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DEVELOPMENT OF INTERACTIVE RESUME

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ABSTRACT

As a fulfillment to our Information Technology Degree Program in University of Malaya, all undergraduate students were required to accomplish a Final Year Thesis Project.

Thesis title of my project is Development of Interactive Resume. As for development this project, I would name it Interactive Resume System (IRS).

Interactive Resume System (IRS) is a smart web-based system which allows users to going step-by step to generate their resume in an interactive way. The "interactive way" is means to present the user's resume in two ways. First is the common and usual method which resume in paper printing. The second way which is the most modern and attractive approach is to present their resume in a flash scheme.

As for the applications development, Visual Basic 6.0, PHP and MySQL will be used in this project. With the IRS, the users will be access the secured services in both easier and convenient fashion. As an overall review, IRS is a meaningful system which providing helps and convenient for the user to develop their interactive resume in no doubt.

ACKNOWLEDGEMENT

First of all, I would like to express my utmost gratitude to Encik Mohamad Nizam HJ Ayub for giving me the rarest opportunity to join his thesis group in developing the "Development of Interactive Resume" Project. Despite my status as a student, I was given all possible help in designing the project and preparing the report in order for me to complete my project flexibly, smoothly and successfully. I would like to express my appreciation towards the guidance I received.

A special thanks to my Moderator, Puan Nurul Fazmidar Mohd Noor for her advice and suggestion throughout the development of the project.

My greatest thank you and appreciation also goes to all my friends. Their views, opinions and the willingness to share their knowledge had indeed enlightened me and given me plenty for self-improvement.

Not forget to express my deeply appreciation to my family. Thank you for their unlimited support by giving me guidance and the most important, caring, motivation and encouragement in putting this project into a success.

Last but not least, finally, thanks to everyone, who has touched my life in developing this project for all the little things which mean so much to me. Thanks to all of you for your kindly support from time to time. I treasured it so much.

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CHAPTER 1: INTRODUCTION

1.1 Project Overview

When we talk about "Resume", it is a very obvious and clear idea in your mind. As we know, "Resume" is similar as a summarize document of describing ourselves about our profiles, qualifications, experiences, skills, personality and etc. in order to provide a clear and good impression to the others. In the job search process, a well-written and well-designed resume is a must.

Currently, most resume is only presenting in print out document and it is too simple. For now, we have to lead ourselves to a higher standard of living life due to the flooding of high-technology world. That is why we have to ensure everything going on time which refers to faster and better performance. For this purpose, an Interactive Resume system (IRS) has been introducing.

This system is to help students to prepare an interactive resume which is not only output will be in printing out document but also will be in flash resume presenting. It will be presenting their resume in the interesting and fantastic way with professional flash animation to eye-catching the people's attention especially in job search process. That's why this project is being developed.

This Interactive Resume System will be given a good guide to users to choose their favorite template design for their own resume through the step-by-step guided. IRS will be preparing various type of flash template design for users to choose. After choosing the template, the user is requiring to enter their particulars according to the form requirements. It's only take a simple steps to finish key in all data, then the system will sending their particulars to store in database server in order to connect to flash. Finally, a nice flash template, systematic, neat and tidy flash interactive resume will be presented.

As presenting the resume in a livelier features, it will not only attracted interviewer for spending a few seconds time to have a clearly image about the candidate, but also will be the new way for users to improve the lifestyle follow the flow of this technology world.

Generally, this Interactive Resume System is helping users to create a new style of resume's presentation. It will be an easy way to act as a resume wizard to the users to create their own attracting resume. As a whole, it is saving user's time in order to creating and arranging the particulars by themselves.

1.2 Project Objectives

IRS is being developed to fully utilize the advancement in Information technology to improve the writing and presentation of resume method. It is to help users to perform their resume in an interactive way within few minutes.

The main objective of developing this project is to design and develop an interactive, easily accessible, user-friendly and reliable resume in flash resume presenting. It provides the easiest way for users to create their own interactive resume. It is not only saving the time for users to writing their own resume but also presenting in an attractive way.

In the mean time, it is improving the convenience, accessibility and quality of an interaction for users.

Meanwhile, the procedure for users to use is easy and simple. Users just need to follow the instructions to complete certain steps and the system will be able to convert it into the interactive presenting way. It is easy to use and doesn't waste much energy and time for users.

As an overall, this project is wish to helping students to come out an interactive resume as not only in documentation format but in another interesting presenting way. The way of expressing the resume presenting will be in an .exe file as to make sure it can access in any computers without any additional software support.

1.3 Project Scopes

IRS enable user for easiest way of preparing their resume in an interactive way. In order to make this system running successfully, the system must be improved from time to time. Before developing, the system must include the most basic design and operation in order to accomplish the success of the project.

The scopes are:

- A system structure must be plan and design for easy refers.
- The design interface must be easy to understand by the user.
- The instructions showing must be clear.
- The output must be able to access in any computer without additional software support.
- The system must be able to support any common image files.
- Easy to navigate the whole document into flash presenting way without causing problems to users.
- Having function of spelling and grammar checking.
- Includes features for user to choose design, music and etc.
- Easy to load, save for files and etc.

1.4 Development Strategy

In developing the IRS, a sequence of steps is followed in order to run smoothly. These steps can be divided into 7 sequence phases although those phases are interrelated and often are accomplished simultaneously in reality.

The 7 phases are:

1. Identify problems, opportunities and needs
2. Determining information requirements
3. Analyzing system needs
4. Designing the recommended system
5. Developing documentation software
6. Testing and maintaining the system
7. Implementing and evaluating the system

1.5 Expected Outcome

After developing the system, we must try to implement the system in many ways. There are some questions which we need to bear in mind in order to boast a successful system such as what will be the benefit for this system brought along, what are the major uses of the system, would it really helping users and so on.

As a result, we must make sure the outcome will be able to meet the user's need. For this project, there are few situations should be expected to meet all its objectives:

- User must be able to choose the design template they like.
- System is able to navigate into flash format.
- System is able to printing out the resume copy.
- System is able to show previewing before running in order for users to edit.
- Output of the system should be able to access in any pc without any additional software support.
- A neat and tidy flash resume is presenting.
- Output will be the full summary of user's resume.

With the situation above been confirm, the expert outcome would be the good steps in develop the system in the better environment to meet the user's need.

1.6 Project Schedule

A project schedule describes the software development cycle for a particular project by enumerating the phases or stages of a project and breaking each into discrete tasks or activities. It gives a rough estimation of the time frame that will be needed to complete all the individual tasks. It is planned as a guideline to manage the various tasks that has to be completed within the given duration or risk undertaking unnecessary additional cost of manpower. With the proper project schedule planning, tasks will be distributed within a fine time to enable the best use of resources and ensure a better outcome.

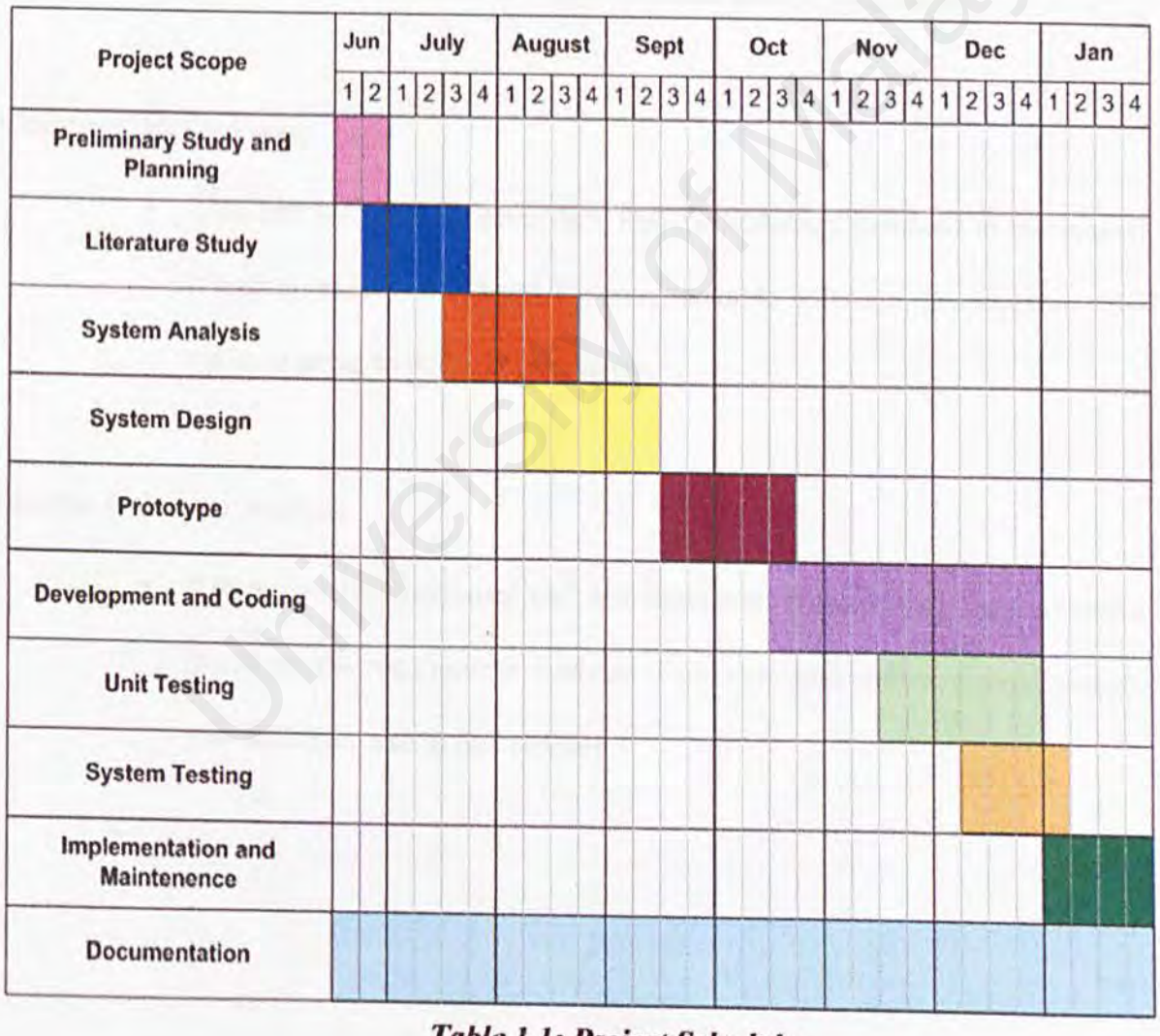


Table 1.1: Project Schedule

1.7 Report Overview

Chapter 1: Introduction

- It gives a brief overview about the whole system.

Chapter 2: Literature Review

- It details the studies that have been done for the system and it includes the details on the field of studies involved. Besides, all the existing systems are evaluated and their concepts are taken into consideration.

Chapter 3: Methodology

- This part includes the procedure and methodology involved in the system planning which considered the most suitable software development life-cycle in using to develop the system.

Chapter 4: System Analysis

- It describes the functional and non-functional requirements for the system based on the requirement analysis. Hardware and software requirements also will converse in this chapter.

Chapter 5: System Design

- It reviews all the design issues in the project development. It focuses on the discussion about the system functionality design, databases design and interface design.

Chapter 6: System Implementation

- In implement where the development environment is concerned here. All the software chosen is listed. It also touches on the coding aspect in the system development.

Chapter 7: System Testing and Maintenance

- As is stated, the activities of testing and maintenance are mentioned in this topic.

Chapter 8: System Evaluation and Conclusion

- The new system is evaluated based on its limitations and strengths. Problems and solutions are also discussed here. Finally, the reports end with a conclusion of the project.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

In the process of developing a system, research and planning should be done in various aspects in order to come up with a better system. The purpose of this review of literature is act as a background research to obtain a better perceptive on the development tools which used to develop the project and get a better comprehension on the development tactic used while mounting the project. It offers the development of using the best way to access and analysis information regarding to the research topic.

There is no use of reinventing the wheel that has already been invented. The development can rather focus in learning the existing and modifying or enhance it into a more powerful feature for project. Another important purpose is to sufficiently equip the development with some knowledge of the strengths and limitations of several development tools. This can help the developer to use the right tools when develop the system. It not only aids the developer to recognize the relevant information and synthesizes and evaluates it according to the guiding concept but also assist user in developing their information and approaching their skill critically.

To ensure the proposed will be a better system compared to the existing system, investigation and analysis of all these info are very important. It will also avoid repeating and carrying the weakness of the existing application to the proposed system.

2.2 Approach of Literature Review

In the hardest sense, a system is a collection of elements interacting together to accomplish some purpose and system around us. Different system can be developed in different approaches using different tools. Before develop a system, a lot of research has to be carried out to congregate the information about the system itself, the procedures as well as the methodology involved in developing the system. All these information can be obtained from various sources.

Each source will provide different information depending on the analysis of the developer himself. It depends on the ability of the developer to analysis the information to extract the most useful information out of it.

In the development of these interactive resume, numerous information were used as a guided to gain information on how to expand the project. The results of this research in have set as a foreground for the development of this system.

Most of the findings for this project are gathered regarding the resource which is as following:

- *Internet searching*

  Internet is the main sources and a most effective way of gathering information. Relevant information is analysis on the web. There are a lot of information about the comparison of such system development can be found on web sites.

- *Refer to reference books*

  A lot of books, journal can be found in workshops or libraries. Some of the books have reference about the methodology and system requirements.

- *Reference to magazines*

  Reference to the latest magazine such as PC magazine and some Microsoft development magazine is the significant technique to obtain the most up-to-date information for the system development.

- *Analysis on the past-developed thesis project*

  Pass year thesis of documentation have been studied in order to identify any potential mistakes and achieve skills in improvement the software development.

- *Discussion with supervisor and friends*

  Useful and valuable advices have been given by my supervisor for each section meeting. Moreover, sharing and discussion with friends also a way to acquire the idea of developing the system. It is a constructive way in error correction and act as reminder when carried out the system development process.

- *Conducting interview and survey*

  Informal Interview have been conducted with various people such as system developers, system administrators, and some other computer based background peoples to find out more about the system and also potential to improve the

system. Surveying is done as a research so that a user-friendly interface system will be design with more effectively and also will be sure to meet the user's requirements.

- *References and study on existing system*

  Look up for the systems that have most of the same operation as the system that is going to build as references.

2.3 Existing System Analysis Studies

As for the research before, I have done the whole research for the existing system in market for any relevant software to the Resume system. As a conclusion, allow me to compare the existing system to see it strengths and weakness so that the IRS can have more improvement and expansion than the others systems.

2.3.1 Case Study 1

Microsoft Word

Date Accesses: 5 July 2004

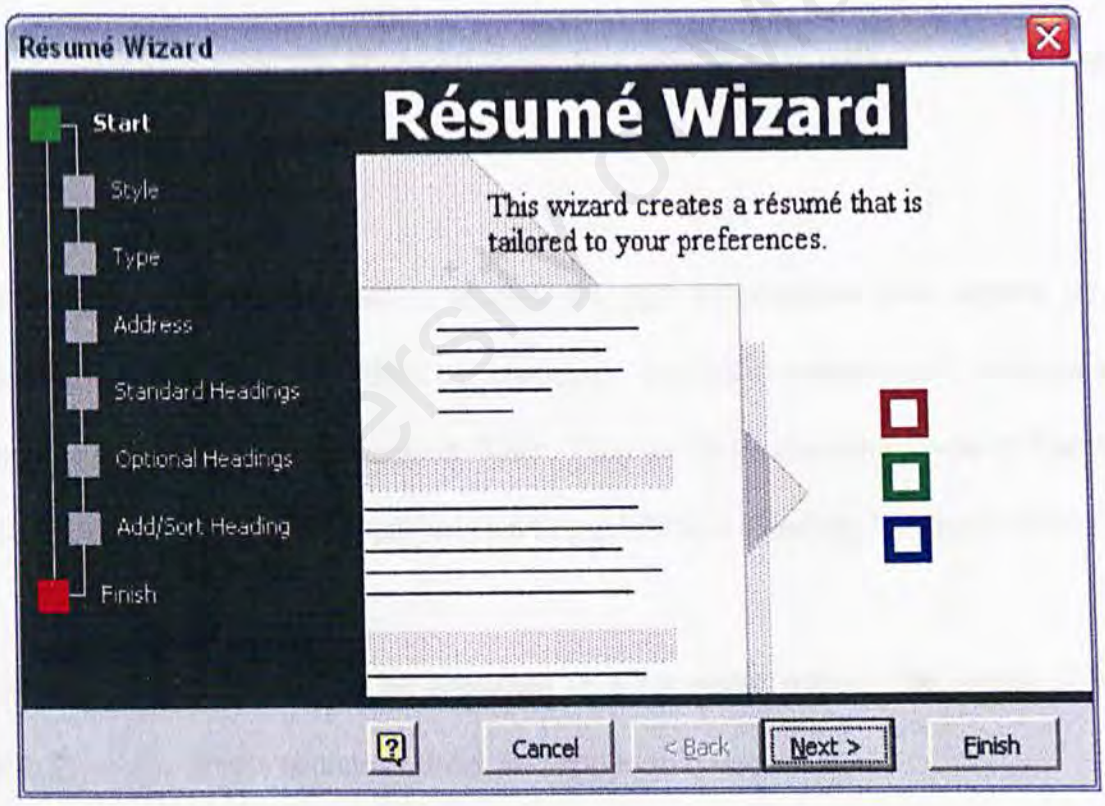


Figure 2.1: Resume Wizard of Microsoft Word

Overview:

As we know, Microsoft Word is a powerful word processor which developed by Microsoft. It is a word processing program that lets us create a variety of documents. This is the most widely used word processor in the world.

