a firm part of our lives. We send and receive mails instantly using electronic mail and without us realizing we spend a great deal of time using it.

The tremendous growth of the Internet particularly the e-mail service is becoming overwhelming the in computer-mediated environment. These developments on the Internet are expanding beyond the utilization as a communication medium.

The electronic service such as e-mail can be used by many professional organizations for various purposes. Businesses can implement new sales and marketing channels through the communication of business personal through electronic mail. Using e-mail is an effective way to rally members and advise Congress of association views on current legislative issues.

Every day the citizens of the Internet send each other billions of e-mail messages. If you are online a lot, you yourself may send a dozen or two e-mails each day without even thinking about it. Obviously, e-mail has become an extremely popular communication tool in a very short time!

1.2 Introduction

E-mail is the electronic counterpart of regular mail. It generally has the same purpose as regular mail such as saying hello, sending business communications, writing home for holidays, that sort of thing. E-mail can be more powerful and cost-effective than regular because it is faster and can include attachments like word processor files, spreadsheets and graphics. The disadvantage is that it can lose some of the personable feeling of a handwritten message. Also encryption and authentication programs are widely accepted, electronic mail cannot be considered secure from snooping. E-mail also is not generally accepted as a legal document.

The usages of e-mails are becoming more frequent day by day. Everyday companies and individuals receive mails by hundreds. So, there is a need to develop a new system that helps the e-mail clients to sort their mail and enable them to categorize the mails according to importance.

E-mails are an important part of our daily lives. E-mail usage is currently a miniscule component of day-to-day work, like it be using it at home or in the office or anywhere in the world. This technology is currently replacing the traditional method of sending mails through post offices and the beauty of these e-mail systems are that they are much cheaper to send and senders get their message through to the designated recipients almost immediately. These e-mail systems are now becoming a major component of how communications are used by international companies to contact companies in other states or other countries so more then half the cost of

communication is cut. This is because a phone call to the other company in another place will cost more than the amount used to send a mail with all the information attached.

1.3 Objective of the project

The software that is going to be developed is called "E-mail filter system" under the project titled "E-mail filter system with auto reply system prototype".

Features or characteristics for the soft ware:

α It has 4 levels of categorization. This enables the client to check the most needed mails first then proceed to check the other mails whenever he/she is free.

- Appointments
- High Priority Mails
- Subscription Mails
- Miscellaneous

The automatic response system helps the user reply mails to fix appointment with the other individual.

The attachment scanning property scans the file extension and all graphic files will be sent to Miscellaneous folder. All text files will be scanned for keyword and sent to respective folders.

1. To design and develop a soft ware that is user friendly, where the user gets to use the system easily with the help of graphic user interfaces that are understandable.

2. To design and develop a simple management system for the incoming mails and out going mail overall without the users having a difficult time to send and receive mail by using a complex management system of the e-mail system.

3. To design and develop a soft ware that is flexible and easy to use. Anyone can use this system even though his or her knowledge in computer usage is not very deep.

1.4 Project Significance

The process of gaining and sharing knowledge is not one that can have limitations or a certain stop to it. It is an ongoing process that has been growing and will continue to grow in the coming years. And so will the methods of gaining knowledge and information. This means that whenever a new way of presenting or gaining knowledge comes up there should not be any doubts of accepting it as it will bring more good than bad. 'E-mail filter with auto reply system' is one example of a new soft ware that enables users to enjoy reading mails than to think of it as a chore. There are many factors that explain the importance and significance of this project. This soft ware is first that helps users to categorize mails automatically without end users suffering helplessly to sort the mails into different folders.

Besides that, it provides useful tools such as automatic response system to send preset mails to clients who send mails to the users. This system also is an

advantage to use because it is a stand-alone system. So the users can download the mails into the soft ware in the pc and the check their mail offline. This way is better compared to web based e-mail systems where users only can check their mail if there are online. This causes problem because sometimes the connection to the net is too busy and users cannot log on to the net.

The advantages of using this mail system are basically convenience for the users as it saves time as the users can check mails important just by clicking the folders that they wish to check instead of having to go through all the mails one by one. And all the time for available appointments will be fixed by the automatic response system where the user can manage the message in the auto response system by keying in the available times weekly.

1.4.1 CUSTOMER'S BENEFIT

- ***Save cost.***

  By using this system, the users use less time to check mails so; they pay less for the Internet charges.

- ***Saves times for checking mails***

  This system helps to lessen the time taken to check unnecessary mails and saves time because users can directly check mails that the need to access immediately by just clicking on the urgent mails category.

- ***Convenient for users to manage.***

  This system is designed with easy to understand user interfaces so users have no problems to understand the procedures to use the e-mail system.

- ***A better system compared to the traditional system.***

The traditional system makes the user check their mails one by one without them knowing which mails are urgent and which are not. This new e-mail soft ware helps user to categorize the mails using keywords to identify the mail categories

- ***Automatic response system***

This system has an automatic response system to fix appointments with the other person mailing using a web planner that sends the available times to the sender.

1.4.2 FIRM'S BENEFIT

- This system allows firms to minimize their worker time that is wasted mostly on checking unimportant mails and turning their attentions to urgent matter, which has to be dealt with via mail.

- To achieve paperless administration

1.5 Scope & Limitation of the project

The scope of this project is development of a soft ware prototype involving an e-mail system with automatic sorting system that involves attachment scanning and auto response system. However, the automatic response system is limited to fixing appointments as the time given might not be enough to build an automatic response system that is highly intelligent.

1.5.1 SYSTEM ACCESS

The system is set in the pc of the user so the users can access the mail from their computer and but they must have a connection any Internet Service Providers. This system support POP3 features. The user has to register to acquire a login name and a password. With this login name and password the user can use it for privacy purpose. More than 1 user can use this system but they must be configured in Outlook Express.

1.6 Project definition

E-mail is used to communicate rather than for any other purpose. One reason is that it is so simple and straightforward. Everyone is familiar with sending and receiving paper mail (referred to in the online world as "snail mail" in reference to its relative speed). The same functions occur in e-mail: we compose and send messages,

we receive and read messages, but this way its all done by computer in a shorter period of time.

There are many acronyms associated with e-mail which is used in this project:

- **SMTP**—simple mail transfer protocol; the standard rules that many e-mail clients use to handle outgoing e-mail messages.

- **POP3**—postoffice protocol version 3; the standard rules that many e-mail clients use to handle incoming e-mail messages.

- **Server and client** - These computers are the basis for the entire Internet. In a general sense, a server is any computer that "serves" or delivers information and data. A client is any computer that requests or receives the information and data.

- **Attachments**- You can send more than simple text in your e-mail messages. You can also attach computer documents—including word-processor, spreadsheet, graphic, and video files—to an e-mail message.

- **Address Book**- An area in which to store e-mail addresses so that you don't have to remember and type them in each time you want to send a message.

- **Filter-** An e-mail management tool which enables you to determine in advance how certain incoming e-mail messages will be treated.

- **Inbox** - A folder where copies of received messages are stored.

- **Mail Server** - The computer and computer program located at your internet service provider that transmits, receives and stores e-mail messages.

CHAPTER 2

LITERATURE REVIEW

2.0 LITERATURE REVIEW

2.1 Purpose

With the astonishing growth of the Internet, communications are becoming equally important. E-mails play an important role in our lives to keep in touch whether at work or at home. In work e-mail plays an important role of sending and receiving mail in a jest of time.

Some of e-mails soft wares that are famous are

- Pegasus Mail
- Eudora Mail
- Outlook Express

As a result, five basic pre-requisites for effective e-commerce rise. The entry-level requirements are:

- ✓ A stable and supportive institutional environment
- ✓ Good bandwidth
- ✓ Fulfillment systems and logistic
- ✓ User friendly, affordable access devices and interfaces

2.2 Approach

A lot of information is needed before development of a system can be done. This information can be obtained from a variety of sources. Each source usually yields a different kind of information and requires a different search method to get that information. Some of the common sources of information are system users, forms and documents, computer programs, procedure manuals and reports.

A number of ways were used to gather information from system users namely through interviews, using questionnaires and through observation of user activities and behaviors. Computer programs were used to determine the details of data structures or processes. Procedure manuals specify user activities in a communication process.

For this project, many books and previously done project reports were used to gain information. Many web sites were visited to get information on things such as software to be used, e-mail sorting software and many others. Basically all the sources that were used can be divided into printed resources and electronic resources. In the next section, the findings from all these resources will be described in detail. Most of the sources came from the electronic books and sites on the WWW.

2.2.1 Some of the keywords that were used to search in the Internet

- Visual Basic 6.0 tutorial

- Email filter
- POP or Post Office Protocol
- Auto Reply
- E-mail soft ware
- E-mail servers
- Windows NT

The Internet search engine that commonly used were:

- http://www.altavista.com
- http://www.google.com
- http://www.yahoo.com
- http://www.hotbot.com
- http://www.infoseek.com
- http://www.catcha.com.my
- http://www.cnet.com
- http://www.freecode.com

2.3 Basic E-mail Features

An e-mail address needs to be able send or receive e-mail. When a user establishes an account with an online service, the account number is the e-mail address.

2.3.1 How E-Mail Travels

A message is composed with an e-mail program on a computer. The email program sends the message to an Internet mail router, a computer your service provider runs using a standard protocol, which is usually SMTP (Simple Mail Transfer Protocol).

The mail router sends the mail either directly to the host specified in the Service Address field or to as many mail routers as needed. Finally, the mail arrives at the destination host system – which may not be the computer, the person the mail is sent to. In that case, the computer calls the Internet Service Provider's computer using a protocol called POP3, which stands for Post Office Protocol version 3. The POP3 checks for mail and transfers mail messages to your PC where it is read using a mail client.

2.3.2 Automated Mail Services

A mail can be sent to computer programs to make them perform a variety of services for you. The mail servers, daemons, knowbots and listservers search for files and programs and then send them to your mail address.

A mail archive server automates the process of searching a remote computer and can be initiated by your e-mail request. Your e-mail request to the mail server results in a response back to your e-mail address, depending on the kind of mail server you query.

2.4 Current software available

There are many mail clients available in the market or the Internet for users. They vary in the type of service it provides. It has many characteristics that differentiate one from the other.

Some of the mail clients that are currently available are:

- Outlook Express
- Eudora
- Pegasus Mail

In this chapter, the Eudora and Pegasus Mail will be defined in detail to differentiate the software that will be developed and these software that are already in the market.

2.4.1 Eudora Mail

The Eudora Mail like any other mail clients helps user to send and receive mail using their accounts. As usual it has the standard outgoing and incoming messages with title bars and icon bars. There are folders to differentiate mails and to save the mails users have checked, a new folder can be created. It has commands to enable user to do various things. Some interesting commands are the priority or attachments. This priority portion of this pop-up menu is on top. If the user wants to indicate that the message is of a higher or lower priority than a normal message, he or she can use this menu to make the desired selection.

The attachment commands are to allow you to attach extra files to the messages. The send or queue commands are useful to time the message that needs to

be sent. If the 'Send Now' is chosen then the message will be sent immediately while if the 'Queue' is chosen then it will be sent on a chosen date.

There is also a password protection on mail checks to the account on the POP server. Each time Eudora is opened, password is requested prior to the first mail check whether it is automatically or manually.

The automatic checking is when Eudora checks for mail when user tell it how often to do so. If automatic checking is set the check mail command displays the next time the automatic check is scheduled. When Eudora performs a mail check, user will be notified of a new mail in four different ways ; an alert box, a special sound, a flashing mail flag icon on the menu bar or the opening of the In mailbox.

Clicking on the 'Check Mail' icon can do the manual checking and if there are errors in the password typed, user will be prompted for it.

The 'Skip Big Message' option is one of the useful commands, as it does not download any messages more than 40K. This capability is useful when user has a slow connection or in a hurry to check mails. The command downloads only the first few lines and attaches a message that states the whole message has not been downloaded.

The 'Sort' command in the Eudora are just sorting according to dates or subjects. Sometimes Eudora does not sort by date properly. This happens if the mail

was stored in an old version of Eudora and the table of contents was rebuilt or the messages have incorrectly formatted date fields or unknown or incorrect time zones.

The message assigning allows assigning priorities to your messages. These priorities are for sender or recipient reference purpose only and they do not affect the way Eudora handles the messages. There are five priority levels from 1 (lowest) to 5 (highest). To change the priority of a message, the desired priority is chosen from the pop-up menu. When user receives a mail with a priority other than Normal, Eudora adds an X-Priority header to the mail. The header lists the assigned priority. All new messages are created with Normal priority, even replies to messages whose priority you have changed. The exception is that, if the sender of a message gives it a priority other than normal, Eudora insists on giving user's reply the same priority.

2.4.2 Pegasus Mail

The Pegasus mail has also all the standard features as mentioned in the Eudora mail description. Unlike the Eudora Mail, Pegasus Mail has other advanced features. For instance, it has the 'Reading Confirmation' command, which notifies the user whether the message sent has been read, or not. A small message is sent back to the user when the message is read.

If the user has a message containing sensitive or private information, the user can encrypt. An encrypted message is scrambled and can only be read by someone who knows the correct password.

The sorting of folders in Pegasus is based on dates.

Pegasus Mail does not try to retrieve mail larger than the size that the users have specified. This is useful to save user's time.

2.5 The E-mail Filter with Attachment Scanning Prototype

2.5.1 E-Mail Filter

This email program is built using the Visual Basic version 6.0 has certain characteristics of the existing mail clients and some added features especially when it does sorting and replying automatically for the user.

The standard feature of the program will be sending and receiving mails with the POP3 and SMTP features. It basically has the sending and receiving features. It also has folders to differentiate mails that have already been read and not read. The added feature in this program is the sorted folders to differentiate the different categories of the mails which are the appointments, high priority mails, subscribed mails and miscellaneous mails. Assuming the program is designed for a lecturer, the appointments section is for the user to check out for appointments that students want to have with the lecturer or even a meeting to attend with fellow lecturers or the Dean.

The high priority mails categorize the mails that the user have input earlier when he install the program. The priority mails will be according to the user's input.

The subscribed mails reads for mails that user has subscribed earlier on. This also requires the user to input the addresses that he or she has subscribed mails from. The miscellaneous mails are for all the mails that are not in any of these other categories.

The mails priority level can be changed when the user changes the priority table. The priority table will be the input table for the categories to differentiate the mails that will be received by the user. The user then keys in all the types of mail addresses that he or she would like the program to categorize.

Basically, the e-mail filter has all the features of the mail client it links to. The difference in this is this program has the sorting of the mails are not just by dates but by scanning the whole e-mail including the attachments with priority which unlike Eudora which numbers its priority mails, this one is categorized in simpler terms which the user does not have to judge its level of priority as it is already in different folders. It really helps the user to save time in checking the mails.

2.5.2 Automatic Response System

The automatic response system is developed firstly on the appointments folders only. It replies to the appointments folder emails. The program send response to the recipients stating the days or times the user is free. This system can be updated weekly or more frequently by the user

CHAPTER 3

METHODOLOGY

3.0 Methodology

3.1 Introduction

Methodology is a process that is used to develop a system. In this chapter, the methodology of the development of the project will be explained. This will be a very important phase as it guides the right techniques for every decision taken when the project is being done.