In Microsoft Word, it is used to create and format text and graphics to form impressive printed materials. With Word you can format text with styles, colors, fonts and font attributes. Word provides tools for numbering pages, creating outlines, formatting lists and tables, and many other document elements. Word even has wizards for creating everything form labels to calendars.

AS for comparison with IRS, Microsoft Word does provide a category of created Resume that we personalized to our own partialities. It called Resume Wizard.

Obviously, the Resume Wizard is helping the user to complete their resume in an uncomplicated and easy way. Only eight steps are needed in preparing a simple resume through Resume Wizard in Microsoft Word. They are Style choosing, Type of Resume, Address, Standard Headings, Optional Headings, Add/Sort Heading, Finish and Print out.

As a whole, this resume will be presented in a document output. The output will be printing out as a simple resume in order for peoples to reference.

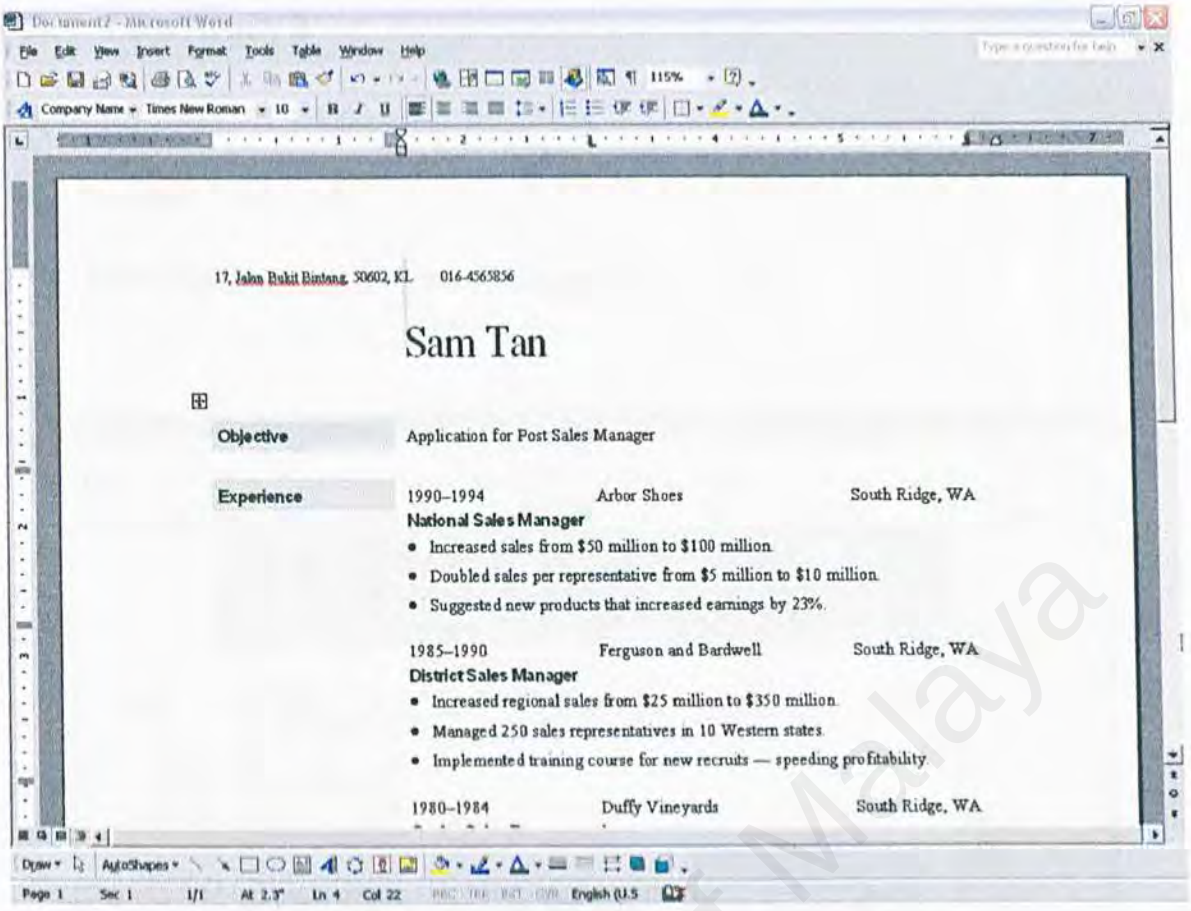


Figure 2.2: Output of Resume from Microsoft Word

Strengths:

- Simple and save time
- Easy for user to create their own resume
- Well-Arrangement

Weaknesses:

- Too simple
- Less choices of type and styles to be choose
- Doesn't provide function of uploading photo or image

2.3.2 Case Study 2

Emotion Resume Design

Date Accessed: 9 July 2004

URL: https://www.emotionresume.com/emotion/index.jsp

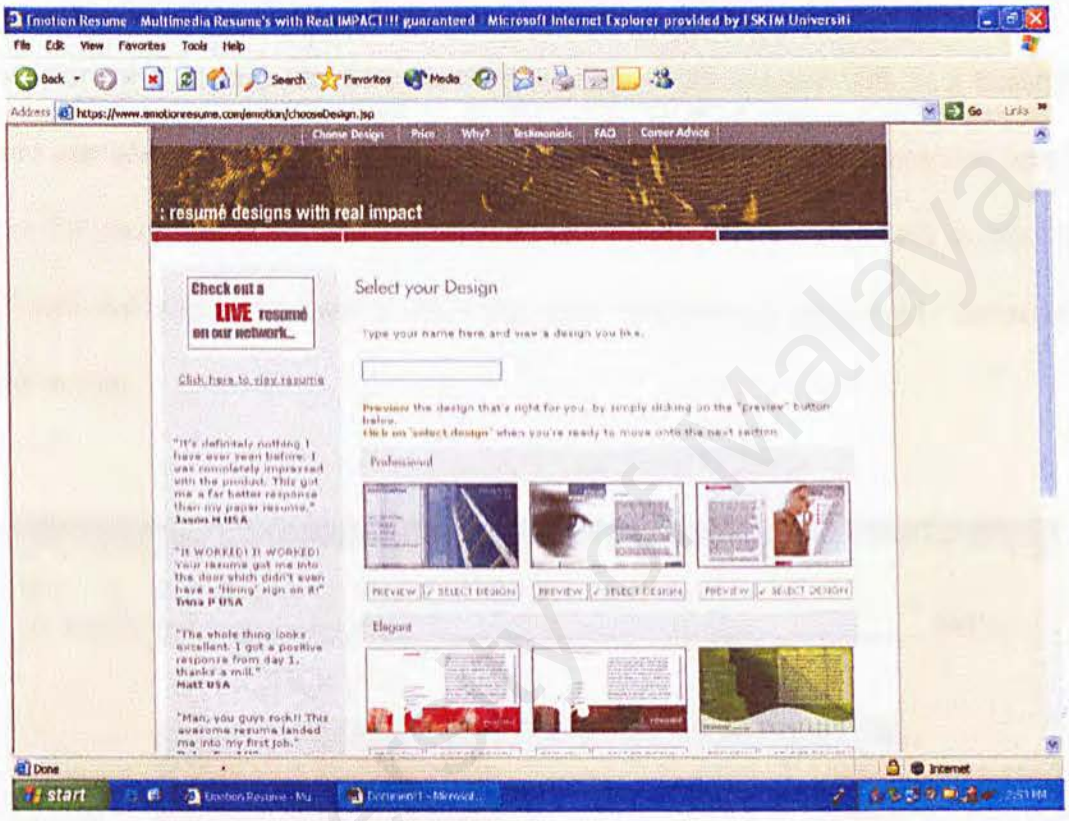


Figure 2.3: Emotion Resume Design

Overview:

Emotion Resume Design is a web-based package system which assist user to engender their resume with real impact way. It is one of the interactive resume design system which can purchase in software market currently.

This resume design system will facilitate user to systematize their job assignments and carefully document their skills and training. It provide a free trial version resume design with exactly same with the real package for user to try with. User can decide to procure or not depends on their satisfaction with the resume outcome. Once decide to obtain, the user have to pay for purchasing of this package system.

As an interactive resume design system, the output of the resume will be a beautifully laid out interactive flash unquestionably. It does endow with several interactive interface designs for users to decide on as their resume background. User only needs to entry their particulars and others information following to the step-by-step specified to inclusive the resume design.

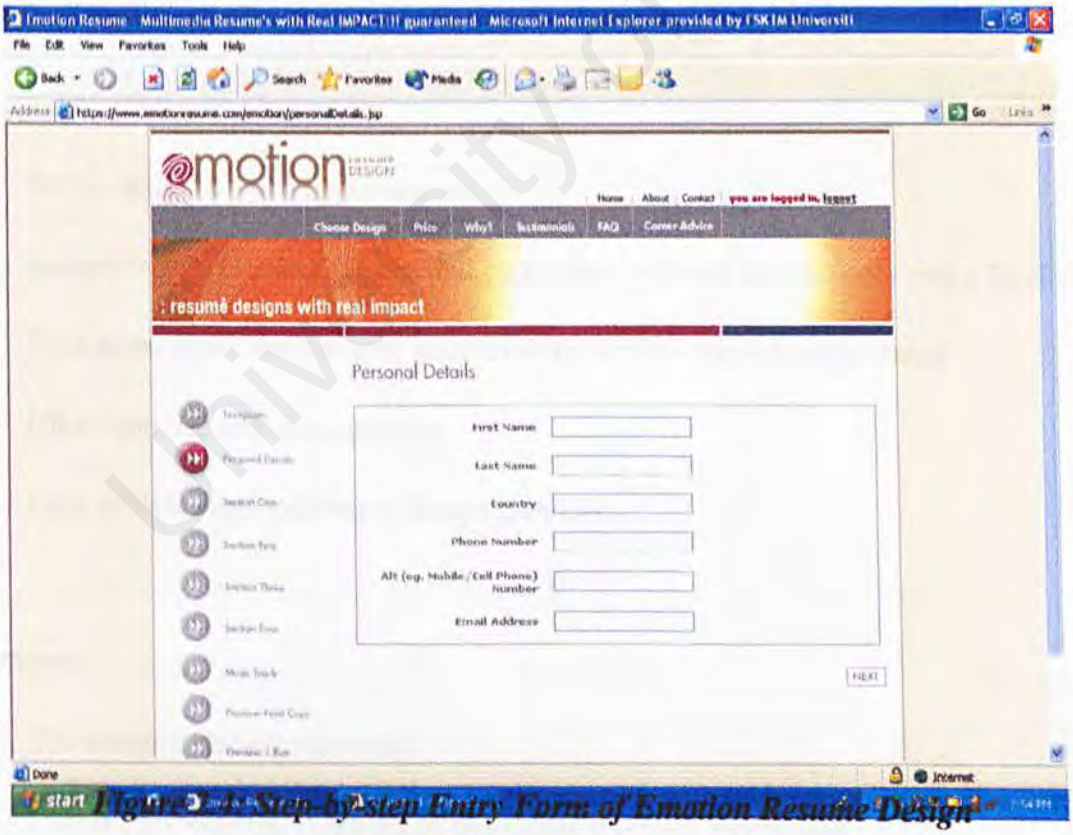


Figure 2.4: Step-by-step Entry Form of Emotion Resume Design

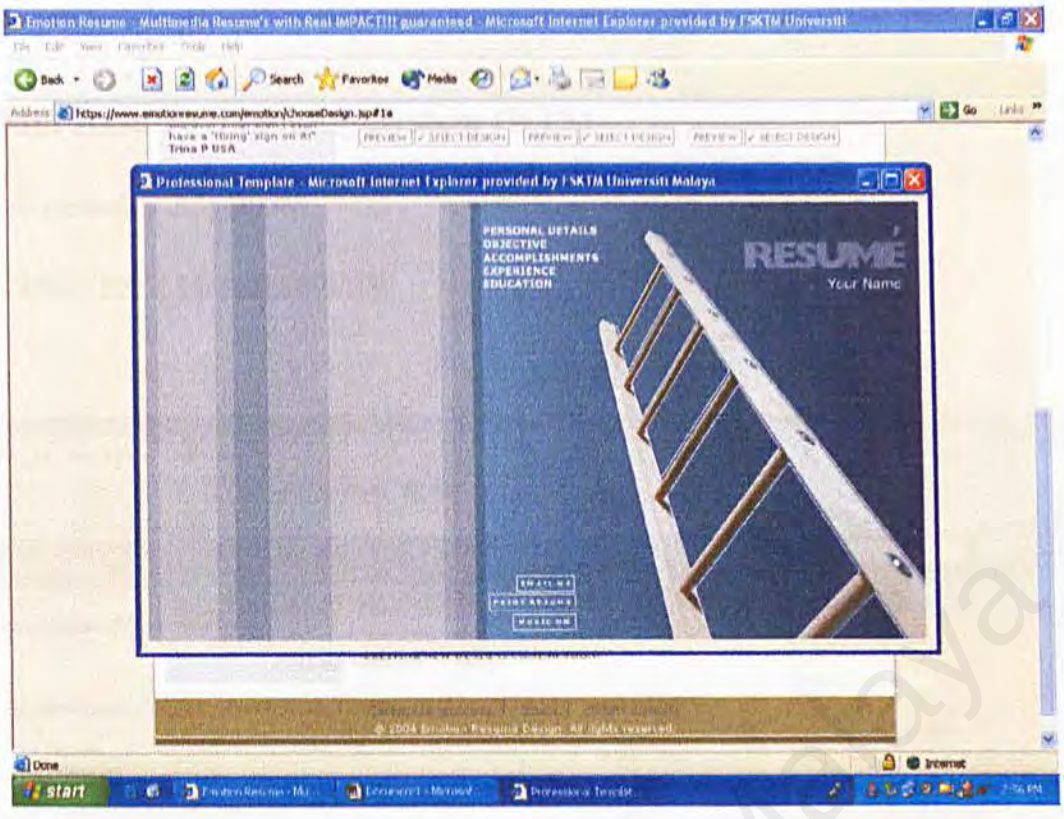


Figure 2.5: Output of Resume Design in Flash Appearance

Strengths:

- Better response than paper resume
- Integrating text, sound, image and animation improve interactivity make livelier
- Ease to navigate from one to another with step-by-step clearing stated
- Clean concise and summarizing
- Lots of styles and templates design provided

Weaknesses:

- The resume package is costly
- Doesn't provide the function of uploading photo or any image

2.3.3 Case Study 3

askSam Resume Tracking System (RTS)

Date Accessed: 9 July 2004

URL: http://www.asksam.com/rts/

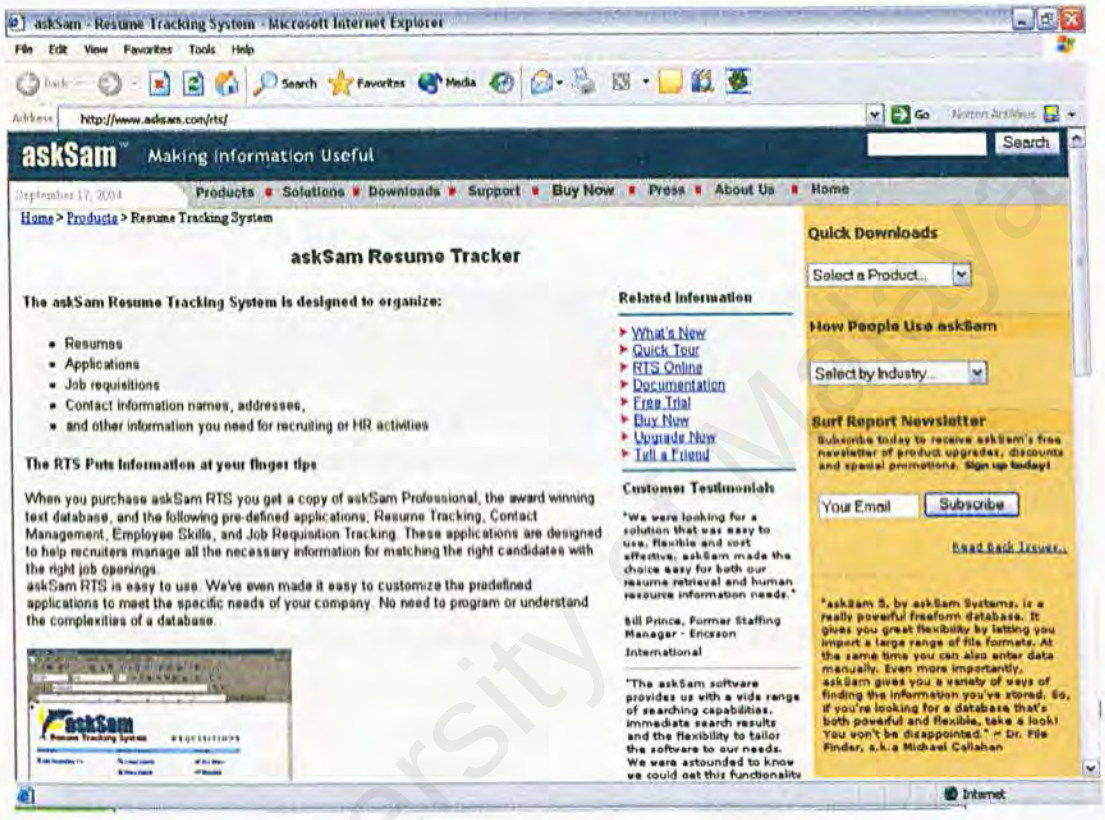


Figure 2.6: Main Page of askSam Resume Tracking System

Overview:

This askSam Resume Tracking System is an innovative system that quickly gets user stack of resumes off the floor and into the computer. It is not only designed to organize resumes but also for systematize applications, job requisitions, contact information names, addresses and other information that user need for recruiting or HR activities.

This system has some useful pre-defined applications such as Resume Tracking, Contact Management, Employee Skills, and Job Requisition Tracking. These applications are designed to help recruiters manage all the necessary information for matching the right candidates with the right job openings.

Features:

- Full-featured WYSIWYG word processor
- Searchable askSam databases
- Fully customize all forms and reports

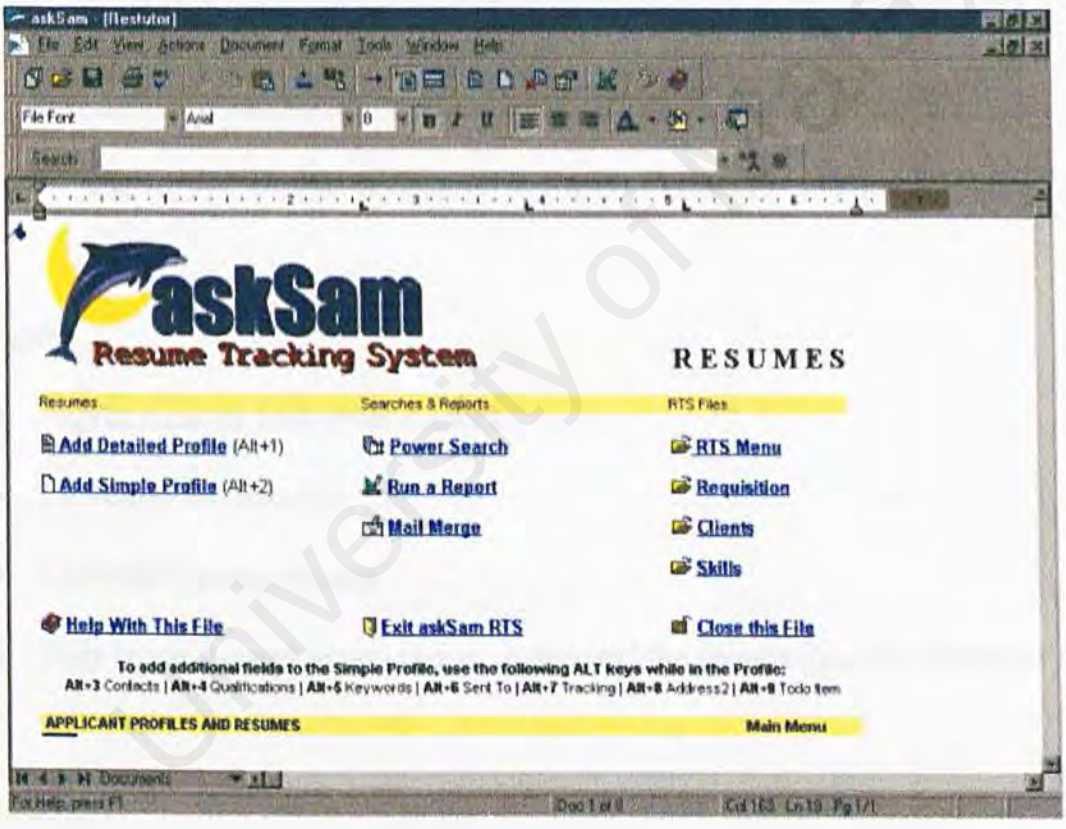


Figure 2.7: Screen shot of askSam Resume Tracking System

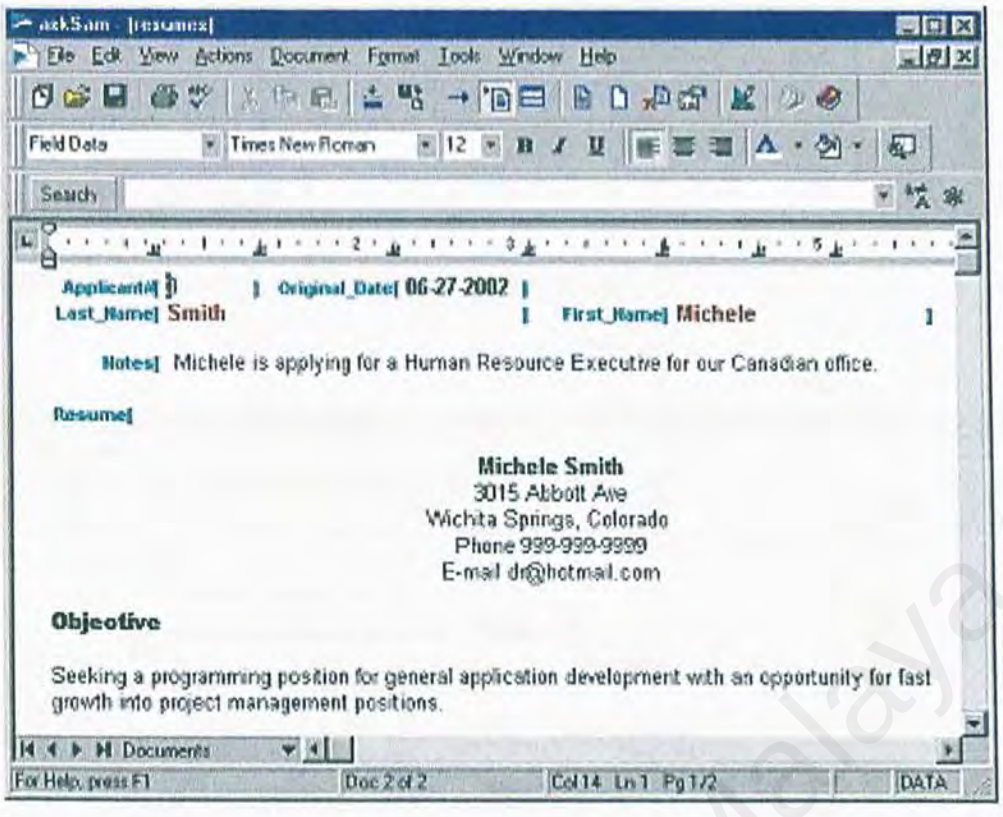


Figure 2.8: Output of Resume in Report Format for askSam RTS

Strengths:

- Import resumes from other sources
- Lightning fast searches
- Unlimited resume storage
- Easy to use as need to program or understand the complexities of a database

Weaknesses:

- Getting information into askSam RTS are not be simple as user has to scan, or import resumes into searchable askSam databases.
- Simple output

2.3.4 Case Study 4

Resume Builder v3.15

Date Accessed: 9 July 2004

URL: http://www.sarmsoft.com/product/resumebuilder/

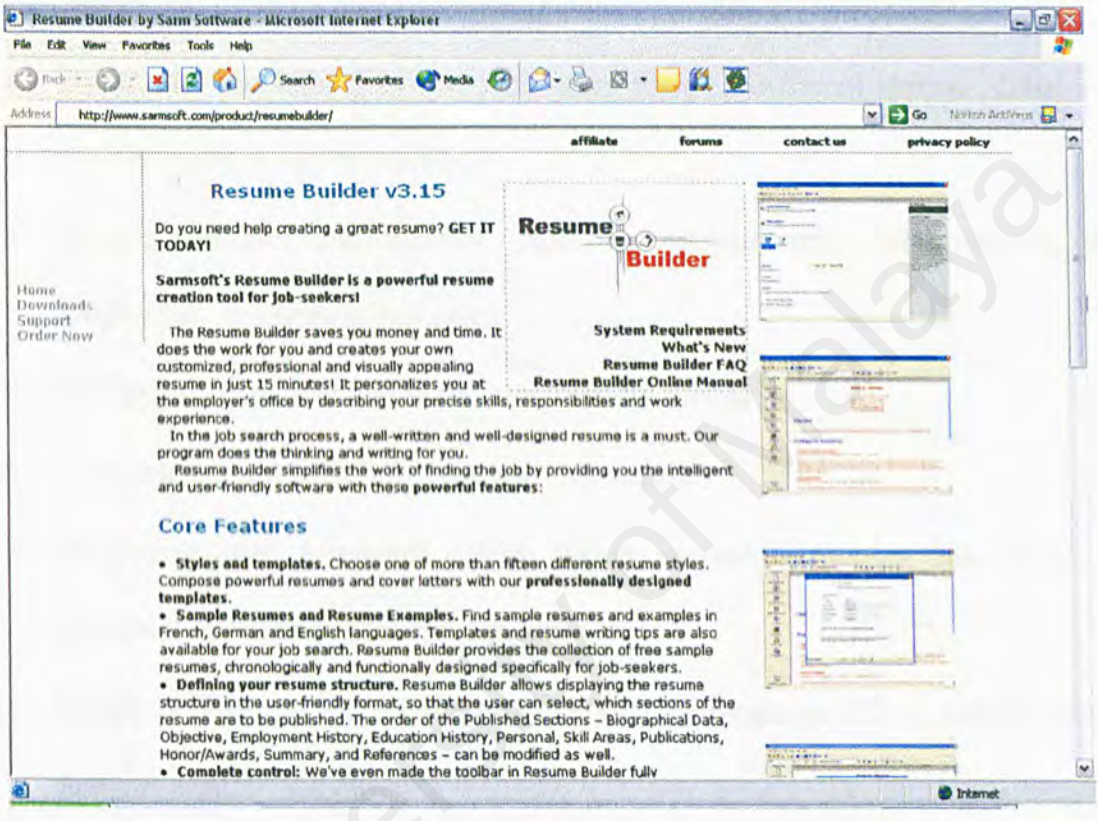


Figure 2.9: Main Page of Resume Builder v3.15

Overview:

This Resume will work for user and rally round user to create their customized, professional and visually appealing resume in just 15 minutes. It personalizes the user at the employer's office by describing their precise skills, responsibilities and working experience. This program does the thinking and writing for the user. It does simplify the

work of finding the job by providing user the intelligent and user-friendly software. Resume Builder simplifies the work of finding the job by providing user the intelligent and user-friendly software with many powerful features which category into Core Features and Advanced Features.

Core Features:

- Styles and templates provided with more than 15 different resume styles with professionally designed templates
- Sample Resumes and Resume Examples granted with chronologically and functionally designed specifically
- Defining resume structure in the user-friendly format
- Complete control with fully customizable toolbar
- Integration with Microsoft Office which supports exporting resume to the Microsoft Word and Plain-text formats
- HTML publication which exporting to HTML generates an HTML-based resume
- Support printing resume

Advanced Features:

- International language with English, France and German
- Internal database of Recruitment companies and employers contacts as can create, modify or remove user contact records freely
- Cover letters designing and providing
- Uploading photo or any graphic images to comprehensive the resume

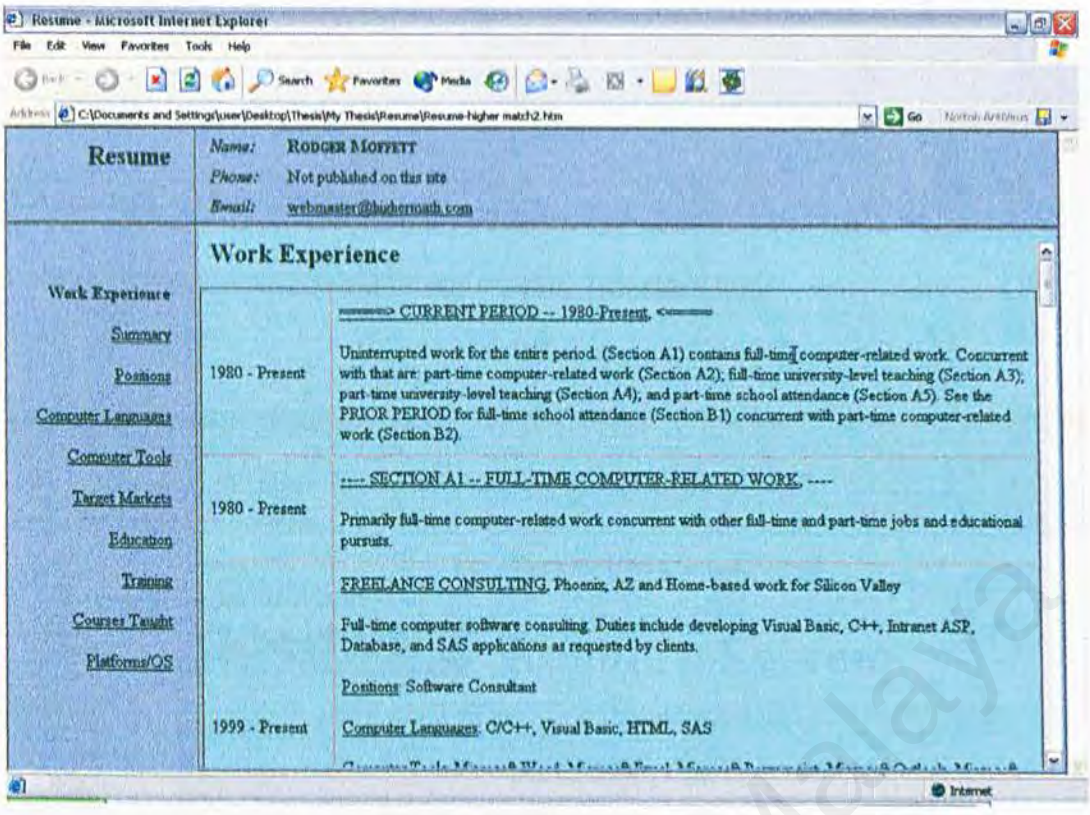


Figure 2.10: Output of Resume by Resume Builder v3.15

Strengths:

- Ease of use
- No time is wasted
- Resume Builder can create an unlimited number of different resumes, each with a different objective, each specifically crafted for a different type of position
- Lots of powerful features provided