3.2 System development methodology

There are two methodologies that can be used to build this system which is the Waterfall Model and the 'V' Model. Choosing the methodology is very important, as it will decide the outcome of the project.

The 'V' Model however is a better choice than the Waterfall Model. This is because in the 'V' Model the feedback or loop-back mechanism happens before the system is built or completed. Meanwhile in the Waterfall Model, the mechanism happens only at the final stage that is after the whole system is built. This mechanism is a very important phase because if any problems are detected in the earlier processes, the problem can be identified and solved. This is important as to make sure that the earlier processes are done perfectly and problem free.

In the Waterfall Model, the mechanism takes place before the system is finished, and this will cause every problem in each step to become a collective

problem and this leads to a much bigger problem. In this scenario, the system developer will face a problem in identifying the root of the problem. This was identified by IEEE Computer Society Press and is referred as *Cumulative Effects Of Error (Davis)*.

The 'V' Model has a higher flexibility because it fulfills the need of the new system. This model also takes into consideration the importance of testing during the system development and does not depend on the earlier specifications. 'V' Models focus are the activities and accuracy. This model also shows how activity testing through analysis and system design (Pledgor, 1998). As Shown in Diagram 3.1, the type of coding is in the shape of 'V' with the system design and analysis on the left while maintenance and testing is on the right.

The 'V' Model also states that unit testing and integration are used for the authentication of the systems design. During when, the code developer has to make sure that all aspects of the systems design is implemented properly. Usage testing is more focused on end-users compared to system developers, to make sure the accuracy of the systems need by gathering each testing step with each level of specification This type of implementation helps to make sure that all the systems needs are implemented fully before the system is put to use.

The left and right sides of the 'V' Model are interconnected. If there is a problem during authentication or accuracy, then the left side of the model is easily altered and to upgrade the user's activities, system design and coding before the

testing is done on the right side. In other words, the 'V' Model does the hidden work of integration that is least visible on the Waterfall Model.

Some of the advantages of using the 'V' Model are:

i. Easy to identify the levels that has to be repaired when there is a problem

ii. Does not need repairing from the beginning of the system when a problem is identified.

iii. Easily understood because each level is separated.

iv. The hidden work and system integration of the Waterfall Model is easily understood in this system.

v. Each level of testing is accurate

vi. Takes into consideration the importance of testing at each level for the hard wares and software.

vii. Involves end-users at testing level to make sure that all their needs are implemented fully. This way, the system developer can come up with a user-friendly system.

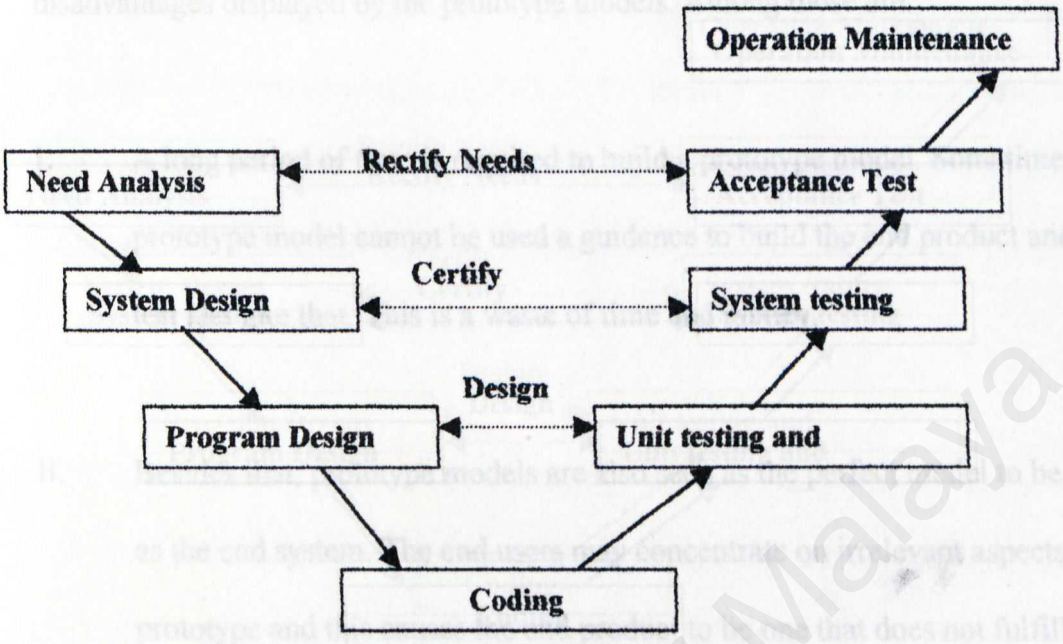

Diagram 3.1 : The V Model

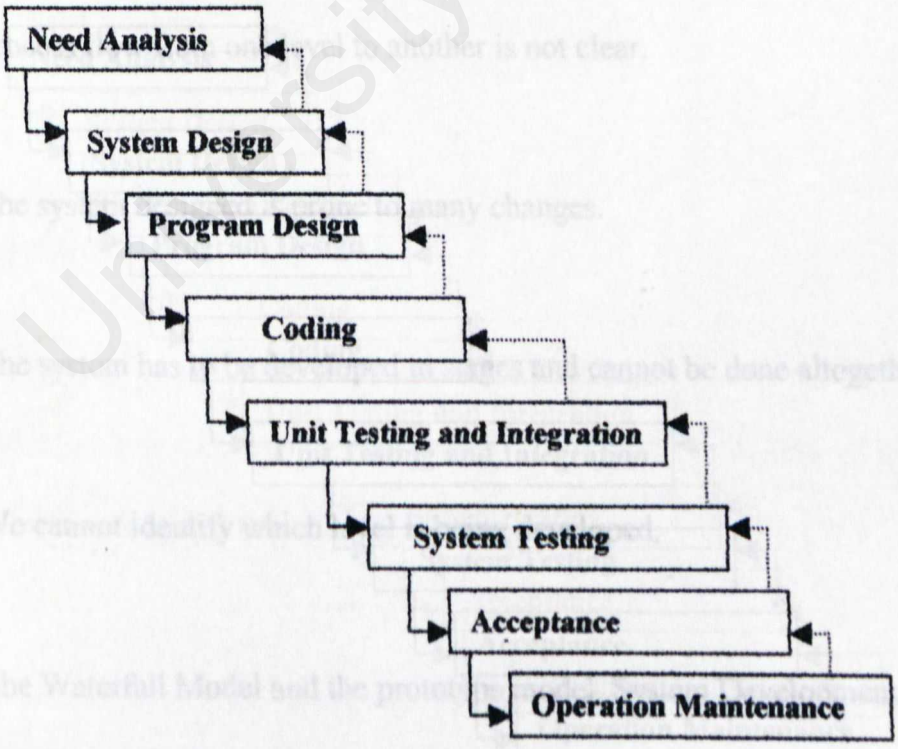

Diagram 3.2: Waterfall Model

Prototype models are not used in the development of this system because of certain disadvantages displayed by the prototype models. Among those are:

I. A long period of time is required to build a prototype model. Sometimes the prototype model cannot be used a guidance to build the end product and it is left just like that. This is a waste of time and money.

II. Besides that, prototype models are also seen as the perfect model to be used as the end system. The end users may concentrate on irrelevant aspects of the prototype and this causes the end product to be one that does not fulfill the real objective.

III. Process flow from one level to another is not clear.

IV. The system designed is prone to many changes.

V. The system has to be developed in stages and cannot be done altogether.

VI. We cannot identify which level is being developed.

Besides the Waterfall Model and the prototype model, System Development Life Cycle (SDLC) can also be used as a logical and systematic approach for the development of this system. Unfortunately, this cycle cannot be applied in the system development. This is caused by two obvious disadvantages that have been

taken into consideration that caused this system to be less useful for the system development of this project. Those disadvantages are, firstly, a long period of time is needed to develop a system using SDLC. To conduct this thesis project, this way is less effective because the system has to be developed at a short period of time. The long period of time that is needed by the SDLC model might cause the project to be extended to a longer period of time.

The second disadvantage is that the user needs are always changing according to time. In the time lapses between the system need analysis and the time that the system is implemented, the user needs may have differed. So, the system that has been developed will go through to much criticism if it doesn't satisfy user needs. After analyzing all three models, I have decided to use the 'V' Model in my system development.

3.3 Project Description

'E-mail Filter' is a stand-alone prototype for those who use the e-mail frequently and need assistance with categorizing their overflowing mails. It will have all the features of e-mail software with some added features.

3.3.1 Modules in 'E-mail Filter'

1. E-mail sorting module

In this module, the system will have four different folders where the incoming mails will be configured to automatically sort into those folders. This will be done using keywords. There are four categories are:

- appointments
- high priority mails
- subscribed mails
- Miscellaneous mails.

❖ Keywords used for appointments are:

"Meeting", "time", "venue", "appointment",

❖ Keywords used for high priority mails are:

"Urgent", "highly classified"

❖ Keywords used for subscribed mails are:

"Subscription","subcribed"

Other incoming mails without these keywords will be sent to the Miscellaneous folder.

2. Automatic response system

This module is implemented only for the response of the appointment folder. This module will be set so that user can type in their preferred text in the Options tab under the Auto Response button. Once the user has done this text will be immediately sent each time the Appointment folder is checked by the

user. This will be done using some basic artificial intelligence knowledge and Visual Basic 6.0.

3. **Attachment scanning**

This module allows the users to put in automatically all the new mails into specified folders by checking for the file extension. If the file is a graphic file, example with .jpeg,.gif an so on, the mails will be sent into Miscellaneous folder. If it is a text file like .txt,doc, and so on, the attachment will be scanned for the keywords and sent into either Appointments Folder, High Priority Mails folder or Subscribed Mails folder. The attachment will be stored under the ***d drive*** under the file name ***emailserver.*** If the user wants to know which e-mail contains the attachment, they can check the file name where each attachment is stored like this 10_0, whereby 10 is the 10^{th} email and 0 represents that there is only one attachment. If it is 41_0,41_1, this means that it is the 41^{st} e-mail and it has 2 attachments to it.

3.4 System Requirement

3.4.1 Functional Requirement

A functional requirement describes an interaction between the system and its environment. Further, functional requirement also describes how the system should behave given certain stimuli. The important thing is the questions addressed by functional requirements have the answers that are independent of an implementation of a solution to the problem.

3.4.2 Non-Functional requirement

Non-functional requirement are defined as constraints under which the system must operate and the standards, which must be met by the delivered system. E-mail Analysis System includes the following functional requirement:

1. **Reliability**

   A system is said to have reliability if it runs undisrupted for a very long period of time without failure or crashing. A system does not produce dangerous or costly failures when it is used in a reasonable manner, that is, in a manner that is typical user expects is normal. E-mail Analysis System has to be reliable to make sure the mails are not lost.

2. **Robustness**

   Refers to the quality that causes a system to be able to handle, or at least avoid disaster in the face of unexpected data. E-mail Analysis System supports robustness by designing a system that is simple and the usage of POP3 and IMAP4, which transfers data (mail), is a trusted system in handling mails.

3. **User Friendly**

   This system can be considered as attractive and an easy-to-use application because the users will only have to click on the hypertext or image by

using the mouse. The use of suitable icons will help the user to use the system with more confidence.

4 **Modularity**

Modularity is a key factor in good program design. The working of the system was decomposed into modules so that distinct functions of modules could be isolated from each other. Modularity has the advantage of making testing and maintenance much easier. In E-mail Analysis System, modularity of program was applied from the beginning, as this will lead to easy modification in future. The modular in design approach means other shell modules may be easily combined or joined at a later time.

5. **Accuracy**

Accuracy refers to the precision of control. E-mail Analysis System provides various accuracy measures. For instance, it sorts incoming mails according to keywords and may keywords are used for each folder so higher accuracy is achieved.

6. **Implementation**

E-mail Filter system can be implemented under any Windows based pc.

7. **Response Time**

The response time to retrieve the information such as incoming mail can be considered within a reasonable interval time. It means that all desirable information should be available to user at any point in time. The requirement for up-to-date information is also a necessity.

3.5 Run-time Requirement

3.5.1 System Requirements

As a Windows user, in order to use the E-mail Analysis System, the minimum requirements are:

- An Ethernet card or modem
- An account on a computer with Post Office Protocol Version 3 (POP3)
- IBM compatible machine
- Microsoft compatible mouse
- Ms Outlook Express
- Ms Access 2000

3.6 Tools Used

3.6.1 Microsoft Visual Basic

Two commonly used programming languages in the development of a Windows based applications are Microsoft Visual Basic and Microsoft Visual C++. Microsoft Visual C++ is an *object oriented* programming language while Microsoft Visual Basic is an *event driven* programming language.

The system that is going to be developed involves a lot of interaction with end-users, so event driven programming is chosen. Visual Basic has become a favorite among system developers for application of a client-server-based program, which has to be done in a short period of time.

3.6.1.1 What is Visual Basic and its functions

Visual Basic is one of the simple fourth generation languages, which is learnt easily and it is the fastest way to develop a Windows based application. This is because Visual Basic has the *drag* and *drop* features which enables the developer to insert a text box, label or image by choosing it from the *tool box* and using the *drag* and *drop* features to drag it to the *window/form*.

1. Event driven programming

   Event is the process of doing something. For example, to move a mouse, to choose a menu and to click on an icon. This event driven programming is done Visual Basic. This is different from traditional programming method where the main coding does the work. In the traditional system the programmer has to write continuos lines of coding to make a program run. This is different from event driven programming where the coding is based on the events.

2. Visual Basic uses Graphic User Interface (GUI)

   Visual Basic is designed in such a way that we can see our system design immediately. It uses two types of objects:

(a) *Forms* is a window that is designed and developed

(b) *Controls* are graphic objects that are drawn like the buttons, list of boxes, time control and so on.

3. List of files by Visual Basic

Visual Basic uses these types of files:

- .mak – Project File : this contains list of all shapes and cods that is used in a project. One project can have many modules, shapes and classes. Each different programming activity stores different modules.

- *.frm – Form* File : contains all object and cods that is connected with it. This part communicates between end-user and system by using user interfaces.
- *.exe* – Execution File : compiles all the information about the project to execution format.

3.6.1.2 Why Visual Basic was chosen

- VB users enable programmers to write, compile, run and debug application easily.
- This is a programming tool that is popular in Windows environment with the ability of RAD (Rapid Application Development)
- VB uses event driven system and does not use programming language which is done using procedures.

- Besides that, there are a lot of ActiveX (OCX) controls that can be used together with VB. OCX is a third party where it can be used as a tool for developing a program.
- Besides that, Windows API (Application Programming Interface) can also be used.
- It also has file blockage where a special password is required if changes are to be made on the data. This is named Exclusive Mod

3.6.2 Ms Access 2000

Microsoft Access 2000 is a relational database that was developed by Microsoft it has currently 10 million users worldwide. The Access package is one of the best-selling relational database packages for Windows on the market. Microsoft Access 2000 provides relational database powers to give the information users need to make better decisions. Together with ODBC driver for Access, both can retrieve data from database in client server based system. Microsoft Access is suitable for process of information.