Weaknesses:

- User Interface design of resume outcome is not attractive
- Complicated for user to entry all the information

2.3.5 Case Study 5

Goodwill Resume System

Date Accessed: 12 July 2004

URL: http://www.woostergoodwill.org/resume_summary.htm

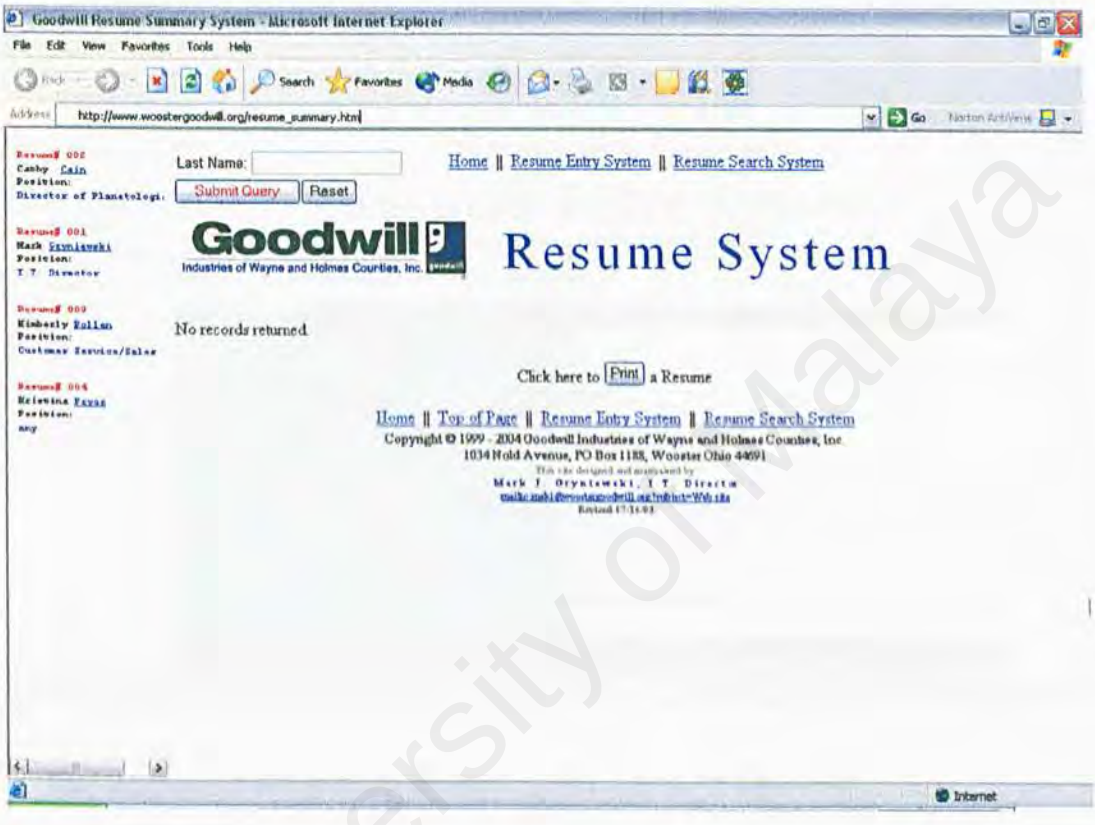


Figure 2.11: Main Page of Goodwill Resume System

Overview:

Goodwill Resume System is a simple web site which provides an expedient scheme for user to generate their resume in printing file format. It is designed to organize the resume in an orderly method to allow user use in directly. It is not an interactive resume builder system which only presents an uncomplicated and unproblematic method for user to

exploit. This system is provided a simple form for user to entry their particulars and others related information such as education information, employment information and etc as a Resume Entry Form.

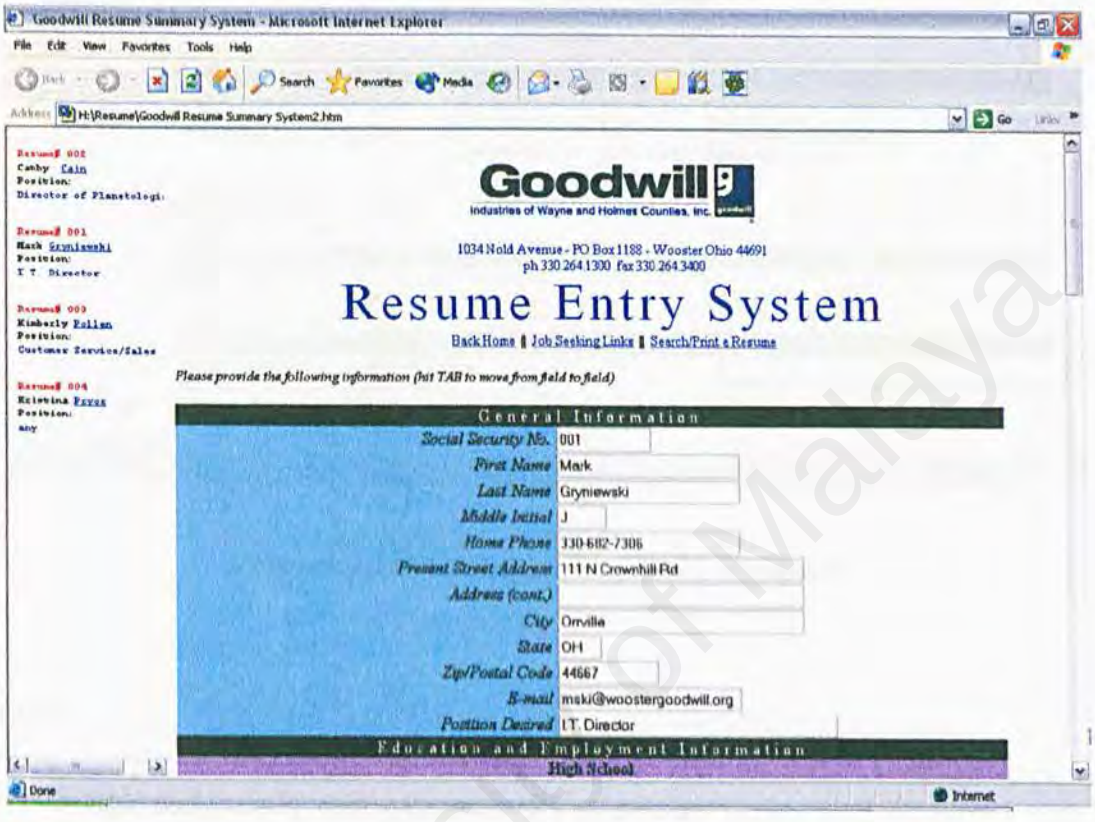


Figure 2.12: Resume Entry Form by Goodwill

The Goodwill Resume System will generate a report according to the information which key in by the user in the entry form. The report will automatically arrange in the well order that prepared by the system.

The system also provides the collection of other user's resume as an example resumes specifically for user to refer as references.

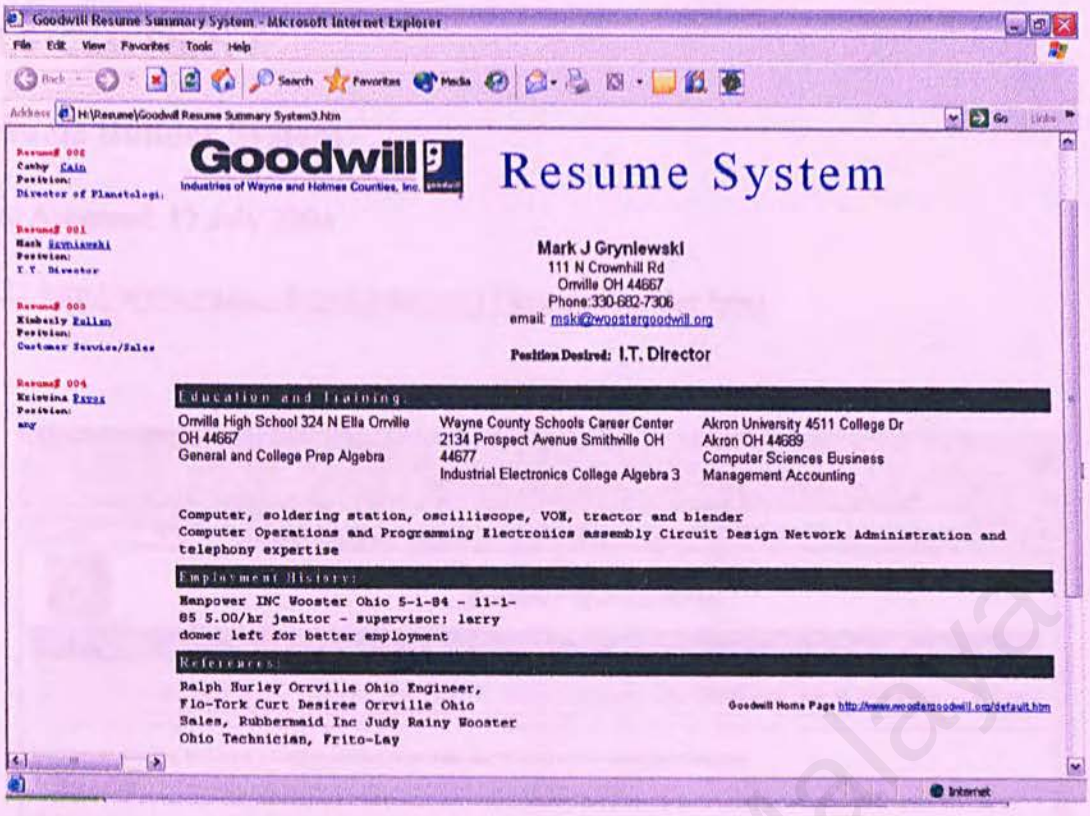


Figure 2.13: Output of Resume by Goodwill

Strengths:

- Simple and orderly with systematically organized
- Easy of use
- Save Time

Weaknesses:

- Too simple
- Paper resume, not interactive
- Doesn't provide function to upload photo or any image on the resume report
- Can't customize the report

2.3.6 Case Study 6

Resume Builder System

Date Accessed: 12 July 2004

URL: http://www.pages.drexel.edu/~an37/resumebuilder.html

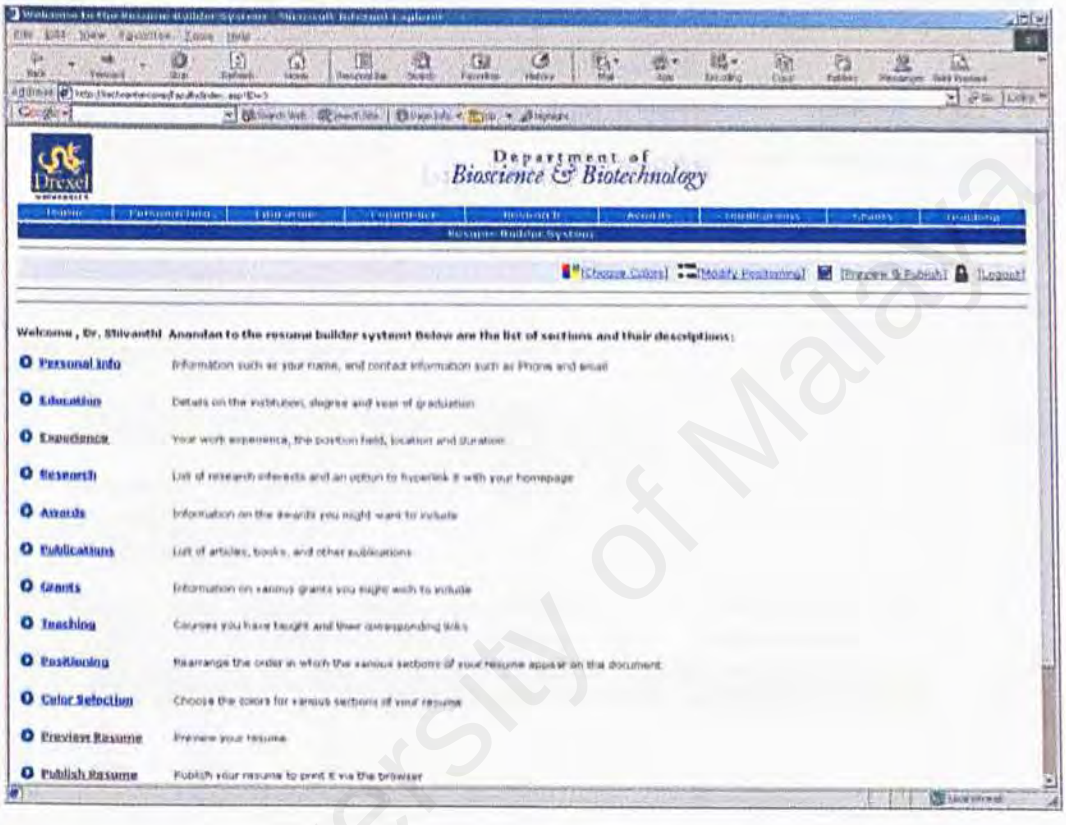


Figure 2.14: Main Page of Resume Builder System

Overview:

This Resume Builder system provides an easy to use system to create and maintain the faculty resume. There was a need for customized faculty resumes for providing them to their homepages, research proposals. Each page was then given a generic design so as to fit any faculty member's resume. A page was created for education , experience, awards,

grants etc. and also customizable features such as color, positioning, publishing format were also created. The login process was implemented with a SSL security based solution and email functionality was added with Collaboration Data Objects (CDO).

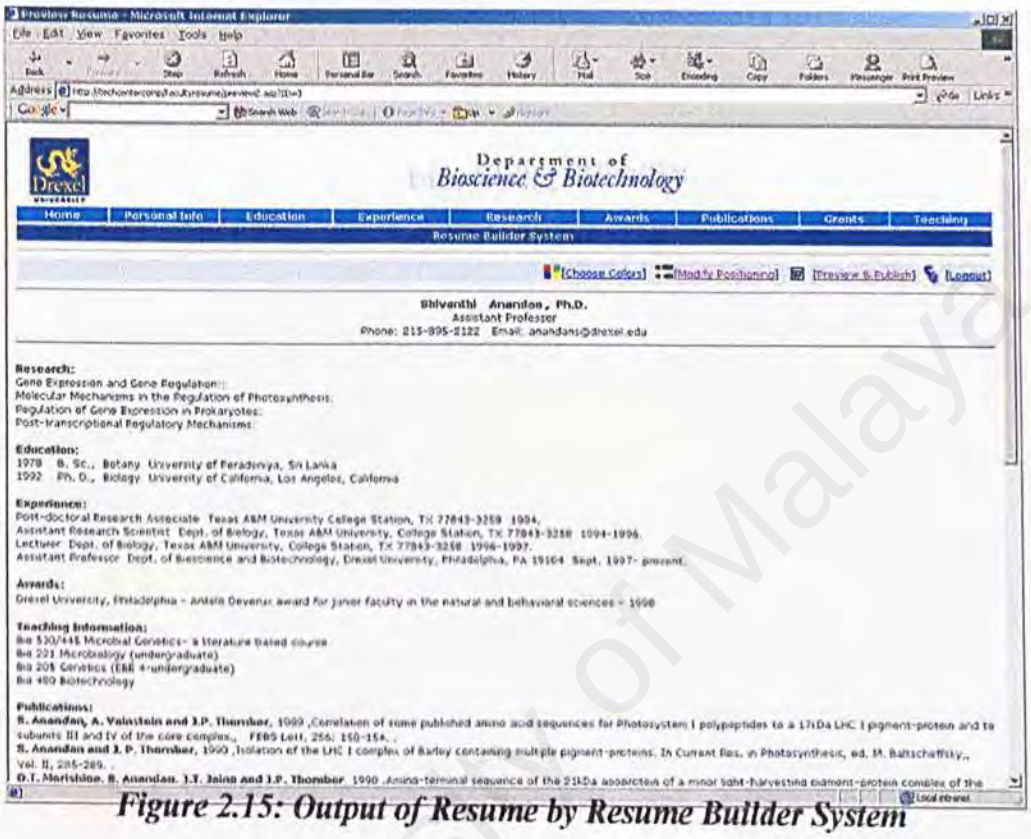


Figure 2.15: Output of Resume by Resume Builder System

Strengths:

- Very secure - Use HTTPS/SSL for transmission during the login process
- Easy to use and customizable interface
- Ability to have resume in Microsoft Word, PDF & plain text format

Weaknesses:

- Simple output and only paper resume, not interactive

2.3.7 Case Study 7

Higher Math Interactive Resume Builder

Date Accessed: 12 July 2004

URL: http://www.highermath.com/irb.htm?loc=indextext

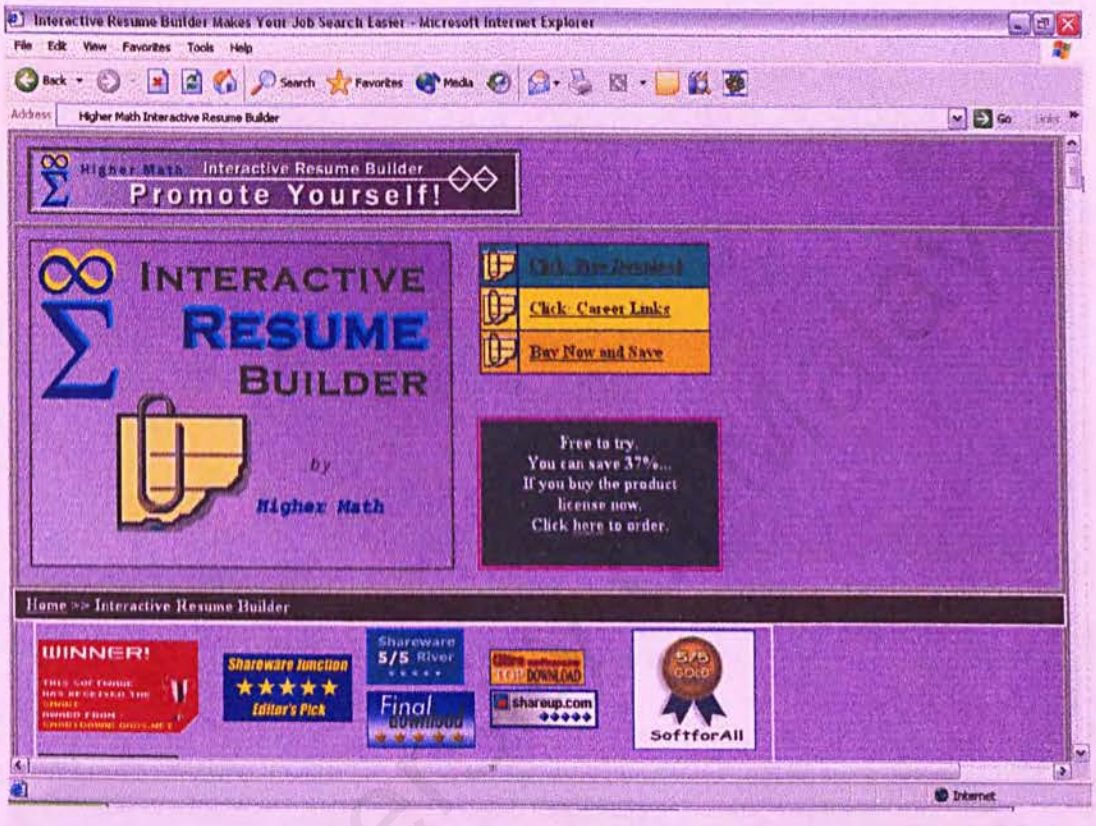


Figure 2.16: Main Page of Resume Builder by Higher Math

Overview:

Higher Math Interactive Resume Builder will assist user in making a beautiful, interactive resume that allow user to post on web site, or send to prospective employers. This system achieved a lot of awards from particular associations for being a good, interactive and best perform resume in software market currently.

Interactive Resume Builder by Higher Math helps user to organize their job assignments and carefully document their skills and training. The result is a beautifully laid out interactive html precise that is suitable for posting on user own web site. But, even if the user doesn't have a web site, the resume is completely contained in one file that can easily be sent via email to colleagues and prospective employers.

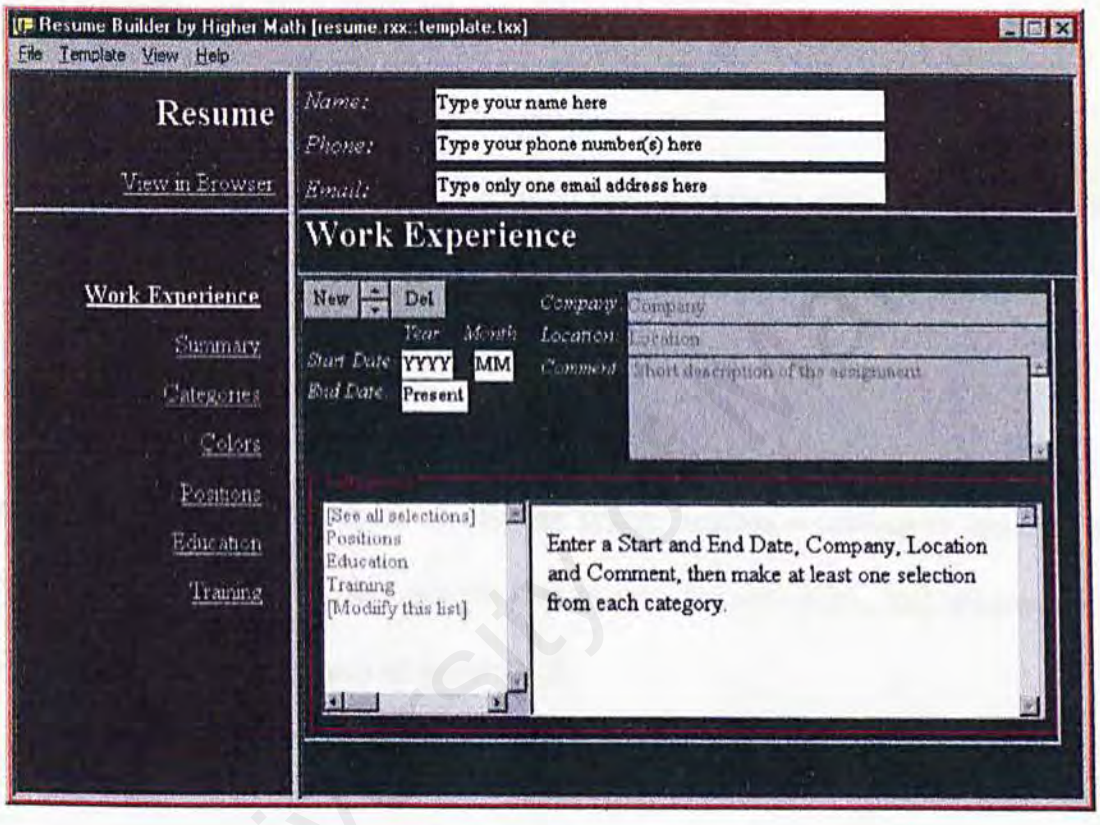


Figure 2.17: Screen Shot of Entry Form

Strengths:

- Make a output resume which is entirely a complete web site, totally interactive, interesting and relevant

- Links are provided to the best career resources: resume-writing advice, job boards, resume distribution services
- Easy to organize user career information
- Will provide user with links to the web's premier resume writing/editing services
- Provide links to the best career assessment and career advice available

Weaknesses:

- The package of this system need to purchase and it is costly
- Not having a free trial version to let user has a comprehensible thought of how the output looks like

2.3.8 Conclusion

The deeply research and analysis of existing system studies is aiming to discover the strengths and weaknesses of the system. Due to this, improvements and enhancements can be made in the development of project IRS.

2.4 Software Architecture

In general, Software Architecture defines the way in which components of systems interact with one another and the way they are mapped into an underlying network on computer. Basically, there are a few of architecture intended in the real-world environments.

2.4.1 Two-Tier Architecture

Two-Tier Architecture refers to client/server architecture. As such, the user interface is runs on the client and the database is stored on the server. The actual application logically can run on either the client or the server.

The two tier architecture requires minimal operator intervention, and is frequently used in non-complex, non-time critical information processing systems. It used extensively in where management and operations of the system are not complex. This design is used frequently in decision support systems where the transaction load is light. Two tier software architectures require minimal operator intervention. The two tier architecture works well in relatively homogeneous environments with processing rules (business rules) that do not change very often and when workgroup size is expected to be fewer than 100 users, such as in small businesses.

There are two types of client:

- Fat Client - Server manages data only
- Thin Client - Server manages data and business logic

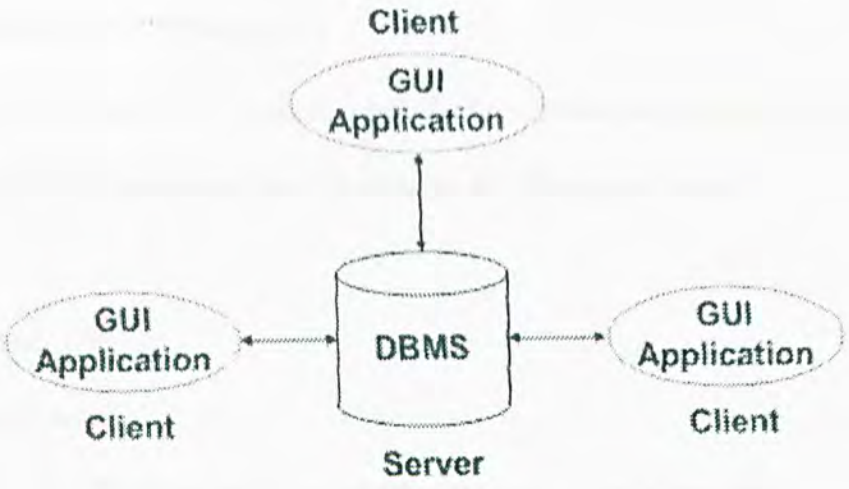


Figure 2.18: Two-Tier Architecture

Advantages:

- The two tier design will scale-up to service 100 users on a network
- Can distribute processing load
- Modifications on server propagated to clients
- Better scalability by adding server nodes and clients

Disadvantages

- Client nodes require more computing power
- Not effective running batch programs
- Development and maintenance more complicated and difficult
- Lack of uniformity in the client configurations and lack of control over subsequent configuration changes increase administrative workload

2.4.2 Three-Tier Architecture

Three-Tier Architecture is a special type of client/server or consisting of three well-defined and separate processes, each running on a different platform.

They consist of:

1. Client-Tier
    - The user interface, which runs on the user's computer.

2. Application-Sever-Tier
    - The functional modules that actually process data. This middle tier runs on a server and protects the data from direct access by the clients.

3. Database-Server-Tier
    - A database management system (DBMS) that stores the data required by the middle tier and it runs on second server.

Three tier architectures are used in commercial and military distributed client/server environments in which shared resources, such as heterogeneous databases and processing rules, are required. The three tier architecture will support hundreds of users, making it more scalable than the two tier architecture.

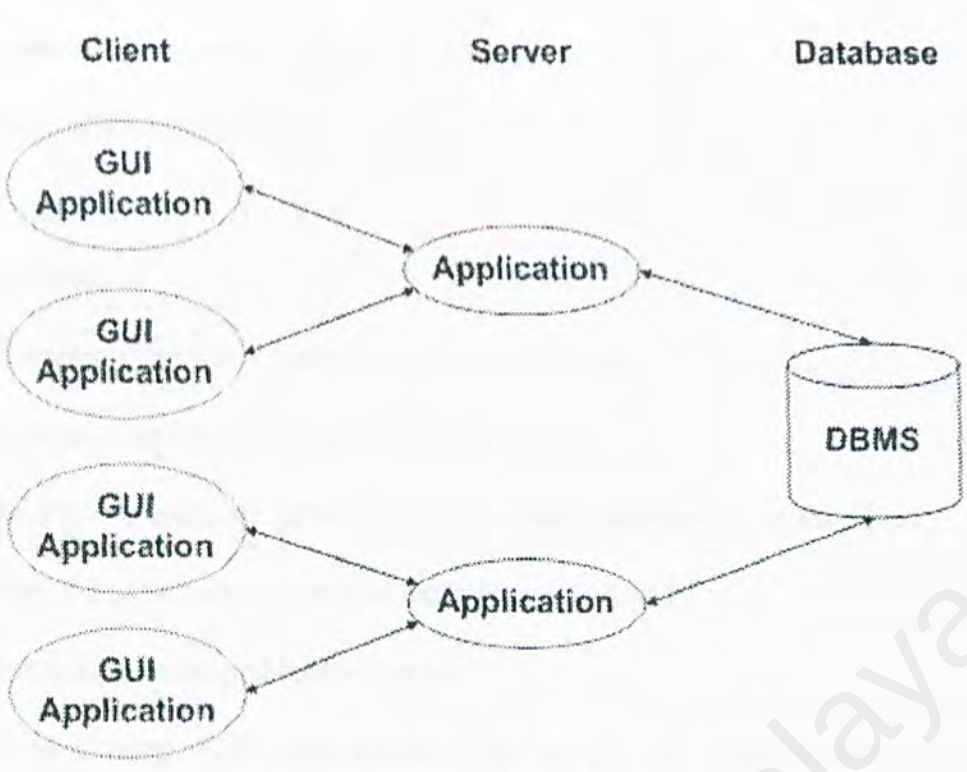


Figure 2.19: Three-Tier Architecture

Advantages:

- User is able to access to the system from any locations via internet browser
- Complete separations of concerns as separating the functions from the database functions make it easier to implement load balancing
- Enable highly security using different type of firewall at each tier to prevent unauthorized access
- Control logic can be reused by client applications
- Cache result in the control layer
- Reduces the amount of workload on each server and increase the performance of the entire system due to the underlying operations are divided within client and the server instead on the server alone

- Ease of development and testing
- Ease of integration between systems

Disadvantages:

- Building three tier architectures is complex work
- Increases cost and development time
- Difficult to integrate legacy stovepipes which represent large investment
- Speed decreases with levels of indirection and latency
- Lack of knowledgeable developers
- Programming tools that support the design and deployment of three tier architectures do not yet provide all of the desired services needed to support a distributed computing environment

2.4.3 Peer-to-Peer Architecture

In this architecture, there is no distinction between client and server. Each client is also a server to other clients. A central control manager such as IT department has been removed in this architecture. The peer-to-peer application accommodates both client and server. For example, Groove and Napster are also the available peer-to-peer applications.

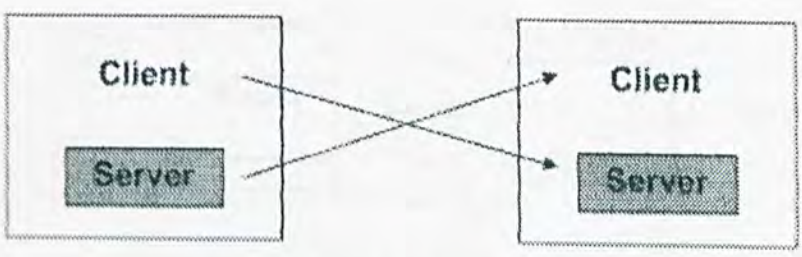


Figure 2.20: Peer-to-Peer Architecture

2.4.4 Client-Server Architecture

Client

- Client is a networked information requester, usually a PC or a wok station that can query database and other information from a server. Clients rely on servers for resources, such as files, devices and even processing power.

Server

- Server refers to a running program or a process on a networked computer that accepts requests from programs running on other computers to perform a service and responds appropriately. Usually a high-powered workstation or a minicomputer is used as a server to manipulate networked clients.

Client-Server

- Client-Server is system architecture in which each computer or process on the network is either a client or a server. Client-Server architecture implies a cooperative processing of requests submitted by a client, or requester, to the server, which processes the requests and returning the results to the client. The client will manipulate the data and presents the result to the user.

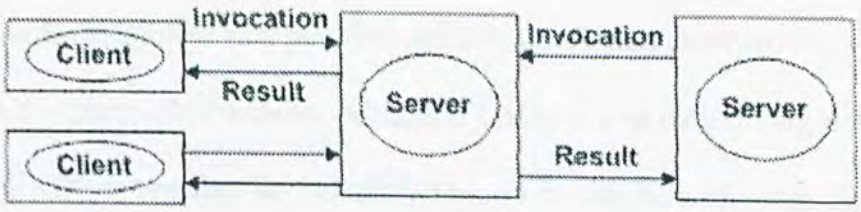


Figure 2.21: Client-Server Architecture

2.5 Operating System Consideration

An operating system is the program that controls all the other parts of a computer system (both the hardware and the software), after being initially loaded into the computer by a boot program, manages all the other programs in a computer.

2.5.1 LINUX

Linux is a Unix-like operating system that was designed to provide personal computer users a free or very low-cost operating system comparable to traditional and usually more expensive UNIX systems. It has a reputation as a very efficient and fast-performing system. Linux is a remarkably complete operating system, including a graphical user interface, an X Window System, TCP/IP and other components usually found in a comprehensive UNIX system.

Unlike Windows and other proprietary systems, Linux is publicly open and extendible by contributors. Because it conforms to the Portable Operating System Interface standard user and programming interfaces, developers can write programs that can be ported to other operating systems. Linux comes in versions for all the major microprocessor platforms including the Intel, PowerPC and Alpha platforms.

Linux is sometimes suggested as a possible publicly-developed alternative to the desktop predominance of Microsoft Windows. Although Linux is popular, among users already familiar with UNIX, it remains far behind Windows in numbers of users. However, its still the priority use in the business enterprise is growing.

2.5.2 UNIX

UNIX is an operating system that originated as an interactive time-sharing system. UNIX has evolved as a kind of large freeware product, with many extensions and new ideas provided in a variety of versions of UNIX by different companies, universities, and individuals.

Partly because it was not a proprietary operating system owned by any one of the leading computer companies and partly because it is written in a standard language and embraced many popular ideas, Unix became the first open or standard operating system that could be improved or enhanced by anyone.

2.5.3 Windows

Windows is a personal computer operating system from Microsoft that, together with some commonly used business applications such as Microsoft Word and Excel, has become a de facto "standard" for individual users in most corporations as well as in most homes. Some of the well-known versions of Windows have included Windows 98, Windows NT, Windows 2000, Windows ME, Windows XP and etc.

2.5.3.1 Windows NT

Windows NT is a Microsoft Windows personal computer operating system designed for users and businesses needing advanced capability. NT's technology is the base for the Microsoft successor operating system, Windows 2000.

2.5.3.2 Windows 2000

Windows 2000 (W2K) is a commercial version of Microsoft's evolving Windows operating system. Previously called Windows NT 5.0, Microsoft emphasizes that Windows 2000 is evolutionary and "Built on NT Technology." Windows 2000 is designed to appeal to small business and professional users as well as to the more technical and larger business market for which the NT was designed.

2.5.3.3 Windows ME

Windows Me (Millennium Edition) is an operating system from Microsoft, released commercially September 14, 2000. Windows Me was developed specifically for the home user, just as their Windows 2000 version was developed specifically for the business user. Microsoft claims that this Windows 98 update (which has a very similar look-and-feel to the earlier version) combines a more intuitive interface for the new user with added functionality for the experienced user.

2.5.3.4 Windows XP

Windows XP is the latest version of the Windows desktop operating system for the PC. Microsoft and trade publication writers view Windows XP as the most important version of Windows since Windows 95. Windows XP is built on the Windows 2000 but brings a new, more personalized look to the desktop that will also make it easier for users to scan or import images and to acquire music files on the Web and transfer them to portable devices. The new Windows allows different family members to use their own desktop and personal sets of files

2.6 Web Server Consideration

A Web server is a program that, using the client/server model and the World Wide Web's Hypertext Transfer Protocol (HTTP), serves the files that form Web pages to Web users (whose computers contain HTTP clients that forward their requests). Every computer on the Internet that contains a Web site must have a Web server program.

Web servers often come as part of a larger package of Internet- and intranet-related programs for serving e-mail, downloading requests for File Transfer Protocol (FTP) files, and building and publishing Web pages. Considerations in choosing a Web server include how well it works with the operating system and other servers, its ability to handle server-side programming, security characteristics, and publishing, search engine, and site building tools that may come with it.

Two leading Web servers are Apache, the most widely-installed Web server, and Microsoft's Internet Information Server (IIS).

2.6.1 Microsoft Internet Information Server (IIS)

Internet Information Server (IIS) is a World Wide Web Microsoft's server, a Gopher server and an FTP server all rolled into one. IIS is the best web server available for the windows platform currently. IIS provides a web server for hosting web pages for the internet or an intranet. IIS is a secure server offering Secure Socket Layer (SSL) ports.

IIS has support for server certificates to prove the identity of the server. IIS also has support for Active Server Pages (ASP). ASP enables IIS to provide dynamic content and database access. It's means that you can publish WWW pages and extend into the realm of ASP whereby JAVA or VBScript (server side scripts) can generate the pages on the fly. IIS has fun things like application development environment (FrontPage), integrated full-text searching (Index Server), multimedia streaming (NetShow), and site management extensions.

2.6.2 Apache

Apache is a web server - a computer on a network that "serves up" web pages. Starting in February of 1995, a group of 8 core contributors came together to form the Apache Project - a team dedicated to making a fully functional "commercial grade" server that would be used by all kinds of people, ranging from educational institutions to multinational corporations. It is freely available, reliable and simple to set up and configure, and it can provide most of the requirements for a web site.

Advantages:

- Powerful and flexible
- Implements the latest protocols
- Can be customized to the needs of a specific user.
- Worldwide collaboration encourages bug fixes, development, new ideas to make Apache more functional.
- Free because it is written and maintained by enthusiasts and volunteers

- Runs on most versions of UNIX without modification.

2.6.3 Comparison Between Microsoft IIS and Apache

	Microsoft IIS	Apache
Ease of use	√	
Cost	Costly	Open-source
Configuration done in	Graphical program	Text file
Platform	Windows	All

Table 2.1: Comparison between Microsoft IIS and Apache

2.7 Database Server Consideration

A database is an information set organized for flexible searching and utilization. There are a wide array of databases, from simple examples such as simple tabular collections to much more complex models such as the relational model. It gives the user access to their data and helps them transform the data into information. Compared to a manual filing system, the biggest advantages to a computerized database system are speed, accuracy, and accessibility.

2.7.1 MySQL

MySQL is an open source relational database management system (RDBMS) that uses Structured Query Language (SQL), the most popular language for adding, accessing, and processing data in a database. A relational database stores data in separate tables rather than putting all the data in one big storeroom. This adds speed and flexibility. The tables are linked by defined relations making it possible to combine data from several tables on request.

Because it is open source, anyone can download MySQL and tailor it to their needs in accordance with the general public license. MySQL is noted mainly for its speed, reliability, and flexibility. Most agree, however, that it works best when managing content and not executing transactions.

It is fully multi-threaded using kernel threads, provides application program interfaces (APIs) for C, C++, Eiffel, Java, Perl, PHP and Python, allows for many column types,

and offers full operator and function support in the SELECT and WHERE parts of queries.

The development team for MySQL has also provided or plans to provide features that include a table definition file format, enhanced replication, more functions for a full-text search, fail-safe replication, a port of MySQL to BeOS, and an option to periodically flush key pages for tables with delayed keys.

MySQL currently runs on the Linux, UNIX, and Windows platforms. Many Internet startups have been especially interested in MySQL as an alternative to the proprietary database systems from Oracle, IBM, and Informix.

MySQL is very fast, reliable, and easy to use. It also has a very practical set of features developed in close cooperation with its users. MySQL is used to access databases on the internet due to its connectivity, speed and security. It was originally developed to manage large databases at a much faster speed than the solutions that previously existed. MySQL has for several years, been thriving in the challenging areas of production.

2.7.2 Microsoft Access 2000

Microsoft Access 2000 is a popular relational database management system for creating desktop and client/server database applications that run under the Windows operating system and powerful to create and manage the databases.

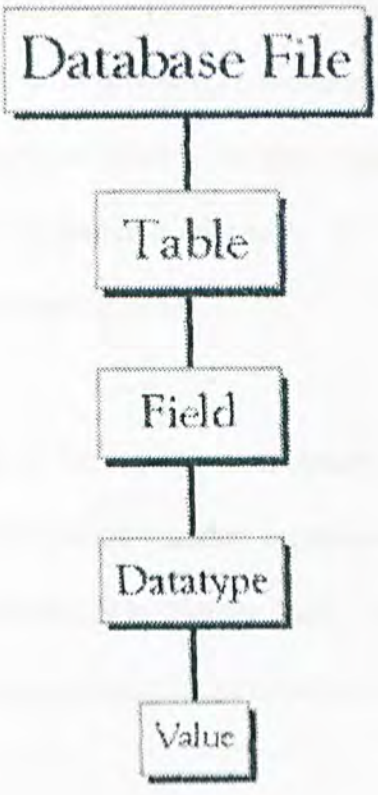
It has many built in features to assist user in constructing and viewing information. It is a development environment that can used to create computer databases for the Microsoft Windows family of operating systems. Besides, it is also a computer application used to create and manage computer-based databases on desktop computers and/or on connected computers (a network).

Microsoft Access 2000 can be used for personal information management (PIM), in a small business to organize and manage all data, or in an enterprise to communicate with servers. Access is much more involved and is a more genuine database application than other programs such as Microsoft Works.

It stores an entire database application within a single file. An Access .mdb file can contain data objects, like tables, indexes and queries, as well as application objects like forms, reports, macros, and visual basic code.

Microsoft Access breaks down a database. Some keywords involved in this process are: *Database File, Table, Record, Field, and Data-type.*

Here is the Hierarchy that Microsoft Access uses in breaking down a database.



Database File: This is your main file that encompasses the entire database and that is saved to your hard-drive or floppy disk.

Table: A table is a collection of data about a specific topic. There can be multiple tables in a database.

Field: Fields are the different categories within a Table. Tables usually contain multiple fields.

Datatypes: Datatypes are the properties of each field. A field only has 1 datatype.

Figure 2.22: Hierarchy of Database from Microsoft Access 2000

Microsoft Access database is primarily a Windows file like any other. It must have a location, also called a path, which indicates how the file can be retrieved and made available. Although you can create a database on the root directory such as the C: drive, it is usually a good idea to create your files, including your databases, in an easily recognizable folder.

2.7.3 Microsoft SQL Server

It is a relational database management system (RDBMS) which is part of Microsoft's BackOffice family of servers that offers a variety of administrative tools to ease the burdens of database development, maintenance and administration. SQL Server supports symmetric multiprocessing hardware; SNMP, ODBC, and major open standard communications protocols. It has Internet integration, data replication, and data warehousing features.

This is the complete database and analysis offering for rapidly delivering the next generation of scalable e-commerce, line-of-business, and data warehousing solutions. Microsoft SQL Server holds benchmark records for scalability and reliability—the critical qualities for an enterprise database.

Microsoft SQL Server runs on only the Windows NT operating system, you can integrate the operating system and the DBMS on a much lower level. This arrangement not only brings performance benefits but also makes administration and other tasks easily. For example, a set of built-in stored procedures enables application programs, DBMS triggers, and other stored procedures to send email.

Microsoft SQL Server lets you create and maintain user-defined data types that are based on the built-in data types. By creating a user-defined data type and binding a number of integrity rules and a default value to it, you can simulate relational domains. You can use these domains wherever a standard data type can be used.

Microsoft SQL Server has added integrated support for dynamic Internet access. This feature makes it possible to provide dynamic Web pages on an Intranet or the Internet. These Web pages can be easily defined using the SQL Server Web Assistant that forms part of the standard installation. This utility guides you through a series of steps before creating a Web page. The contents of a Web page can be formatted using a template, and you can specify whether the data-driven Web pages must be refreshed once, periodically, or when the data changes.

Microsoft SQL Server has certainly grown beyond "just another Sybase port." It is now a DBMS in its own right, with many unique features that make it the logical choice of DBMS if your organization uses the Windows NT operating system.

Microsoft intends to make its SQL Server a leading DBMS for implementing new technology such as distributed processing and Internet access. Microsoft SQL Server is also one of the fastest solutions for connecting a desktop or laptop computer with a database using ODBC. By including SQL Server as an integral part of the Microsoft BackOffice suite, BackOffice users automatically receive runtime licenses for SQL Server, making it easier to use SQL Server in other home-grown applications.

2.7.4 Oracle

Oracle says it is the world's leading supplier of software for information management but it is best known for its sophisticated relational database products which are used in Fortune 1000 corporations and by many of the largest Web sites. Oracle's relational database was the world's first to support the Structured Query Language (SQL).

Oracle targets high-end workstations and minicomputers as the server platforms on which to run its database systems. Along with Sun Microsystems, Oracle has long been a champion of network computers. It now boasts that it was the world's first software company to develop and deploy 100 percent Internet-enabled enterprise software across its entire product line: database, server, enterprise business applications, and application development and decision support tools.

2.8 Programming Language Consideration

2.8.1 PHP: Hypertext Preprocessor

PHP, or PHP: Hypertext Preprocessor, is a server-side, cross-platform, HTML-embedded and open source scripting language for creating dynamic web pages. A dynamic Web page is a page that interacts with the user so that each visitor to the page sees customized information. Dynamic Web applications are prevalent in commercial sites where the content displayed is generated from information accessed in a database or other external source.

PHP scripts are embedded within a Web page along with HTML, similar to other scripting languages such as Microsoft's Active Server Pages (ASP) or Sun Microsystems' Java Server Pages (JSP). Because of its wide distribution to a large community of users, PHP is very well supported. As an open source product, PHP enjoys the support of a large group of open-source developers. The community gives excellent technical support to users, and bugs are found and repaired quickly. The code is continuously updated with improvements and language extensions to expand PHP's capabilities.

PHP offers excellent connectivity to most of the common databases (including Oracle, Sybase, MySQL, ODBC and many others), and offers integration with various external libraries, which allow the developer to do anything from generating PDF documents to parsing XML. Another key advantage of PHP, when compared to other scripting languages such as ASP or ColdFusion, is that it is open-source and cross-platform, suitable for today's heterogeneous network environments.

PHP also has support for talking to other services using protocols such as IMAP, SNMP, NNTP, POP3, HTTP and countless others.

Advantages:

- Ease of use
- Easy to maintain
- Inherent with 12 major database support which easier the developer to interact with the database without having to do any extra work
- Implementing persistent sessions to help maintain the values of variables across multiple web pages

Disadvantages:

- Limited functionality
- Language not already known by the developers and will have to be learned in order to be used

2.8.2 Microsoft Visual Basic

Visual Basic (VB) is a programming environment from Microsoft in which a programmer uses a graphical user interface to choose and modify reselected sections of code written in the BASIC programming language.

VB is good for developing Windows interfaces; it invokes fragments of BASIC code when the user performs certain operations on graphical objects on-screen. Since Visual

Basic is easy to learn and fast to write code with, it's sometimes used to prototype an application that will later be written in a more difficult but efficient language. Visual Basic is also widely used to write working programs. It can also be used to create ActiveX and COM components.

Features:

Microsoft Visual Basic has several features, which state below:

- *Working with multiple project*

  You can create much application by working with single project. However, as your application become more complex, you may want to work with multiple projects in the same section of the programming environment. You can add a new or existing project to your current editing section by adding into a project group. You can then save the project group and work with it in subsequent editing section. You can open project group or an individual project in the project group, or add the project group or its individual project to another project group.

- *Using condition compilation*

  Condition compilation lets you selectively compile certain part of the program. You can include specific features of your program in different version, such as design an application to run in different platforms, or changing the date and currency display filters for an application distributed in several different languages.

- *Working with resource files*

  A resource file allows you to collect all the version specific font and bitmap for an application in our place. This can include icon, screen text, and other materials that may change between localized versions or between revision and specific configuration.

- *Creating own data type*

  You can combine variables of several different types to create user-defined types (*structure* in C) user-defined are useful when you want to create a single variable that records several related pieces of information. You create user-defined type with the type statement, which must be placed in the Declaration section in a module.

- *Working with template*

  Visual Basic provides variety of templates for creating common application components. Rather than creating all the pieces of your application for scratch, you can customaries an existing template. You can also reuse custom components in multiple applications by creating your own template.

- *Working with command line switch*

  Command line switch provide a way to control hoe Visual Basic execute. Using command line switch, you can start an instance Visual Basic and run a specified

project, make an executable file or dynamic link library, or specify a string to be passed to the command function.

- *Compiling project to native code*

  If you have the professional or enterprise version of Visual Basic, you can compile your code either in standard Visual Basic p-code format or in native code format. Native code compilations provide several options for optimizing and debugging that are not available with p-code.