The reason Access 2000 is used because:

- It integrates data from spreadsheets and other databases, and is the easy way to find answers, share information over intranets and the Internet,
- This relational database tool can be integrated easily Microsoft Outlook Express 2000
- Many simple and user-friendly feature in building tables, queries, forms and reports that can be customized to suit project needs.

3.7 System Planning

Project Schedule

To facilitate that the whole project runs on time, a schedule is proposed to foresee the smooth running of the development of the whole system.

MONTH / ASSIGNMENT	APR 2001	MAY 2001	JUNE 2001	JULY 2001	AUG 2001	SEPT 2001	OCT 2001
Literature Review							
System Analysis							
System Design							
Coding							
Testing							
Documentation							

Table 3.1:Gantt Chart for project schedule

The project is planned such that it will involve constant developing so that the whole project will be developed following a planed schedule. The schedule is planned such that it coordinates all the aspects of the project so that it will be finished by the proposed time allotted.

System planning is a critical part in the development of the project. This is the stage in the system development process whereby the requirement for the system is translated into system characteristics. The data structures used in the system implementation in detailed and specific. In the user interface section, service is

allocated to different component of the system and the interface of the component is designed. This enables user to interact with the system.

3.7.1 Data Flow Diagram

Data Flow Diagram graphically characterizes data process and flows in system. It provides further understanding of the interrelatedness of systems and subsystems. Basically, Data Flow Diagram describes in brief system's inputs processes and outputs.

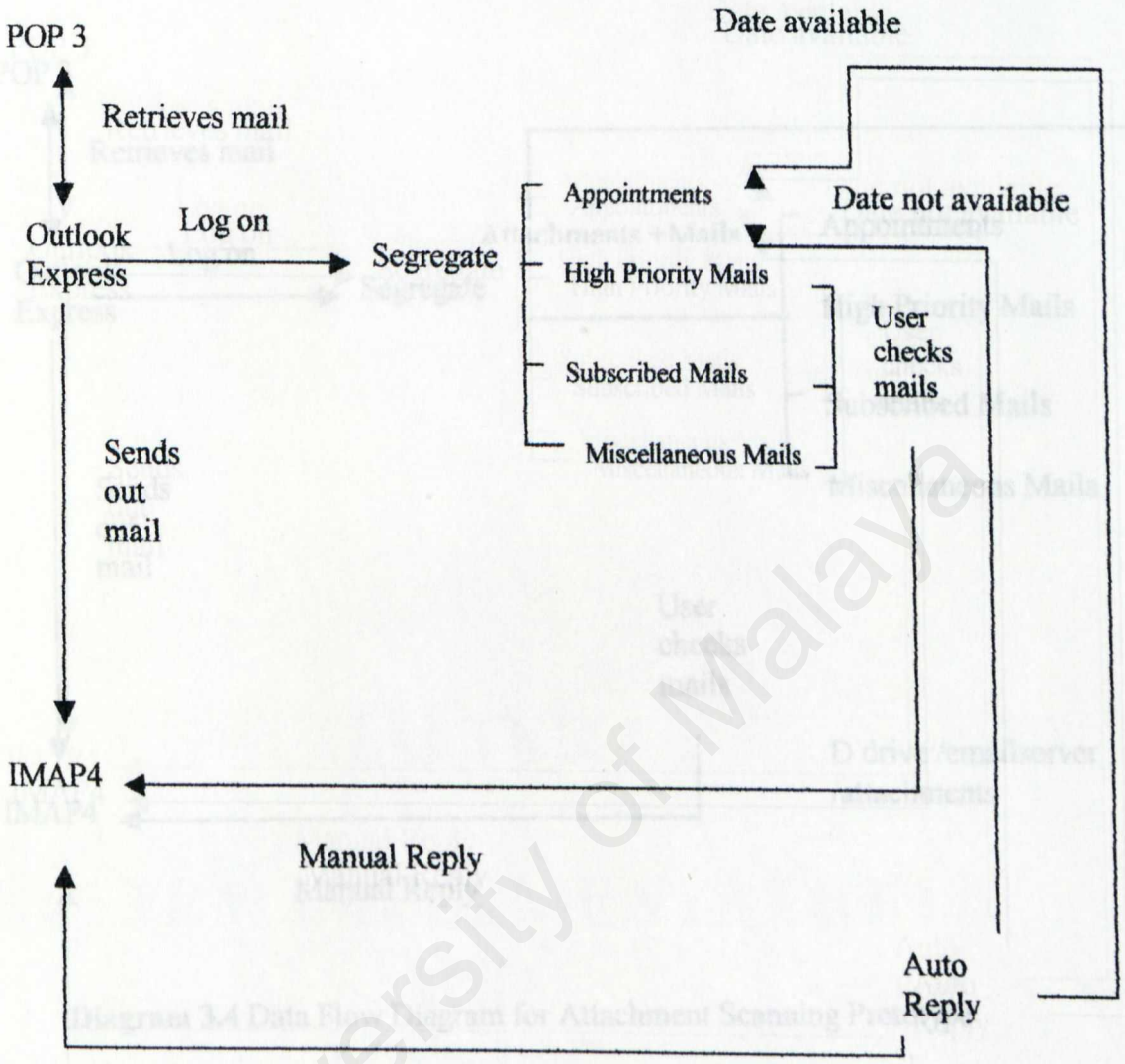

Diagram 3.3 Data Flow Diagram for Automatic Response Prototype

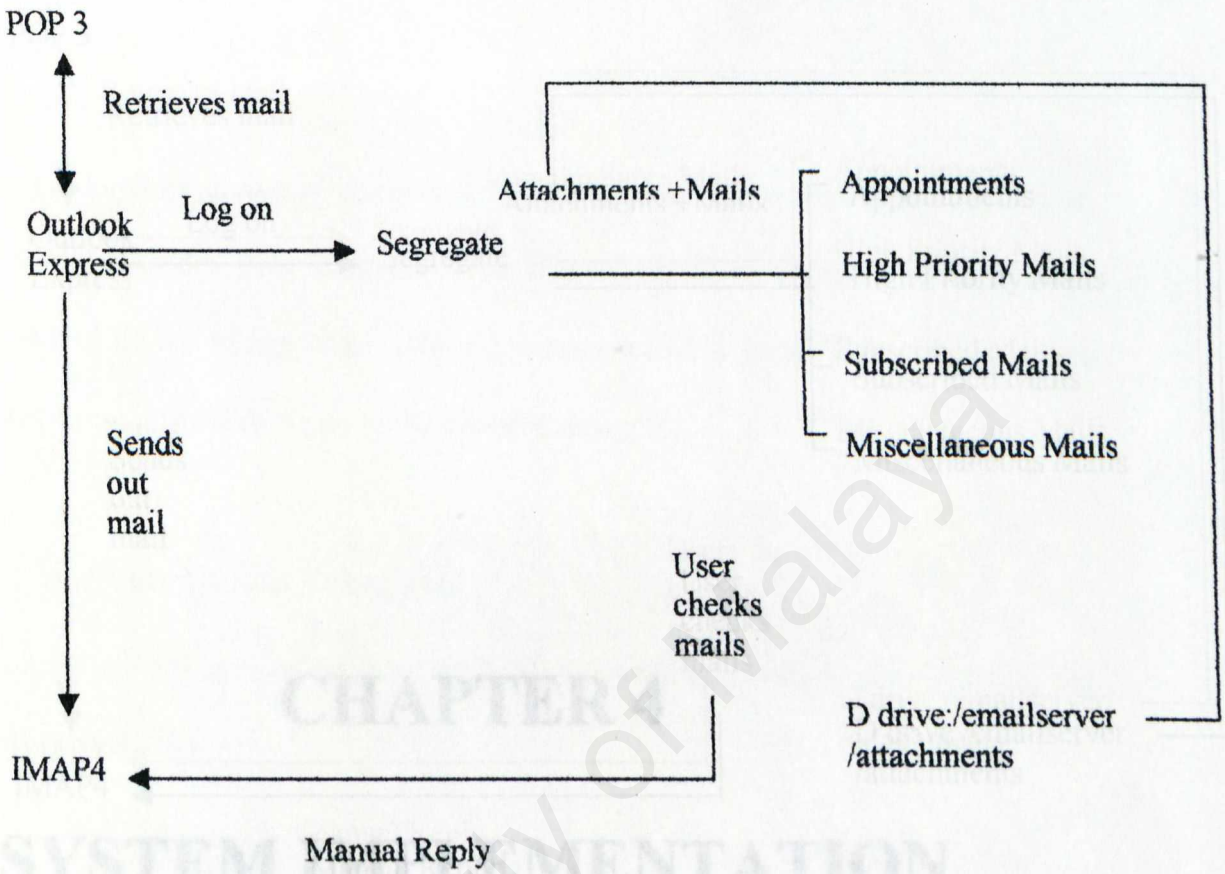

Diagram 3.4 Data Flow Diagram for Attachment Scanning Prototype

In this data flow diagrams, it is considered that the user is already a registered user.

3.7.2 User Interface Design

The goal of user interface design is to provide the best way for users to interact with computers, or what is commonly known as Human Computer Interaction (HCI). Improving interaction between people and computer is one of the most important activities in system design. People are no longer interested on technology behind the computer.

CHAPTER 4

SYSTEM IMPLEMENTATION AND TESTING

4.0 : SYSTEM IMPLEMENTATION AND TESTING

4.1 Introduction

System Implementation is the construction of the new system and the delivery of that system into production. It involves the translation of the software representation produced by the design phase into a computer-readable form. This phase at times involves some modifications to the previous design.

4.2 Implementation Principles

As a stand-alone application, e-mail filter follows the following principles during the implementation phase:

- **Works continuously**

  Just as a stand-alone system's development process often is continuous, so is this project's implementation. Because of this, project implementation procedures should be designed with process orientation, allowing for replication, improvement, and reliability in file management and coding techniques.

- **Separation of tasks.**

  All these systems are separated and done in different modules. This enables the programming to be done easily.

4.3 Software tools for report writing

Microsoft Word XP was used to write the report and draw the DFD, Structure Chart, and System Model.

4.4 Coding

Coding conventions

Coding is a process that translates a detailed design representation of software into a programming language realization. [1]

The following coding guidelines were followed to preserve the design quality of the **e-mail filter**:

- **Coding conventions**

  Coding conventions such as page labeling, naming conventions, and indentions should be adhered to.

- **Revising & Reusing**

  Functions and procedures created earlier should be reused in subsequent modules.

- **Readability**

  Codes should be easy to understand. Adherence to coding conventions contributes to readability.

- **Maintainability**

  Codes should be easily revised or corrected. To facilitate maintenance, code should be readable, modular and as general as possible.

4.5 Testing

Testing is a verification and validation process. Verification refers to the set of activities that ensure that the correctly implements a specific function. Validation refers to a different set of activities that ensure that the software has been built is traceable to customer requirements. Software testing is a critical element in system development to discover a defect or bug that is present in the system. A successful test is one which no errors are found.

All newly written systems must be tested thoroughly; this is no exception for **e-mail filter.** Testing has to done throughout system development and not just at the end .**E-mail filter** was tested with the following generic characteristic:

- Testing begins at the module level and works "outward" toward the integration of the entire computer-based system.
- Different testing techniques are appropriate at different points in time.
- Testing and debugging are different activities, but debugging must be accommodated in any testing strategy.

4.5.1 Testing Techniques

Two techniques were employed in the testing process:

4.5.1.1 White Box Testing

White-Box testing, sometimes called *glass-box testing* is a test case design method that uses the control structure of the procedural design to derive test cases. [1] By using white box testing methods, the following test cases can be derive:

- Guarantee that all independent paths within a module have been exercised at least once;
- Exercise all logical decisions on their True and False sides;
- Execute all loops at their boundaries and within their operational bounds;
- Exercise internal data structures to assure their validity.

4.5.1.2 Black Box Testing

Black-box testing focuses on the functional requirements of the software. Black-box testing enables the software engineer to derive sets of input conditions that will fully exercise all functional requirements for **e-mail filter**. Black- box testing is not an alternative to white-box techniques. Rather, it is a complementary approach that is likely to uncover a different class of than white-box methods.

Black-box testing attempts to find errors in the following categories [1]:

- Incorrect or missing functions
- Interface errors
- Errors in data structures or external data base access
- Performance errors
- Initialization and termination errors.

4.5.2 Testing Strategies

Testing strategies adopted during the development of **e-mail filter** consist of unit testing, integration testing, regression testing and system testing.

4.5.2.1 Unit testing

In this first stage of testing, each program component is tested on its own, isolated from the other components in the system. Unit testing verifies that the component functions properly with the types of input expected from studying the component's design. Unit testing is done in a controlled environment. Unit testing is shown in Figure 4.1.

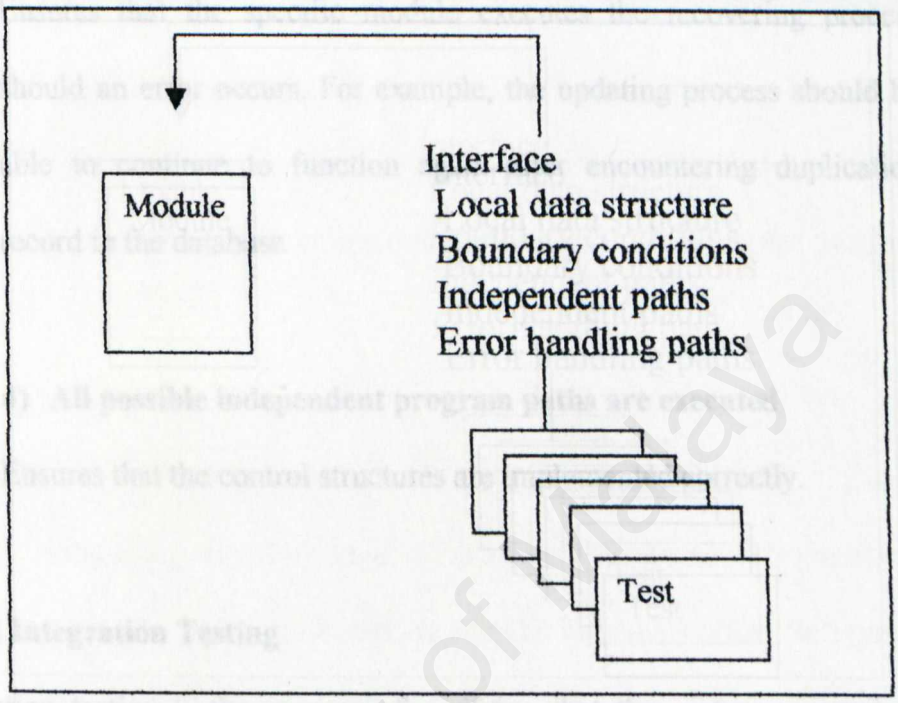

Figure 4.1 Unit Testing

The following areas are tested during unit testing for **e-mail filter**:

a) Interface

Testing the interface to ensure that information flows properly into and out of the program unit.

b) Boundary value analysis

Ensure that the module operates properly at boundaries established to limited or restrict processing.

c) Error handling paths

Ensures that the specific module executes the recovering process should an error occurs. For example, the updating process should be able to continue to function again after encountering duplication record in the database.

d) All possible independent program paths are executed

Ensures that the control structures are implemented correctly.