Advantages:

- Easy to learn and use and inexpensive
- Vast around of tutorial and support materials available in books, magazine and online
- Application compiled to executable form, and there are no restrictions on distributions
- Visual Basic is royalty for distribution model meaning that application written in this language can be distributed without having to pay more royalty fee to Microsoft Company
- Feature of Visual Basic include multiple-documents interacted (MDI), objective linking and embedding (OLE) and dynamic data exchange (DDED)

Disadvantages:

- No hypertext capability

- Poor at text handling.
- Required a lot of coding in a daunting programming language.

2.8.3 Visual Basic.NET

Visual Basic .NET (VB.NET or VB .NET) is a version of Microsoft's Visual Basic that was designed, as part of the company's .NET product group, to make web services applications easier to develop. According to Microsoft, VB .NET was reengineered, rather than released as VB 6.0 with added features, to facilitate making fundamental changes to the language. VB.NET is the first fully object-oriented programming (OOP) version of Visual Basic, and as such, supports OOP concepts such as abstraction, inheritance, polymorphism and aggregation.

2.8.4 Java

Java is a programming language expressly designed for use in the distributed environment of the Internet. It was designed to have the "look and feel" of the C++ language, but it is simpler to use than C++ and enforces an object-oriented programming model. Java can be used to create complete applications that may run on a single computer or be distributed among servers and clients in a network. It can also be used to build a small application module or applet for use as part of a Web page.

There were four primary goals in the creation of the Java language:

- It is object-oriented.
- It is independent of the host platform (more or less).

- It contains language facilities and libraries for networking.
- It is designed to execute code from remote sources securely.

2.8.5 ASP.NET

ASP.NET is the next generation of Microsoft's Active Server Page (ASP), a feature of their Internet Information Server (IIS). Both ASP and ASP.NET allow a Web site builder to dynamically build Web pages on the fly by inserting queries to a relational database in the Web page. ASP.NET is different than its predecessor in two major ways: it supports code written in compiled languages such as Visual Basic, C++, C#, and Perl, and it features server controls that can separate the code from the content, allowing WYSIWYG editing of pages. Although ASP.NET is not backwards compatible with ASP, it is able to run side by side with ASP applications. ASP.NET files can be recognized by their .aspx extension.

2.8.6 ActionScript

ActionScript is an object-oriented programming (OOP) language that is designed specifically for Web site animation. ActionScript makes it possible for developers to create onscreen environments (such as games, tutorials, and e-commerce applications) that can respond to user input through the keyboard or mouse. ActionScript is an *event-based* language: just as is the case in real life, actions are triggered by events. ActionScript was modeled as an international standard for JavaScript.

2.9 Scripting Language Consideration

2.9.1 Visual Basic Script

VBScript is an interpreted script language from Microsoft that is a subset of its Visual Basic programming language designed for interpretation by Web browsers. It is Microsoft's answer to Netscape's popular JavaScript. Both are designed to work with an interpreter that comes with a Web browser - that is, at the user or client end of the Web client/server session. VBScript is designed for use with Microsoft's Internet Explorer browser together with other programming that can be run at the client, including ActiveX controls, automation servers, and Java applets. Although Microsoft does support Netscape's JavaScript, Netscape does not support VBScript. For this reason, VBScript is best used for intranet Web sites that use the Internet Explorer browser only.

2.9.2 Java Script

JavaScript is compact, object-based scripting language for developing client and server Internet applications. It is the Netscape-developed object scripting language used in millions of web pages and server applications worldwide.

JavaScript uses some of the same ideas found in Java, the compiled object-oriented programming derived from C++. JavaScript code can be imbedded in HTML pages and interpreted by the Web browser (or client). JavaScript can also be run at the server as in Microsoft's Active Server Page before the page is sent to the requestor.

JavaScript is used in Web site development to perform certain tasks not possible in static HTML alone such as:

- Automatically change a formatted date on a Web page.
- Cause a linked-to page to appear in a popup window.
- Cause text or a graphic image to change during a mouse rollover.

It is best uses in:

- Client side interactive forms
- Dynamic content for pages
- Opening specific sized web browser windows
- Determining browser features

Advantages:

- Interactive forms created without relying on server-side "CGI"
- No creation software required
- Fast test and modify cycle as the code is typed directly into HTML files
- Built-in feature in modern browsers
- Many free resources can be download from internet reference sites

Disadvantages:

- More complex than HTML
- Long, complicated JavaScript will causing adds file "weight" to HTML files
- Cross-platform issues and cannot save date to a file or database

2.10 Multimedia

2.10.1 Definition

The term multimedia describes a number of diverse technologies that allow visual and audio media to be combined in new ways for the purpose of communicating. Multimedia often refers to computer technologies. Multimedia can be defined as the computer-delivered combination of a large range of communications elements - text, sound, images, animation and moving video. Each element has its own particular advantages in conveying particular kinds of messages and evoking particular kinds of learner responses.

Essentially however, the ability of the single source, the computer, to combine, link and orchestrate all these communications elements means we have a multimedia message which is most probably greater than the sum of its individual parts. These mediums are digitally controlled by a computer. In order to get an idea across, one can use multimedia to convey their message. Multimedia enhances the information for better communication and understanding.

2.10.2 History

The term Multi-Media, which was used during the 1970's to describe a particular theater-based film and slide-show collage experience, has now been shortened to just the word "multimedia". From the mid 80's through the late 90's, the prevalent meaning of multimedia was a category of "authoring" software that allowed designers to develop interactive computer programs without having to have advanced programming skills.

This category of software still exists, and is sometimes referred to as multimedia, but the term is now is used to more generally describe nearly every hardware or software technology that displays images or plays sounds.

2.10.3 Element's Definition

- *Text*

  It means words, sentences, paragraphs. It contain of two categories:

  1. *Unformatted (plain) text*
     - Characters coded in binary form
     - ASCII Code
  2. *Formatted (rich) text*
     - Characters of variable size, shape and style
     - No predominant standard image

- *Image*

  It is a display of photograph that can be scanned of drawn by using software tools. The format is mainly divided into two categories which are bitmap and object oriented.

  - *Bitmap* format support file with extension such as: .bmp, .gif, .jpg, .png
  - *Object Oriented* format support file with extension such as: .cdr, .cgm, .fvw

- *Graphic*

  It is a group of lines which drawn to form two or three dimensional shapes. It refers to any computer device or program that makes a computer capable of displaying and manipulating pictures. The term also refers to the images themselves.

  Some graphics application: paint programs, design programs, animation software, CAD software, desktop publishing, etc.

- *Audio*

  It divides into three types which are background music, sounds effect and narration as following:

  - *Background Music* is use to set at the mood or ambience for presentation.
  - *Sound Effect* is served to punctuate an event, so that the user is alerted to the action.
  - *Narration* is the use of a speaker's voice to introduce product or event.

  The audio format support files are generally with extension of .wav, .mid, .mp3.

- *Video*

  It is refers to recording, manipulating, and displaying moving images, especially in a format that can be presented on a television. It is a moving images that

represented by a sequence of frames (pictures) and each frame is being a digital image. It has a delay constant between appearances of two successive frames.

- *Animation*

  It referring to the simulation of movement created by displaying a series of pictures, or frames. For example, cartoons are one of the animations on television. Animation on computers is one of the chief ingredients of multimedia presentations.

Note the difference between animation and video. Video takes continuous motion and breaks it up into discrete frames whereas animation starts with independent pictures and puts them together to form the illusion of continuous motion.

2.10.4 Advantages

Today multimedia is used for advertising, entertainment, public information, training and education. Educational computer programs which use multimedia and the interaction of the student allows the student to see their mistakes immediately and guide them to learn a concept more quickly. The student can also move at their own speed, by reviewing or skipping material that they are unfamiliar or familiar with. Besides, Multimedia enhances text only presentations by adding interesting sounds and compelling visuals. It will make the audiences more attentive to multimedia messages than traditional presentations done with slides or overhead transparencies.

Communication research has shown that the combination of communication models (aural and visual) offers greater understanding and retention of information. People are more interested in multimedia messages which combine the elements of text, audio, graphics and video.

In summary, the use of multimedia offers many advantages:

- Easy to understand and easy to use
- Integrated and interactive
- Conducive to cooperative work environment
- Flexible
- Supportive of large audience
- Enhancement of text only messages
- Improves over Traditional Audio-Video Presentations
- Gains and holds attention
- Multimedia is Entertaining as well as Educational

2.10.5 Disadvantages

It requires high-end computer system. The multimedia applications with sound, images, animation and especially video, constitute large amount of data, which not only slow down and might not able to fit in a low-end computer. Unlike simple text files created in word processing, multimedia packages require good quality computers. Moreover, developing a system with multimedia is costly and the process is time consuming.

2.11 Authoring Tools Consideration

Authoring tools usually enable you to create a final application merely by linking together objects, such as a paragraph of text, an illustration, or a song. By defining the objects' relationships to each other, and by sequencing them in an appropriate order, authors (those who use authoring tools) can produce attractive and useful graphic applications. Most authoring systems also support a scripting language for more sophisticated applications.

Typically, though, authoring tools used exclusively for applications that present a mixture of textual, graphical, and audio data.

2.11.1 Swish v2.0

Swish v2.0 is a program that is used to create Flash animations without using Macromedia's Flash product. It is an excellent choice for anyone who wants to build Flash animations using pre-defined effects. Its robust set of animation tools and Flash commands and its ability to enhance behaviors make it a product you won't soon outgrow. The release of Swish v2.0 clearly demonstrates that you don't need to be graphic artist or a programmer to build stunning Flash movies for your Website.

Swish v2.0 includes tools for creating lines, rectangles, ellipses, curves, motion paths, rollover buttons, and more. Once the animation is created, it is exported into the SWF format used by Flash so that it can be viewed by anyone who has Flash Player.

Features:

- *Sprite Object*

  Similar to movie clips in Flash. You can create a short animation and have it be placed within a button, inside a main movie, or anywhere along the timeline.

- *Importing*

  Can import many of the common open standards for Vector and Raster graphics. The new imported formats include: WMF, EMF and SWF files, as well as GIF, JPG, BMP and PNG images.

- *Drawing Tools*

  Allow you to draw and edit Vector graphics on the stage.

- *Live Editing*

  You can play the animation as a SWF file (the exported file format needed to play a Flash movie in a Web page) within Swish and edit it at the same time.

- *SWF Opitimization*

  The optimization of all files into Flash SWF files is now much more intelligent. Exported files are now much smaller.

- *Button*

  Can create buttons that work and operate exactly like buttons in Flash.

- *Effect Presets*

  Swish v2.0 now not only gives you 150 animation effects, but also allows you to modify each Effect, giving you total control over how the animation plays back. As an added bonus, you can save that setting.

Advantages:

- Easy to makes flash
- Ease of use
- Affordable
- Has over 150 built-in effects
- Emerge with more advanced pre-defined motion effects, such as 3-D Spin, Explode and Vortex
- Can easily animated text
- Quick produce

Disadvantages:

- Does not provide any pre-defined actions
- The lack of support for importing Adobe Illustrator or Macromedia Freehand files
- Not to design interactive Flash presentations

2.11.2 Macromedia Flash MX

Macromedia Flash MX is a bandwidth friendly and browser independent vector-graphic animation technology. It is a popular latest version authoring software developed by Macromedia, is used to create vector graphics-based animation programs with full-screen navigation interfaces, graphic illustrations, and simple interactivity in an anti-aliased, resizable file format that is small enough to stream across a normal modem connection. The resulting files, sometimes called "flash files", may be included in a web page to view in a web browser, or they may be played on a standalone players. It unlike animated but akin GIF and JPEG, are compact, efficient, and designed for optimized delivery.

File Types

Flash can also create files in a variety of static or animated formats.

- *.fla* files are the source files, which contain source material for the flash application. Flash authoring software is used to edit FLA files and compile them into .swf files. FLA is not in any sense an open format; it is proprietary to Macromedia.
- *.swf* files are completed and published files that cannot be edited.
- *.as* (or sometimes *.actionscript*) files are simple text files containing ActionScript source code. Actionscript can also be built directly into FLA files, but is often separated into external .as files for structural reasons, or to expose the code to versioning applications, and so on.
- *.flv* files are Flash video files that can be created by Macromedia Flash or Sorenson Squeeze

Advantages:

The Macromedia Flash MX has several advantages over "regular" HTML pages that make it an extremely popular option for professional web site creation and for some other types of sites. Those advantages include:

- Flash allows the embedding of images, sounds, movies and simple HTML files. These abilities make it a good multimedia platform. It also supports two-way streaming of sound and video, thus being an excellent platform for high-level multi-user applications.
- Flash circumvents browser controls which block the display of animation on web pages, allowing ads to display animation even when the end user has turned off the capability in the browser.
- Like PostScript, SVG and PDF, Flash allows exact specification of where the various page elements are, and so it gives the designer a great degree of control over how the user interface looks. In some people's opinions, it is much more difficult to do the same with HTML and CSS.
- Again, like PostScript, SVG and PDF Flash uses vector graphics; they may translate into small file sizes which take less bandwidth to transmit than bitmaps do.
- Flash's file format is not platform-dependent; players exist on Microsoft Windows, Mac OS, Linux and various other Unix systems.
- Flash's embedded ActionScript language (an application of the ECMAScript programming language) allows the creation of simple fill-in-the-blank forms.

- Flash is a highly ubiquitous format. According to Macromedia, the Flash Player penetration is well over 95%. Flash Players exist for PDAs, cellular phones and even for the Java platform.
- The Flash file format has been opened by Macromedia, and compatible third-party tools exist.
- Macromedia has stated their intention of moving Flash away from the simple animations of web ad banners and move toward true application development.

The ActionScript language in Flash has been extended and can be used to create extensive event driven GUI's which features strong types, interfaces, inheritance and other features of advanced object-oriented programming language.

Disadvantages:

There are some disadvantages to Flash and these have caused some of the initial surge in use outside ads to decline, as the negative consequences of Flash use were seen. Those disadvantages are:

- Viewer plugins don't exist for all systems, and they're not installed on all computers that can run them, particularly non-enthusiastic systems.
- Flash does not support internationalization thoroughly.
- Flash is not an easily human-readable format, taking away a level of control over content for the end user.
- Flash does not respect browser settings which prevent animation from displaying, one reason why it is commonly used for animated ads.

- Flash content is not accessible to most search engines, so sites using Flash experience decreased visibility in search engines unless redesigned to allow for this problem.
- Users cannot easy navigate through content because individual Flash pieces may not support concepts such as Back buttons.
- Flash does not obey browser settings for font size, etc, so text may appear tiny for vision impaired people or those with high resolution screens.
- Flash demands significant CPU power to display, as it uses a very high degree of graphic abstraction that many video cards are not able to accelerate. Particularily, the anti-aliasing utilized by the Flash Player is heavy on the computer.
- Because the flash movie is played from a user agent plug-in, limited memory resources are available to the flash-movie. This is the amount of memory the user agent allocates for the plug-in. This amount depends on the user agent used.
- Flash demands significant CPU power to display, as it uses a very high degree of graphic abstraction that many video cards are not able to accelerate. Particularly, the anti-aliasing utilized by the Flash Player is heavy on the computer.
- The .swf files it makes aren't secure. There are several commercial programs out there that can allow someone to extract graphics, sounds, etc. from a .swf file and also view its ActionScript. There's even an open source program called "flasm" that allows someone to extract ActionScript from a .swf file as "bytecode", edit it, and then reinsert it into the file. However, the swf obfuscation makes the extraction not feasible in most cases.

- Critics charge that many Flash animations are nothing more than eye candy, and many users say that they are ugly.

2.11.3 Macromedia Dreamweaver MX

Macromedia Dreamweaver MX is the most dynamic HTML editor available off the shelf. It is a web design software application developed by Macromedia and easy-to-use professional visual Web editor. It has an integrated text editor with customization options, such as live syntax coloring, code navigation, and auto-indenting features.

Dreamweaver even helps with the code, a full electronic version of the reference sections from O'Reilly's Dynamic HTML: The Definitive Reference on HTML, JavaScript and CSS is included with context-sensitive interaction.

Dreamweaver has always produced clean and compatible code, without adding the extra code that Microsoft FrontPage tends to insert. The Layout mode allows designers to click and drag table cells to position screen elements in the design view, similar to Adobe GoLive's grid.