4.5.2.2 Integration Testing

Integration testing is the process of verifying that the system components work together as described in the system and program design specification. It ensures that the interfaces among the components in the **e-mail filter** are defined an handled properly. In **e-mail filter**, the Bottom-up integration approach was adopted. Each component at the lowest level of the system hierarchy is tested individually first. Then, the next components to be tested are those that call the previously tested one. This approach is followed repeatedly until all components are included in the testing.

This approach was chosen because **e-mail filter** integrates a large number of stand-alone modules and many of the low-level components are general-purpose utility routines that are invoked by others.

4.5.2.3 Regression Testing

Correcting faults during the testing process can introduce new faults while fixing old ones. Regression testing identifies new faults that may have been introduced as current ones are being corrected. It also verifies that a corrected version still performs the same functions in the same manner as the previous version.

4.5.2.4 System Testing

System testing is actually a series of different tests whose primary purpose is to fully exercise the computer-based system. [1]. For **email filter**, the primary purpose of this testing is to verify that all system elements have been properly integrated and perform the allocated functions.

4.6 Debugging

Debugging is performed as a consequence of successful testing. When a test case uncovers an error, debugging is the process of attempting to match symptom with the cause and if successful, leads to the correction of the error. The debugging approach employed was causes elimination. Data related to the error occurrence was organized to isolate potential causes. A list of all possible causes was developed and tests conducted to eliminate each. If initial tests indicate that a particular cause hypothesis promise, the data are refined in an attempt to isolate the error. [1]

CHAPTER 5

SYSTEM EVALUATION AND CONCLUSION

5.0: SYSTEM EVALUATION AND CONCLUSION

5.1 Problems And Solutions

5.1.1 Problem and Solution During System Studies And Analysis

5.1.1.1 Wide Area of Studies

In order to successfully develop and implement a completely smart e-mail filter and auto-reply, researches have to be done. Furthermore, various technologies and tools had to be explored in order to choose the right tools.

The Internet was a great help in helping to obtain necessary information. Research papers published by academic institution and other organizations were studied. Other similar systems were also studied. Besides, knowledge was also obtained from reading of printed materials.

5.1.1.2 Determining the Project Scope

Due to the time frame given, it was impossible to incorporate too many features into system. Availability of tools was also considered in determining the project scope. Therefore the system has simple features and can be enhanced to make it work as desired.

5.1.2 Problems And Solution During System Implementation And Testing

As there is no prior knowledge in programming in Visual Basic 5.0, a lot of studies need to be done to familiarize with the new programming language. Programming

languages and various web development tools seed to be learnt within a short time span. Choosing Visual Basic as the programming language was a wise decision since it has easier tutorials to use to learn the language. Many web-sites were available to obtain knowledge on this language. Discussion with course-mates, seeking advice from the Internet and self studies also helped resolved the problems faced.

5.1.2.1 Lack Of Knowledge In Email system

Email filter tries to ensure that very little time is spent to check emails. However, lack of knowledge in email system and the search engines has been a hindrance. Research was done into many different email clients and search engines to know how these systems work.

5.1.2.2 Lack Of Knowledge In Network Operating system

During the setting up of Microsoft Windows Windows 2000, problems have occurred due to unfamiliarity. Installation was tedious as there are many system configurations which need to be followed to ensure proper function of the Windows. Windows 2000 also takes up a significant amount of memory thus decreasing the system performance.

5.1.2.3 Too many keywords

Use of keywords is the main feature of this system. Since there were many keywords available from a single mail, which is received, it was impossible

to enter that many keywords during the programming of the system. A new method should resolve this problem.

5.1.2.4 No Prior Knowledge in Auto Reply

Since there has not been any knowledge in the field of auto replying, therefore it was difficult to configure an auto reply system from scratch. Many sites were visited to view various types of auto-reply system which can be used as an example.

5.2 System Strengths

5.2.1 Folder options

Appropriate use of folders can save time for the user to check mails. The official and personal folder lets one give priority to work related mails rather than having to go through one by one in the inbox.

5.2.2 Editable Auto Reply

The system allows the user to edit the auto reply as frequent as the user wants.

5.2.3 User-friendly Interface

HEIS has a very user-friendly and consistent environment that is similar to mail applications. Effective use of icons and selection control eliminates typing need when capturing data from users. Carefully planned system make sure that users are able to navigate smoothly through the system by simple point and click.

5.3 System Limitations

5.3.1 No printing capability

There is no printing facility provided in the application. Administrator cannot generate listings for offline viewing. Though printing through the browser works well, a more powerful printing feature should be integrated into the application.

5.3.2 No Extensive Help Facility

Currently the system provides a minimal help. Though instructions are available on the system pop-up menus, it cannot satisfy users who demand more detailed information.

5.3.3Unable to read the meaning of mails

The system is unable to conclude whether the sender would like to have an appointment which is fixing an appointment or simply fixed an appointment to be attended to. Therefore it is hard to predict the meaning of these mails.

5.4 Future Enhancements

5.4.1 Provide Printing capability

Currently the filter does not support printing of information for offline viewing. A printing function can be incorporated to allow administrator to print the records retrieved from the database. This will help the user to print relevant information rather than copying them into disks.

5.4.3 Provide Comprehensive Help

A comprehensive online help should be added to the system to provide timely response to user's questions and queries. This would also lessen the workload of the system administrator.

5.4.4 Better Database Record Displaying

Records could be paged to support systematic viewing. This will be an advantage because users do not have to view unwanted mails.

5.5 Conclusion

The project has achieved it objectives to develop an application which not only provides time saving for user but allows greater user interactivity and personalization elements.

In the process, invaluable insight was gained into the complexities and intricacies of application programming. Knowledge gained throughout the life cycle of project development, from the planning of the project, studies on the subject and technologies, setting up of servers, programming, to implementing the system proves to be a valuable experience. At the same time, theories and knowledge gained throughout the course of Information Technology studies were put into practice. This experience will definitely prove useful in future software development projects.

There is still much rooms for improvement in the email filter and auto response system. The successful development of this system is the first step towards the future development of similar systems. It is hoped that it can provide a foundation and basis for the concept of mail sorting and its implementation using other technology.

SUMMARY

Summary

'E-mail Filter with Attachment Scanning Prototype' is a start to ease the burden of checking mails one by one without knowing which is important and which is not. This is an important step in the development of new soft wares because it enables the system to guide an organization towards future generations of e-mail soft wares. While developing the whole system is not very easy task because various objectives have been targeted, but it can still be considered as a contemporary effort to achieve the goal.

In the process of analyzing how to develop the system, invaluable insight was gained into complexities and intricacies that would be faced throughout the whole process. The application of artificial intelligence principles throughout the development is necessary to further enhance the required skills for developing a sound system. Adherence to a development schedule is very important in order to get a job or a task done on time.

With hope that the E-mail Filter with Attachment Scanning Prototype will have a successful development, it would be the first step towards the future development of systems definitely. The problems and experience gained during the system development should be useful in future endeavors. It is hoped that this system can provide a foundation upon which many more innovative and comprehensive system may be built to perform multiple task and fulfill various user requirement.

APPENDIX A
USER MANUAL

USER MANUAL FOR 'E-MAIL FILTER' PROTOTYPE.

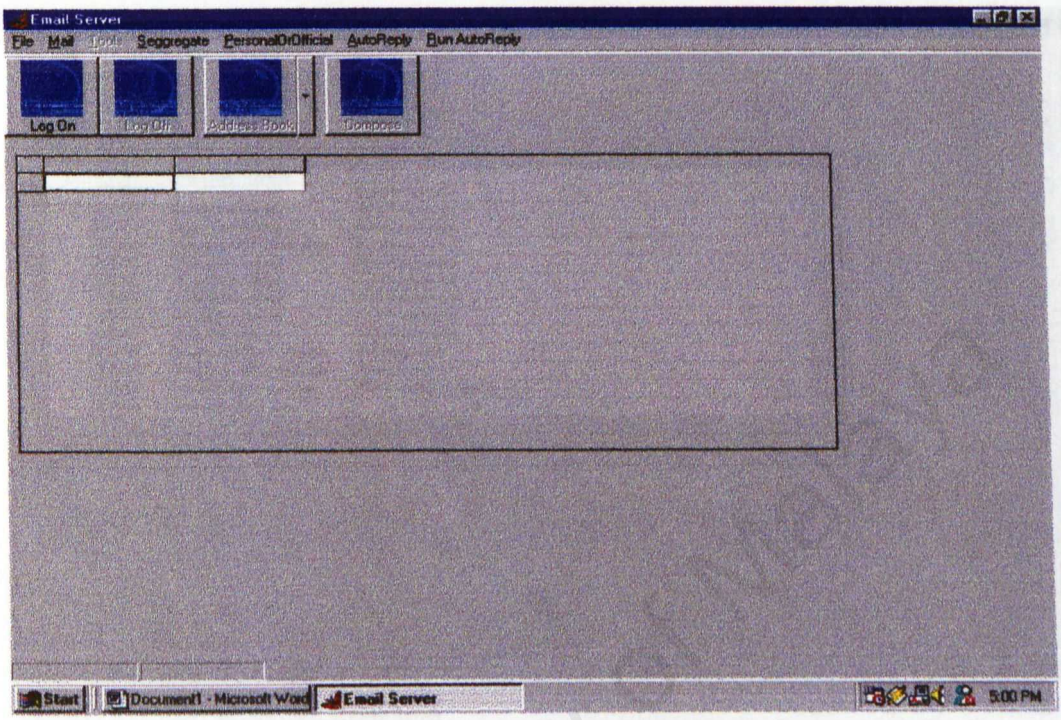

Figure 6.10: Log on menu

1. Log on to import all the mails from Outlook Express.
2. Mails will be imported and shown as in **Figure 6.11**

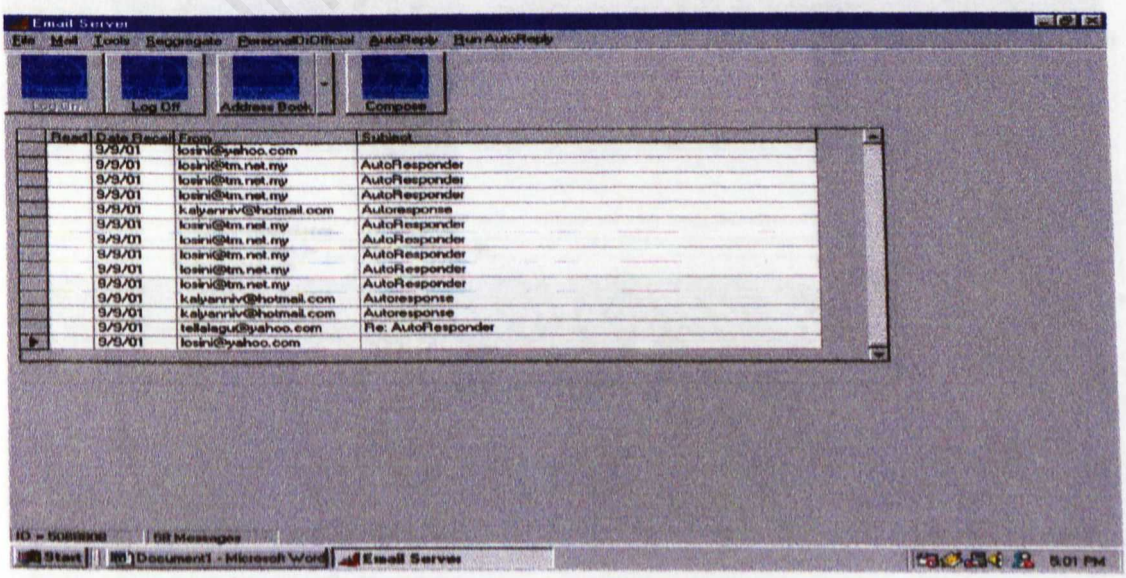

Figure 6.11: Inbox

3. Go to the Segregate button and choose the segregate drop down button.

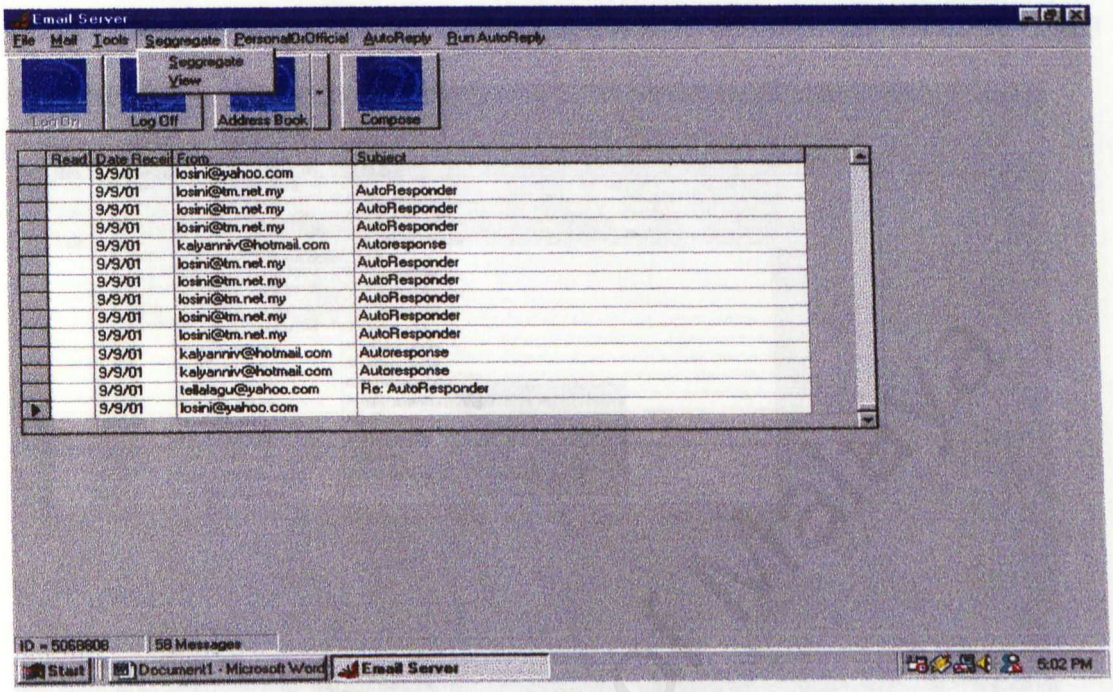

Figure 6.12: Segregate button

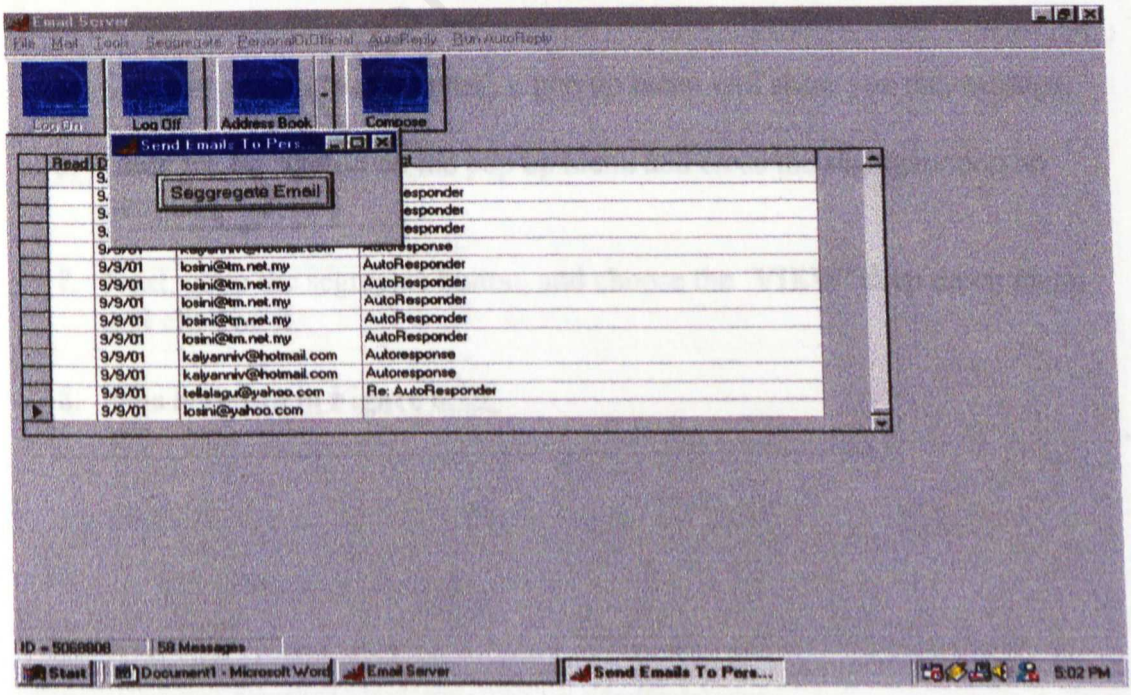

Figure 6.13: Segregation of mails

4. **Figure 6.13** shows you the button that has to be clicked, so that the mails are segregated into specified folders.

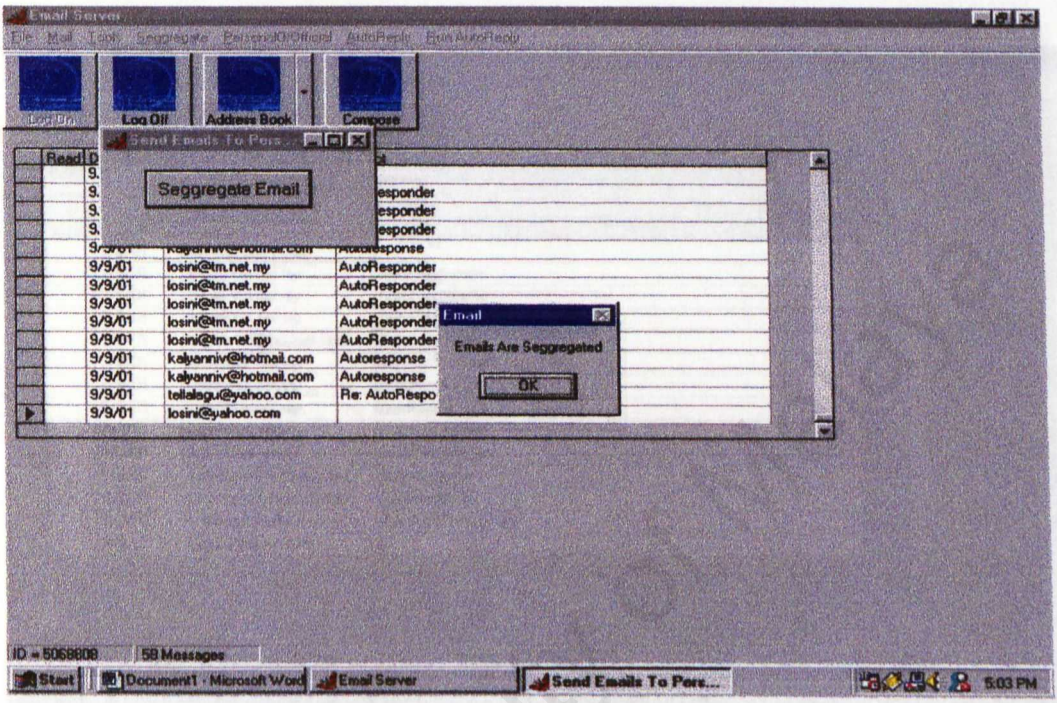

Figure 6.14: Segregation complete

5. Once the mails are segregated, a pop up menu will show you the message.
6. Click the OK button on the pop up menu and close the segregate pop up menu.
7. Next, go to the segregate button, and choose the '**VIEW**' drop down menu and click on it.
8. This is shown in **Figure 6.15**.

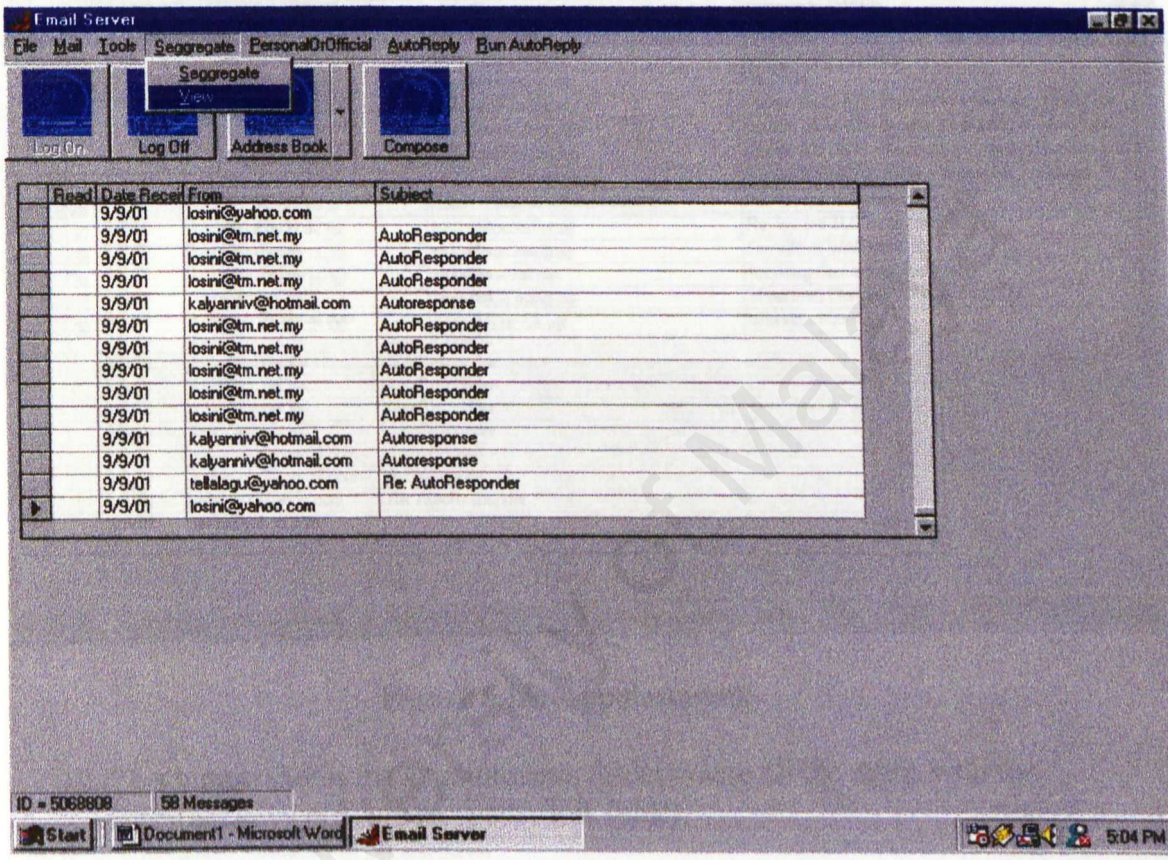

Figure 6.15: View Button

9. The View button takes you to another screen.
10. The interface for **Figure 6.16** shows you the interface of the segregated mails columns.
11. There are 4 buttons that you can choose to click to check the appropriate section of mails that you want.

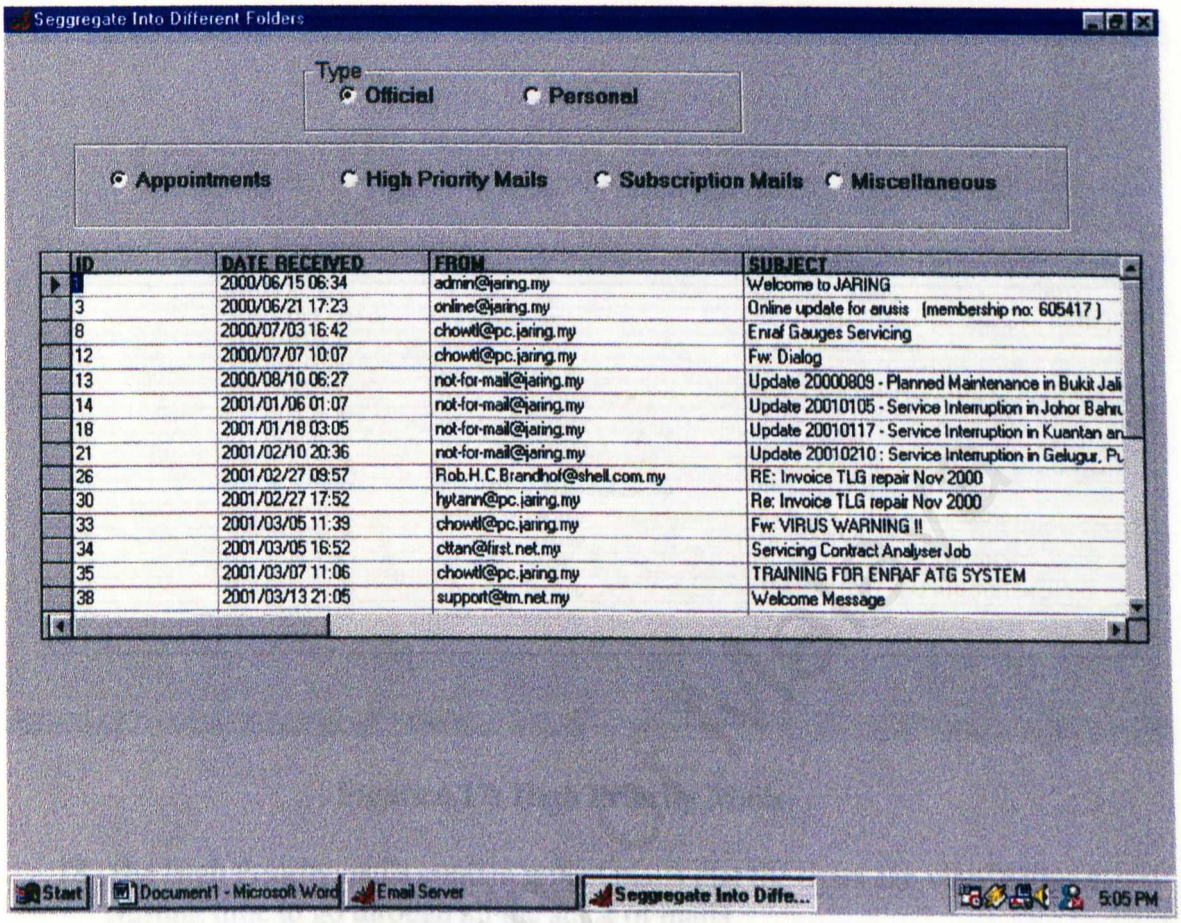

Figure 6.16: Appointments

12. This button shows the appointments folder where all the mails with the specified keywords are put under this folder.

13. Users can choose to view their personal mails or official mails by choosing the two options given.

14. The Official button allows the user to check mails that are important and has to be seen as soon as possible.

15. This can seen in **Figure 6.16**

16. This Official button has four sub-folders.

17. The appointments sub-folder allows the users to view the mails concerning appointment from senders.

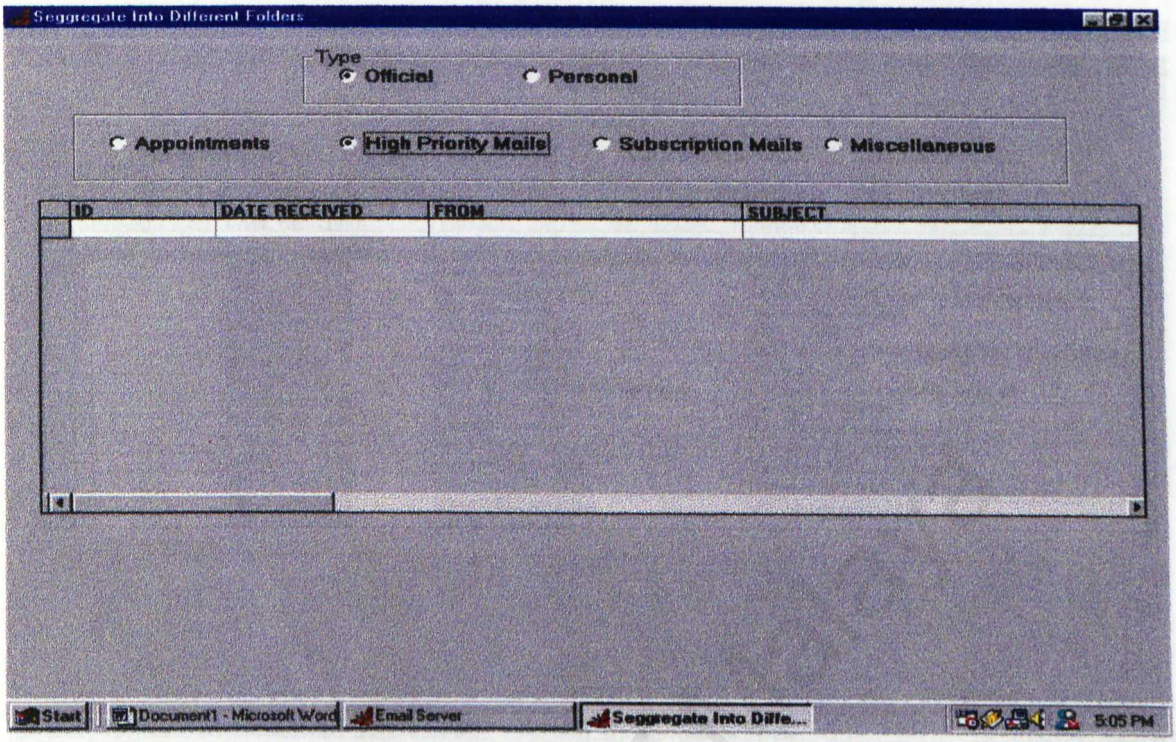

Figure 6.17: High Priority Mails

18. The High Priority mails contain urgent mails that the users can view without wasting time to go through all the stack of mails.

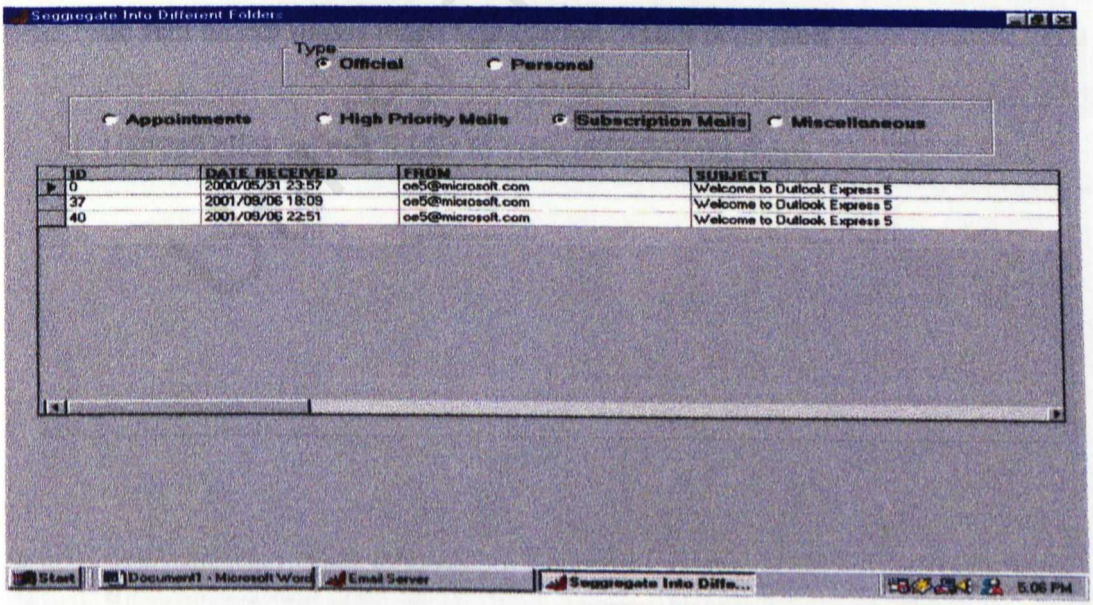

Figure 6.18: Subscription Mails

19. All subscription mails will be sent to the Subscription Mails (as shown in **Figure 6.18**) which enables them to check these mails in their leisure time.

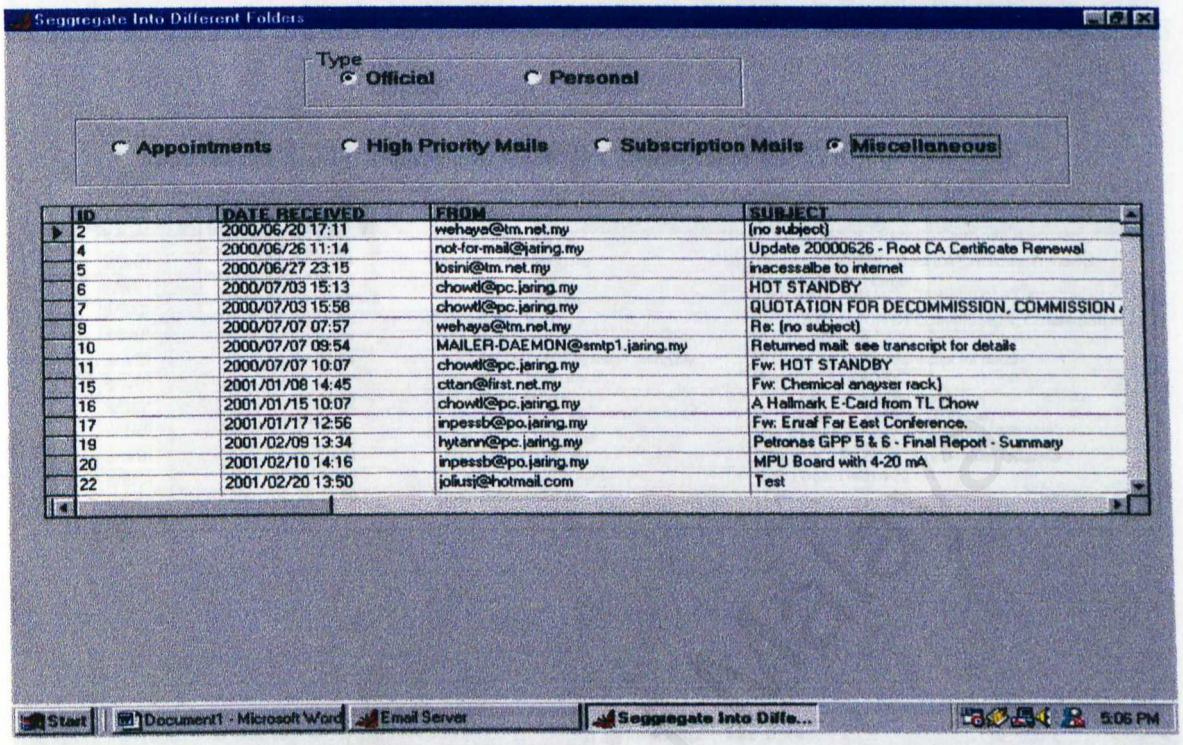

Figure 6.19: Miscellaneous

20. All Miscellaneous mails which do not fall into the other entire 3 category will be sent to this folder when segregation button is clicked.

21. Use can click on this folder to view unimportant mails.

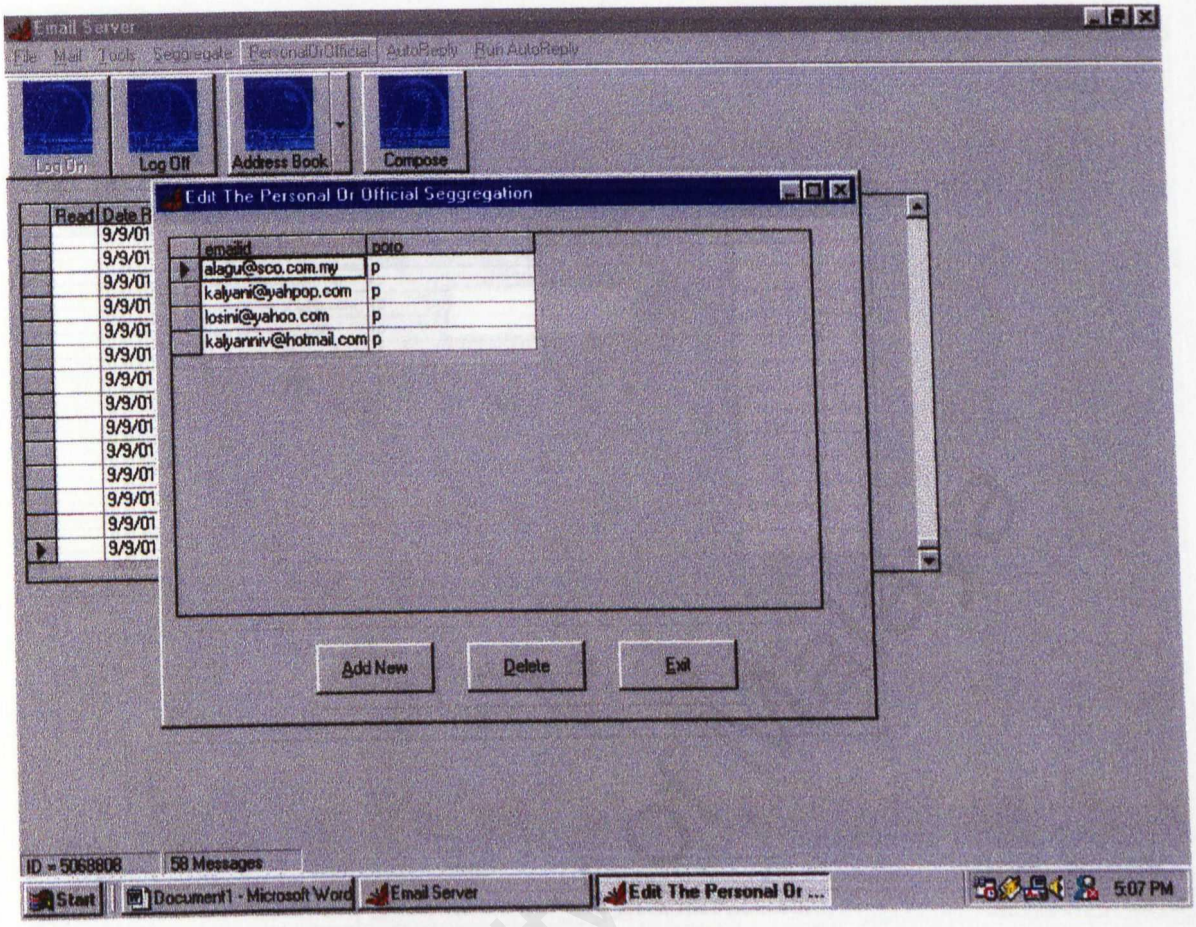

Figure 6.20 Edit Personal or Official Segregation.

22. **Figure 6.20** shows the edit button so that users can add mail addresses in the Official folder if it is for official use or if it is friends e-mail addresses it can be put into Personal folder.

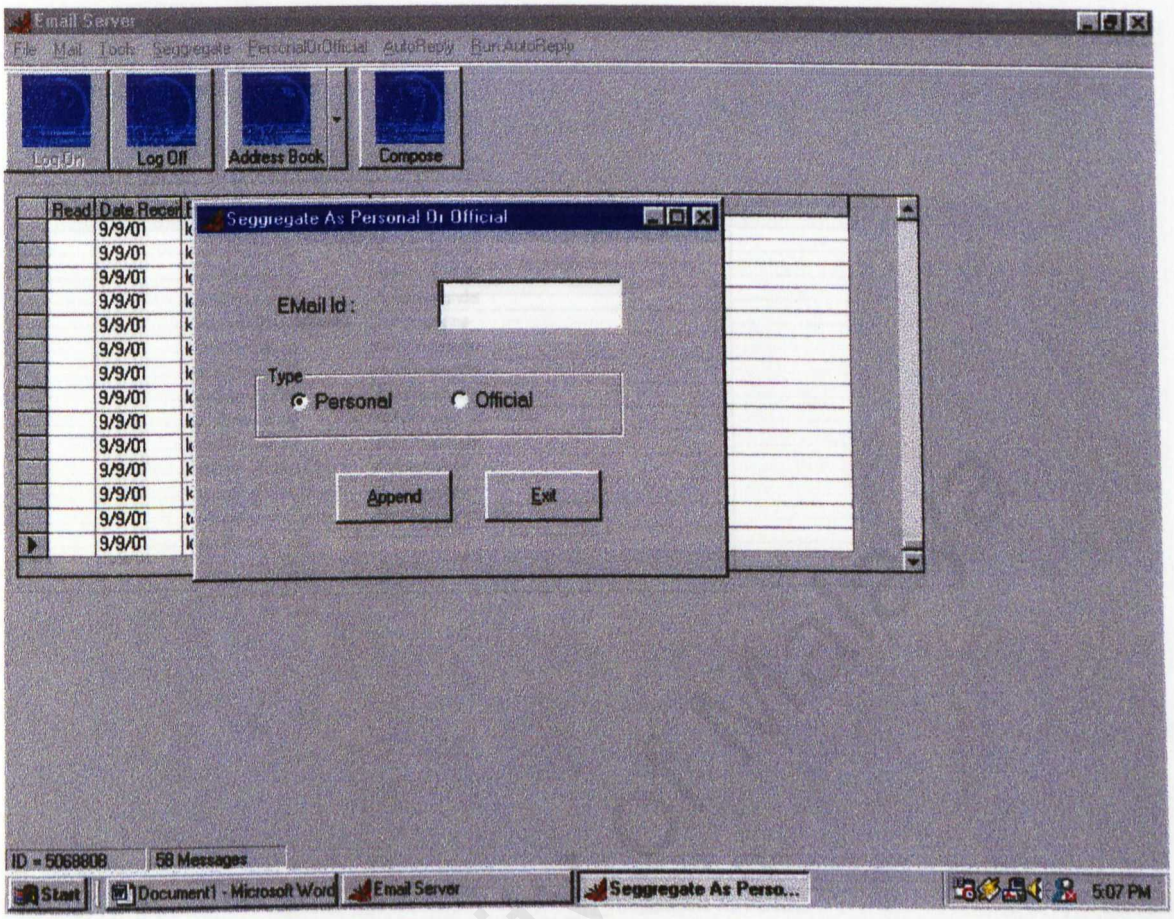

Figure 6.21 Choosing The Appropriate Segregation Folder

23. Enter the email id and choose the appropriate segregation folder preferred.

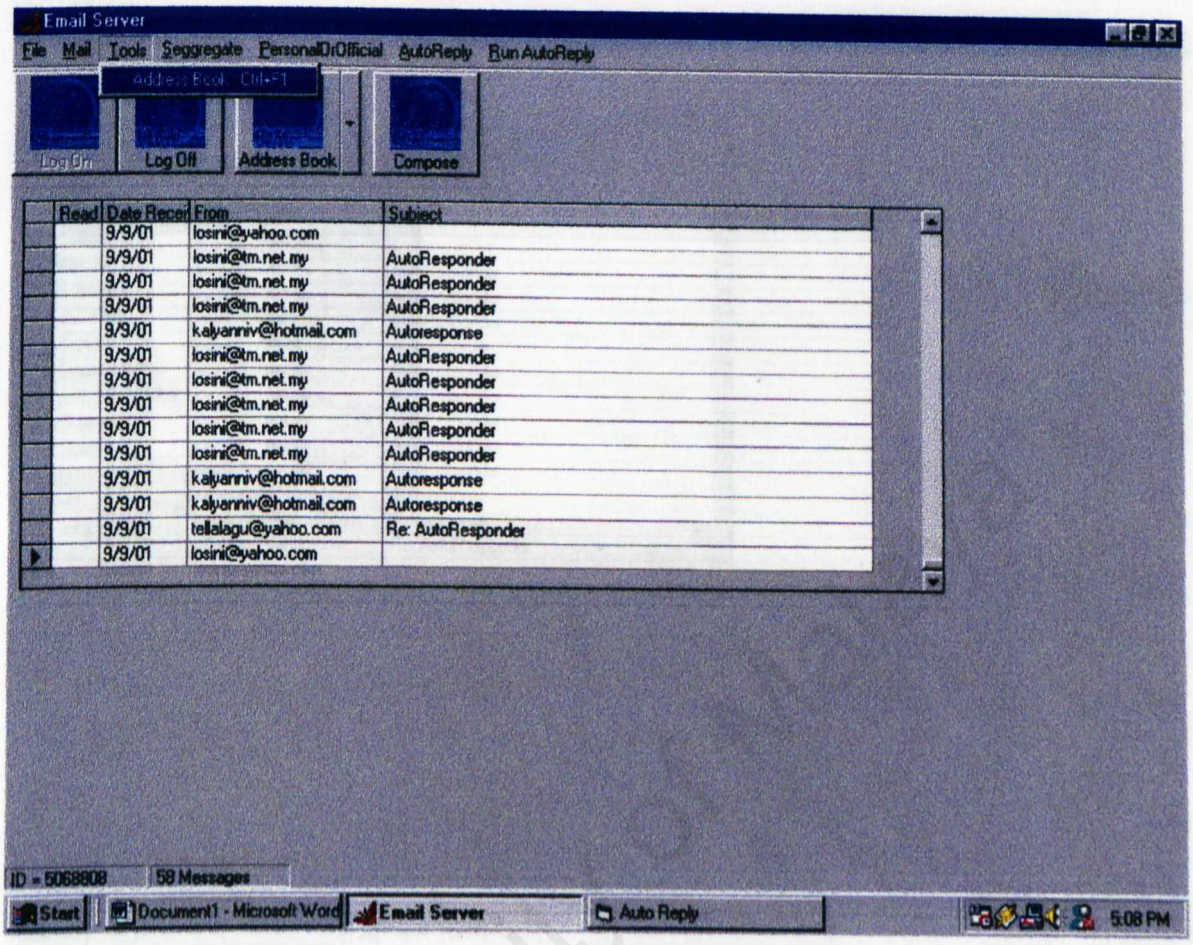

Figure 6.22 The Address Book function

24. The Address Book function is imported from the Outlook Express, therefore the addresses in the Outlook Express can be used in this program.

25. The program stores the Address Book function under Tools. User can choose the function using the click of the mouse or simply press CTRL+F1.

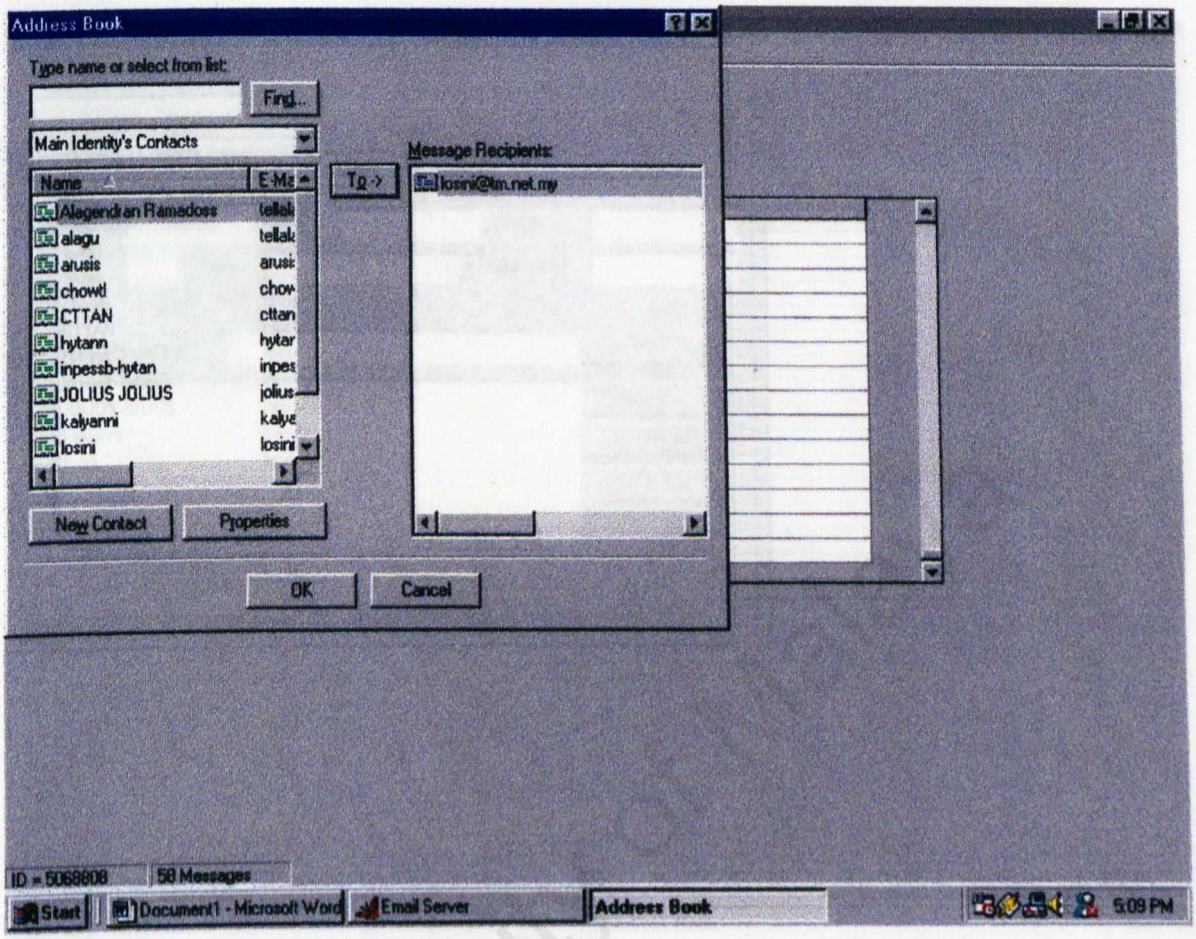

Figure 6.23 The Address Book

26. The Address Book function from the Outlook Express.

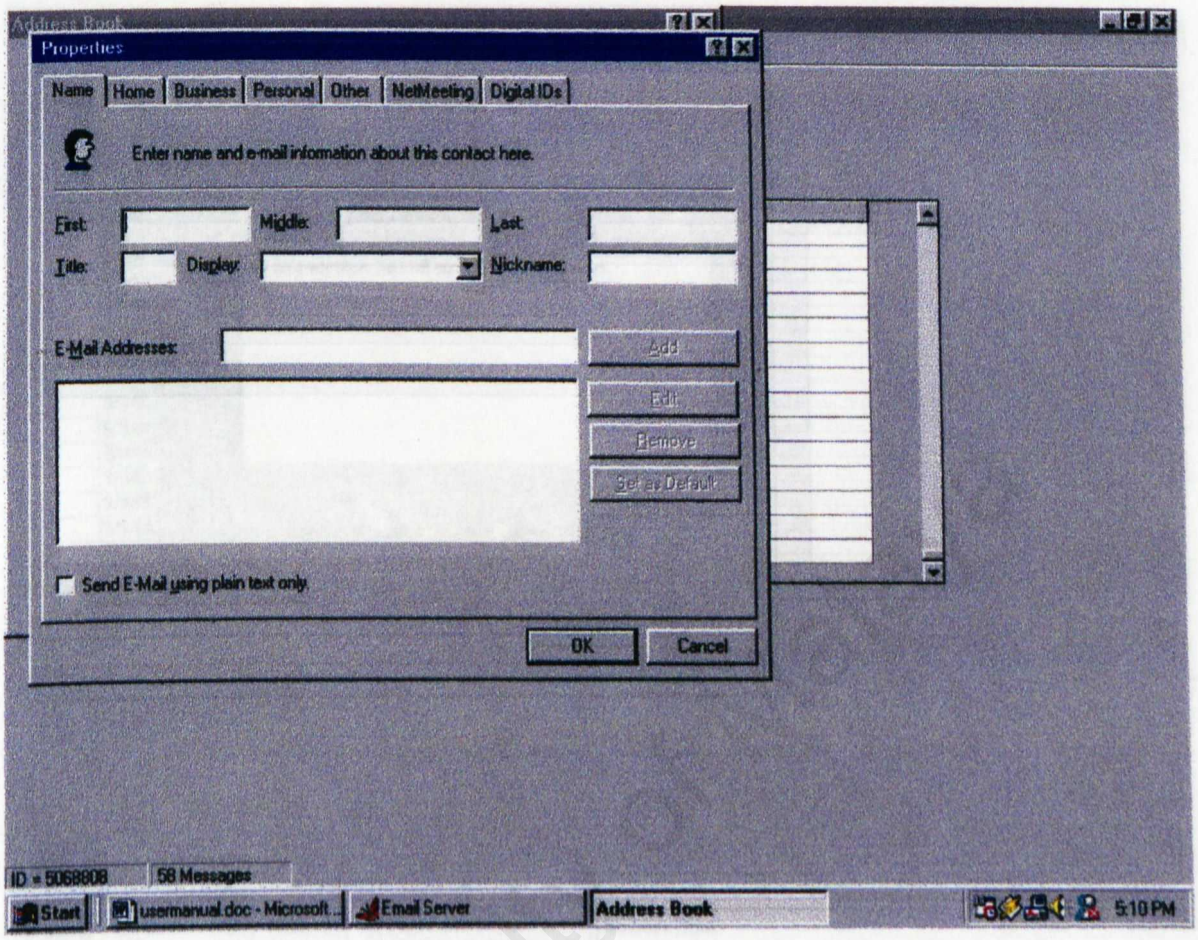

Figure 6.24 Adding A Contact Into the Contact List

27. The pop up menu to add a contact into the contact list. Fill in all the particular details and click OK.

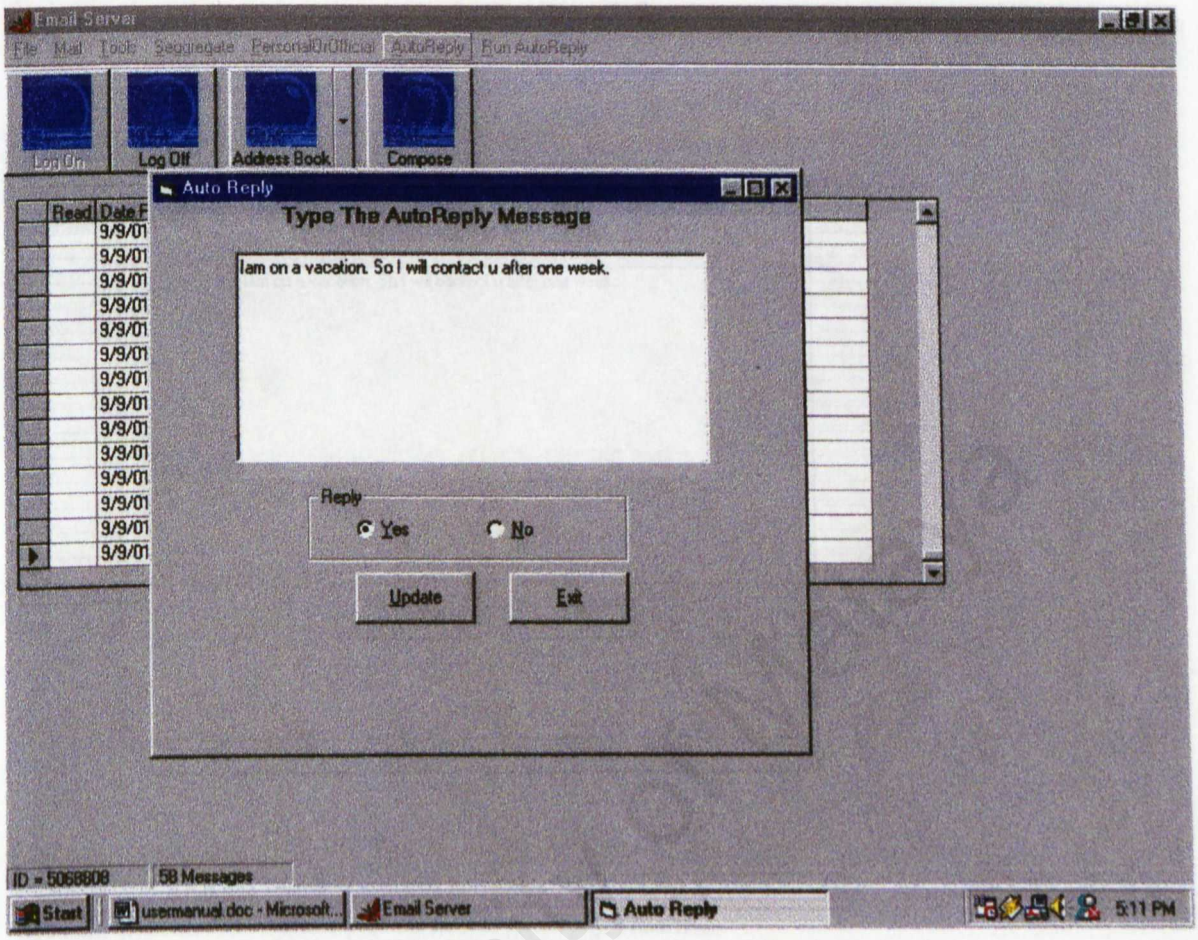

Figure 6.25 The Auto Reply Update

28. The Auto-Reply function can be selected to reply email when users are not in the office or out of town.

29. The function is under the Auto-Reply function in the Toolbar. Select Auto-Reply and user will see the pop up menu in **Figure 6.25**.

30. The function allows user to edit the reply to be sent to the receiver.

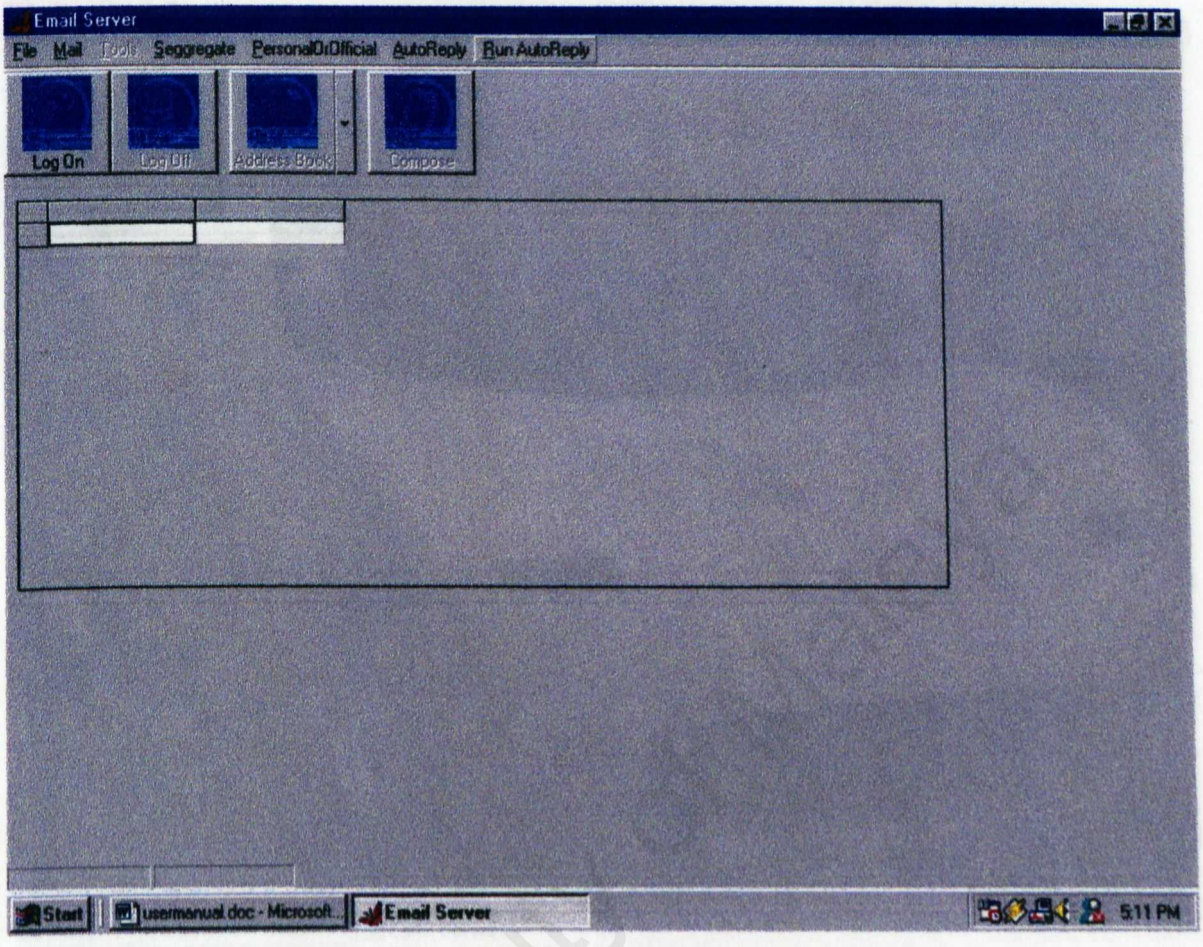

Figure 6.26 Run Auto-Reply

31. To enable the function, select Run Auto-Reply. This will activate the Auto-Reply system.

Figure 6.27 The Auto-Reply Activation Signal

32. The Auto-Reply will signal its activation with a pop up menu in the figure above. It will close the Inbox and continue to run and send replies to email address that sends mails from the time of activation.

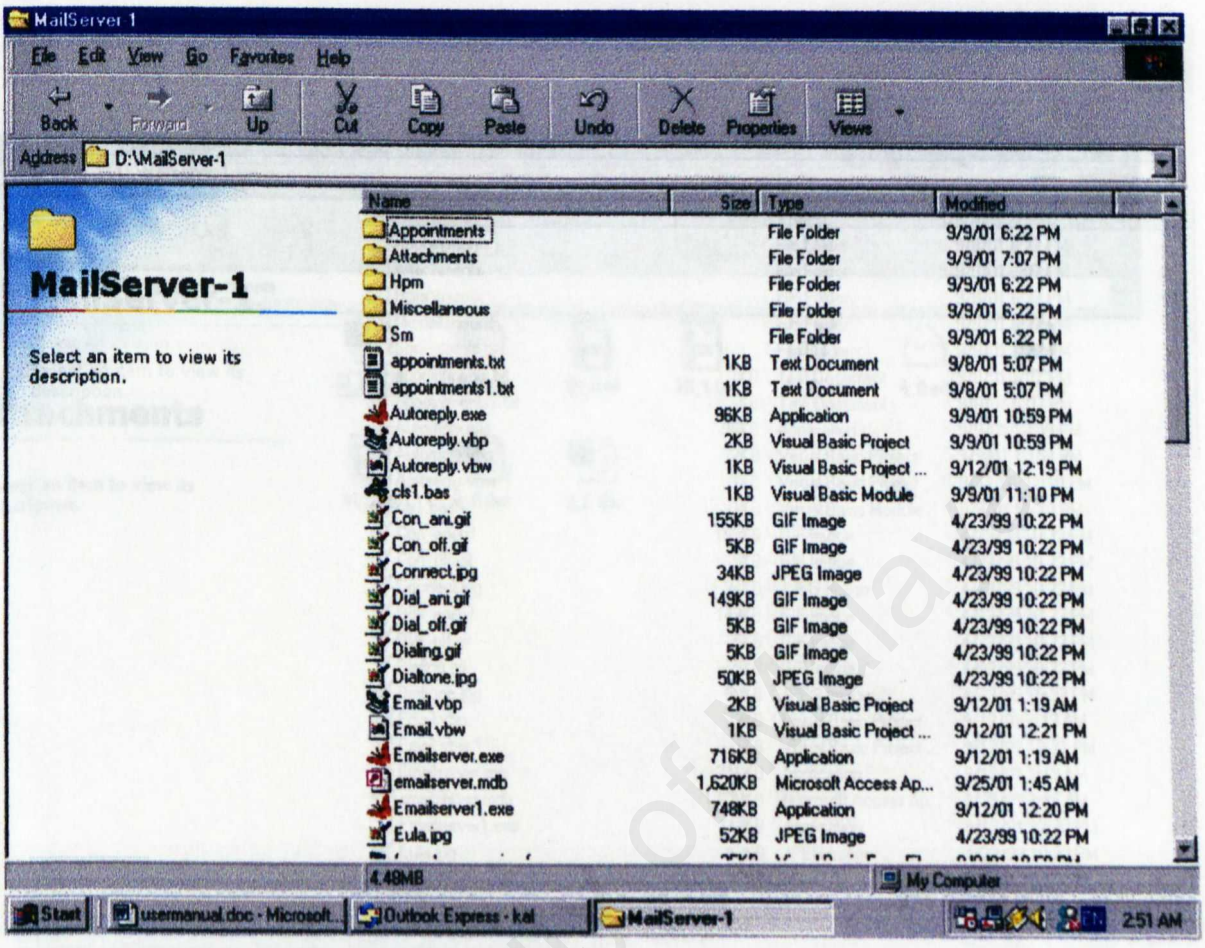

Figure 6.28: Attachment Folder

33. The attachments are stored under d drive to make easier for users to check their mails.

34. These attachment are stored as d://Mailserver-1/attachments

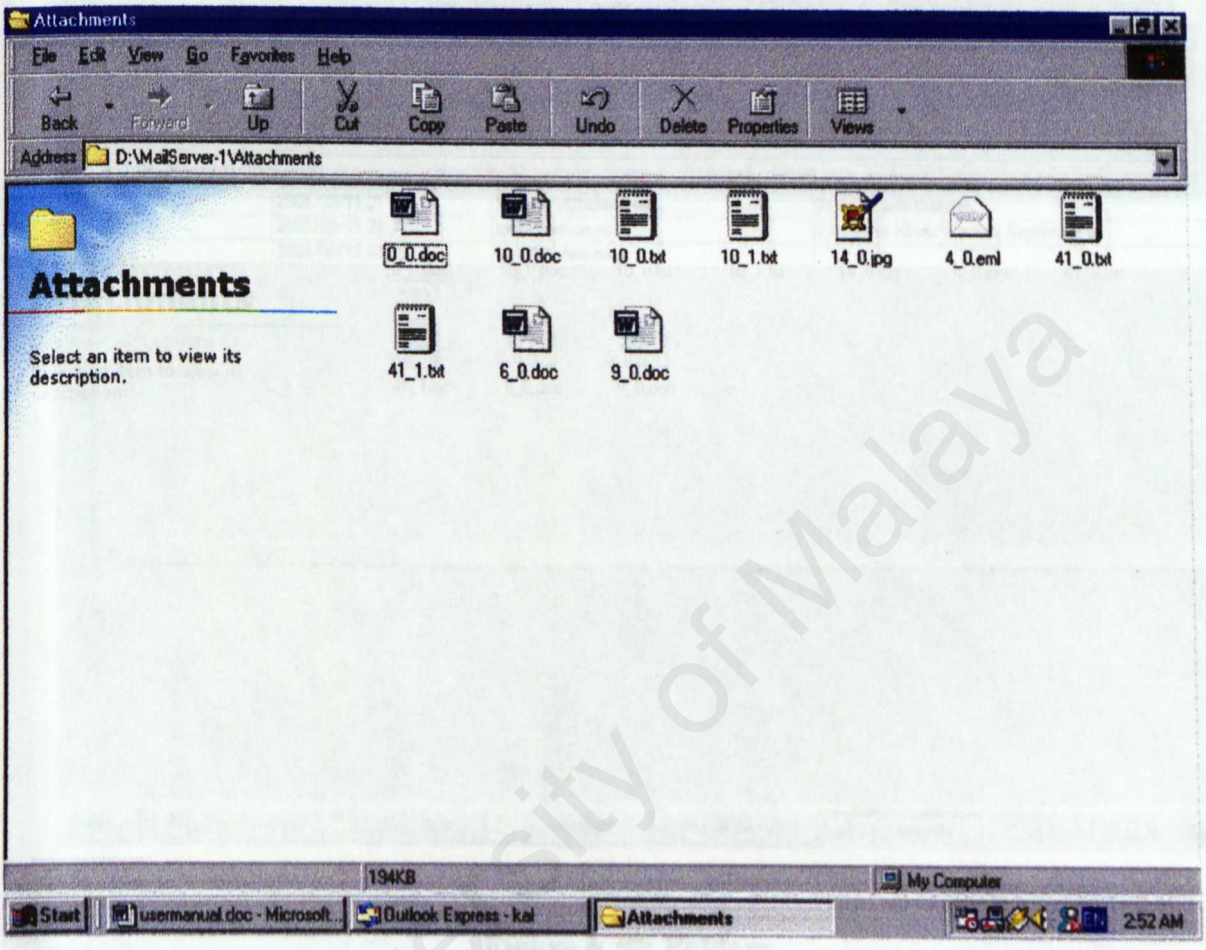

Figure 6.29: Attachments

35. The attachments are stored as 4_0 whereby the 4 represent the e-mail number and the 0 represents 1 attachment for the specified e-mail.

36. If there is more than one attachment for the e-mail then it is represented by 0,1 and so on.

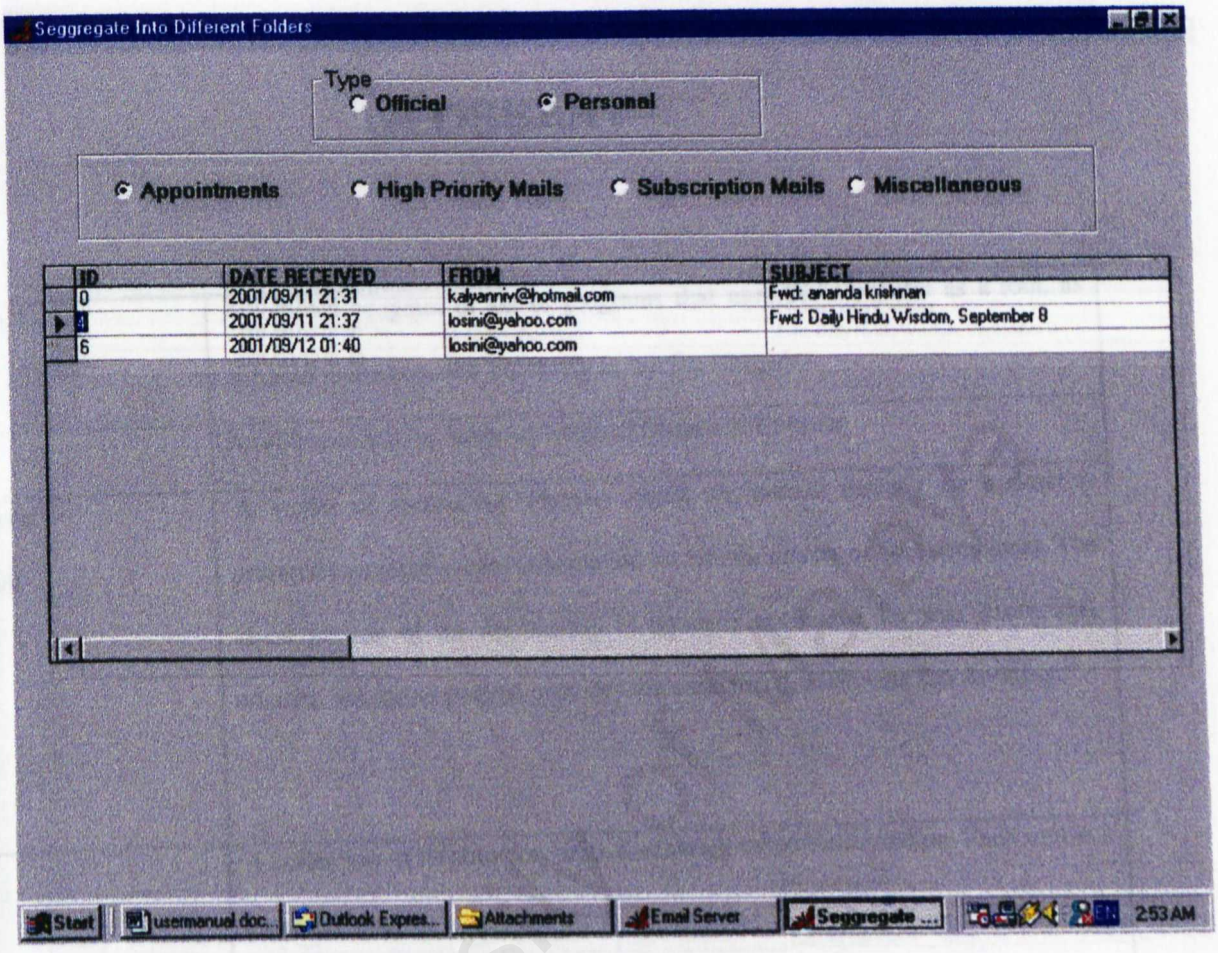

Figure 6.30: Folders

37. The mails can be checked in the folders itself.

GLOSSARY

Application	A software program or set of programs that uses the computer as a tool, as opposed to the software necessary to run the computer.
ANSI	An abbreviation for America National Standards Institute.
Client / Server Architecture	A model of computing whereby client application running on a desktop personal computer access information on remote servers or host computers. The client portion of the application id typically optimized for user interaction, whereas the server portion provides the centralised, multi user functionality.
Database	A collection of information units containing related information. Each unit is a database record
Data Dictionary	A repository of information about data, such as its meaning, relationships to other data, origin, usage and format. A data dictionary manages data categories such as alias, data elements, data records, data structures data stores, data models, data flows, data relationships, process, functions, dynamics, sizes, frequencies, resource, consumption and other user-defined attributes of data.
Database Management System (DBMS)	Any set programs designed to build and maintain database.
DLL	An executable code module that Windows can load on demand as and when programs need to use its function.

E-mail	Or Electronic mail. Involves sending and receiving message over the network.
File	A collection of related records treated as a unit
Graphical User Interface (GUI)	A user interface that displays graphics and characters and which provides an event model for users to control the operating environment.
Host	The controlling or main computer in a data network.
Internet	A world-wide system of linked computer networks for data communication services such as World Wide web and electronic mail.
Internet Service Provider (ISP)	The starting point everyone on the Internet. An ISP can be a commercial provider, a corporate computer network, a school, college, unuversity, of the government.
Operating System	Often referred to as "OS. The set of programs that control the computer and its processing.
Protocol	A set of rules
Record	Data items brought together to from a unit. A group of records make up a file.
Server	The computer system that responds to inquiries or transaction is from a client computer.
Standard	A commonly agree-upon, published specification for communications or systems hardware, software or interface.

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