User:

- Dreamweaver is a favorite of multimedia designers, since it easily integrates with other Macromedia applications, like Flash and Shockwave

- It's probably a less popular choice for small staffs or corporate sites, since it doesn't come with a library of Web-ready graphics, like FrontPage and NetObjects does.

Advantages:

- Dreamweaver does both WYSIWYG, ***What You See Is What You Get***, (visual layout) and code-based (text) editing equally well.
- Intuitive environment for building cross-platform sites.
- It is expandable and have a good documentation is provided in the form of the Behavior Development Kit and users are encouraged to experiment.
- Supporting multimedia.
- Dreamweaver has code cleaners for Word and other HTML sources.
- Provides wizards for CSS editing.
- Drag-and-drop client-side behaviors add to Dreamweaver's functionality.
- Dreamweaver has a JavaScript Debugger to help execute and fix any script errors.
- Asset Management helps organize images, media, and color schemes by allowing the creation of groups and favorites that keep frequently used assets instantly available and the rest easy to find.
- Site reporting finds and identifies errors such as untitled pages, missing alt text, and bad or missing links. Clicking on an error instantly brings up the offending code for quicker fixes.
- Provides user with extensive menu driven options with the help of which allow user to create a powerful, yet complex websites easily and with in no time.

- Enables user to use technologies such as PHP, ASP, and CFML and more as helps to save time and effort spent in creating complex codes for programming.
- Provides user with an extension manager, with the help of which user can download code snippets and various behaviors from the macromedia website.
- Site Management features allow for streamlined productivity.

Disadvantages:

- Site reporting doesn't match Microsoft FrontPage's, which can flag slow pages or recently added or modified pages.
- Cannot alter existing HTML by inserting esoteric tags that add nothing but weight
- Lacks keyboard shortcuts for simple formatting commands.

2.11.4 Macromedia Fireworks

Macromedia Fireworks is developed by Macromedia and is bundled as of the Studio MX suite. This program is built to allow web designers the ability to manipulate vector and bitmap graphics. It is often compared to likes of Adobe's Photoshop, even though the functions are very limited and less sophisticated.

2.11.5 Macromedia Director 8.5

Macromedia Director 8.5 is a powerful media application created by Macromedia. Its proprietary scripting language Lingo motivated some to use this application. Many companies deliver demonstrations or use it as a user interface (UI) for content on CDs and DVDs. It can incorporate many different formats (e.g. AVI, BMP, QuickTime, PNG,

JPEG, Real Video) thus making it possible to integrate without re-encoding files. It also supports vector graphics and 3D interactivity, which is great for producing games. Version MX and its successors are also easily linked with Flash animation. Since version 2004 MX you can use JavaScript instead of Lingo.

2.11.6Adobe Photoshop 7.0

Adobe Photoshop 7.0 is a bitmap graphics editor (with some text and vector graphics capabilities) published by Adobe Systems. It is the market leader for commercial bitmap image manipulation. It is usually referred to simply as Photoshop. As with most of other Adobe's applications, Photoshop is available for Mac OS and Microsoft Windows; versions up to Photoshop 7.0 can also be run under operating systems such as Linux with an emulation program such as Cross over Office.

Photoshop is generally considered one of the best (if not *the* best) image editing programs but it has the disadvantage of a high price. This has allowed competing programs such as Jasc Software's Paint Shop Pro and The GIMP Team's GIMP to become popular. To capture this lost market share, Adobe has introduced a much less expensive program called Photoshop Elements that consists of Photoshop minus some of the high-end output capabilities, useful for editing photos from consumer digital cameras and for doctoring images for the web but not as useful for professional prepress work.

Features:

- Image-editing software for photographers, Web and graphic designers

- Visually browse and retrieve images with enhanced file browser
- Simulate painting techniques with painting engine
- Liquefy distorting tool and pattern maker plug-in
- Runs native on Microsoft Windows XP

Advantages:

- Familiar with adobe interface
- Provide powerful image-editing tools
- Optimizes files for Web
- Supporting any image file format
- Provide powerful designing tools

Disadvantages:

- High price and costly
- Slightly clucky interface
- Animation effects are confusing to set up
- Doesn't create true vector objects

Systems Requirements:

- Pentium III, 4, or faster processor
- Microsoft Windows 98, NT, 2000, Me, or XP
- 128 MB RAM (192 MB RAM recommended)
- 280 MB hard disk space

- CD-ROM drive
- 256-color display with 800 x 600 resolution and 16-bit color video card minimum

2.11.7 Adobe Premiere

Adobe Premiere software revolutionizes nonlinear video editing. Powerful real-time video and audio editing tools give you precise control over virtually every aspect of your production. Built for the exceptional performance of Microsoft Windows XP systems, Adobe Premiere takes video production to an entirely new level.

2.11.8 CorelDraw

CorelDraw is a vector-based drawing application which came into its own with Microsoft's release of Windows 3.1. Although a 16-bit application, the inclusion of TrueType in Windows 3.1 transformed CorelDraw into a serious illustration program capable of quality typography.

2.12 Conclusion

After encompass a look at all the research materials, it furnish me a guidance and direction of a comprehensible analysis on how to produce an Interactive Resume System. Chapter 2 did a deeply searching into the related domain studies and technology review in order to gain more knowledge and understanding to build a better system compared with existing system.

CHAPTER 3: METHODOLOGY

3.1 Introduction

Most of the systems designed have their own methodology for the purpose of succeeding their design. The methodology is use as a reference step-by-step of preparation for understanding the developing information systems in practice. It can define as a method that helps in completing a series of steps or stages for software process. Meanwhile, software process refers to whole software development that contains a series of steps of involving activities, constraints and resources that produce an intended output of some kind.

As the development strategies, we should decide on a life-cycle model that is appropriate for the system implementation, its management, its software process, its users, and vary the life-cycle model depending on the features of the specific product currently under development.

Each model has its own features and advantages and there are no guidelines in order for which method to be chosen to develop the system. It depends on when they are use, how they are applying, and who is involved in the development process.

3.2 Software Process Models

Software Process Models refers to the progression of a software system from development through maintenance and eventually replacement.

Every system development software process model involves the activities in the production of a software system includes system requirements (user need, resource) as input and a finished product as an output.

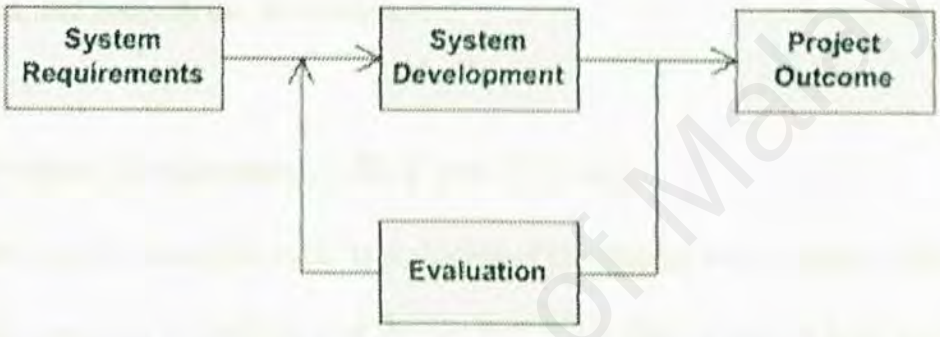


Figure 3.1: System Development Software Process Model

Generally, there are several kinds of Software Process Models in system development which included as follow:

- System Development Life-Cycle (SDLC)
- Waterfall Model
- Prototyping Model
- Code-and-Fix Model
- Rapid Prototyping Model
- Spiral Model

- Rapid Application Development
- Synchronize and Stabilize Model
- Evolution-Tree Life-Cycle Model
- Iterative-and-Incremental Life-Cycle Model
- Etc

Many people to develop their project have used the above methodologies. In order to make the project success in no time, each of the models has clearly identifiable goals, milestones, and tasks by the developers.

3.2.1 System Development Life Cycle (SDLC)

The system development life cycle is a process of developing information systems which is a phase approach to analysis and design that holds that system is best development through the use of a specific cycle of analysis and user activities. It is a conceptual model, used in project management that describes the stages involved in an information system development project, from an initial feasibility study through maintenance of the completed application.

Seven phases of SDLC

This section examines each of seven activities that made up the SDLC. Although each phases discretely, it is never accomplish as a separate step. Instead, several actions can occur simultaneously, and action may be repeated. All the seven phases are state as follow:

I. *Identify problem, opportunity and objective*

Analysis is concerned with identifying problem, opportunities and objective. This stage is critical to be success of the rest of the projects, since no one wants to waste their time addressing the wrong problem. Analyst looks honestly at what is occurring in a business. Identifying objective is also an important component of the five phases. Activities in this phase consist of interviewing user management, summarizing the knowledge obtained; estimate the scoop of the project and documenting the results. The output of this phase is feasibility report containing a problem definition and summarizing the objective. Management must then make a decision on whether to proceed with the project.

II. *Determining information request*

A tools use to define information request in the business are sampling and investigate, interviewing, questionnaire, observing decision makes behavior in office environment and even prototyping the system analyst need to know the details of current system function the who (the people who are involved), when (the timing), and how (how the current procedures are performed) of the business.

III. *Analyzing system needs*

The system analyst undertakes involved analyzing the system needs. Special tools and techniques help the analyst make requirement determination. One such tool is the use of data flow diagram to chart the input, process and output of the business functions in a structure graphical form. A data dictionary is developing that list all

the data items used in the system, as well as their specification whether they are numeric or text.

IV. *Designing the recommended system*

The system analyst uses the information collected earlier to accomplish the logical design of the information system. The analysts design accurate data entry procedures so that data going into the information system are correct. The analyst provides for effective input to the information system by using technique of good font and screen design. Part of the logical design of the information system is designing the user interface. The interface connects the user with the system and is extremely important.

V. *Developing and documenting software*

The analyst works with programmer to develop much original software included the structured techniques for designing and documenting software. The system use one or more of these devices to connect to the programmer what need to be program.

VI. *Testing and maintenance the system*

A step to test is to run first with sample data and eventually with actual data from the current system. Maintenance of the system and its documentation begins in this phase and is carried out routinely throughout the life the information system. Many of the systematic procedures the analyst employed throughout the system develop life cycle can help to ensure that maintenance is kept to a minimum.

VII. Implementing and evaluate the system

The analyst helps implement the information system. The vendors have over sign of training the responsibility of the system analyst to do some training. This process includes building a database, installing equipments and bringing the new system into production.

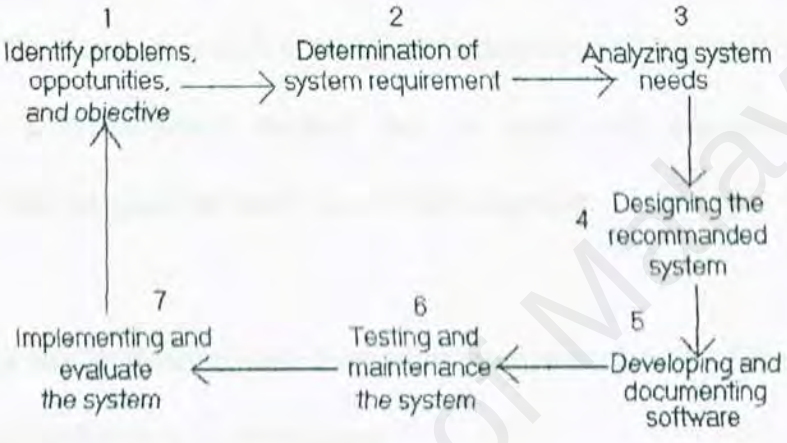


Figure 3.2: System Development Life-Cycle (SDLC)

Summary of seven important phases of SDLC:

I. Identify problem, opportunity and objective

II. Determining information request

III. Analyzing system needs

IV. Designing the recommended system

V. Developing and documenting software

VI. Testing and maintenance the system

VII. Implementing and evaluate the system

3.2.2 Waterfall Life-Cycle Model

The Waterfall Life-Cycle Model is the earliest method of structured system development. Although it has come under attack in recent years for being too rigid and unrealistic when it comes to quickly meeting customer's needs, the Waterfall Model is still widely used. It is attributed with providing the theoretical basis for other Process Models, because it most closely resembles a "generic" model for software development.

Often considered the classic approach to the systems development life cycle, the waterfall model describes a development method that is linear and sequential. Waterfall development has distinct goals for each phase of development.

This methodology can be dividing into five major steps, which each of them have their function, procedure and even own preparation.

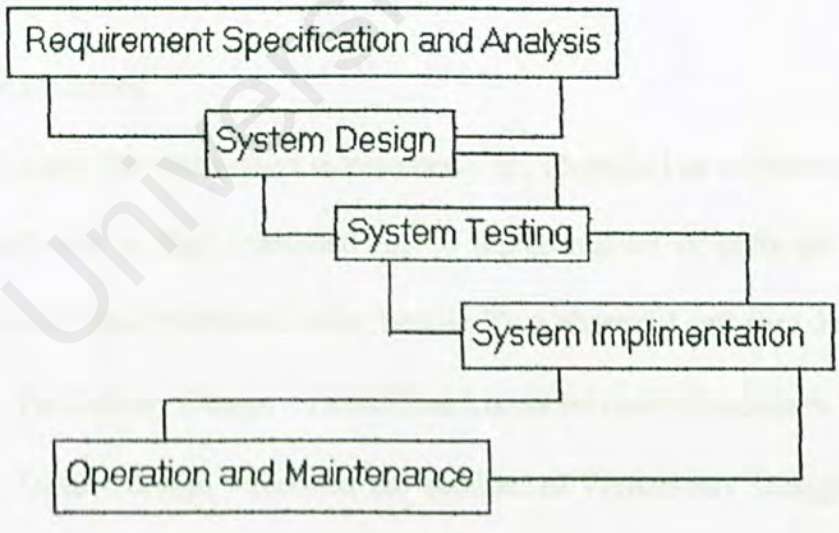


Figure 3.3: Waterfall Life-Cycle Model

I. Requirement Specification and Analysis

In this stage, the requirement for the "to be development software" is being established. It classifies functional capability, performance, and system interface and design constraints. It provided the software designer with representation of information and function that can be translated to data, architecture and procedure design. In this stage:

- Information gathering - Done using written material such as reference book, magazine, surfing through Internet, discussion with lecturer to acquire update information.
- Requirement Specification - Structured documents that set out the system services. In details is determine, which included functional requirements and non-functional requirements.
- Development Language and tools - Development the system.
- Runtime requirement for system are determined.

II. System Designed

In this stage, the established requirements are identified as software or hardware. The software is then translated into a representation of software that can be accessed for quality before coding begins. Two phases of software design are:

- Preliminary Design - Transformed requests into architectures.
- Details design - Refined the product of Preliminary Design into details data structures and algorithmic representations.

In this stage:

1. Data Flow Design - Represent as data flow diagram; show how data passed through system.
2. Database Design - Focuses on the design of the database model that support the system operation
3. User Interface Design - Interface screen design to meet the objective of easy-to-use, consistency, simplicity and attractiveness of a system.
4. Error Message Design - Display error message.

III. System Implementation

For this stage, computed program are created. The design must be translated into a machine-readable form. The coding step performs this task. Coding involved translating a detailed design representation of software into a program language realization. Coding Methodology, coding style, coding tools will be studied carefully.

IV. System Testing

Each program is calling a unit, and unit testing is the verification that every unit meets its specification. The entire units are combined and now the whole are tested. When it is successfully tested, the product is finished. Testing is exercising the software to uncover errors and ensure the system meets defined requirements.

- Testing - Few types of testing is perform during this phase.

V. *Operation and Maintenance*

Most system products include this step, as this is the final step for the Waterfall Life-Cycle Model methodology. In this final point, all kinds of error, weakness, problem, correction and insufficiency is traced and identified. Software maintains reapplies of the preceding life-cycle step to an existing program rather than a new one.

Strengths:

- Allows for departmentalization and managerial control
- A schedule can be set with deadlines for each stage of development to make sure is delivered on time
- Enforced disciplined approach
- Document driven

Weaknesses:

- Once a phase of development is completed, the development proceeds to the next phase and there is no turning back
- Does not allow for much reflection or revision
- Once an application is in the testing stage, it is very difficult to go back and change something that was not well-thought out in the concept stage

3.2.3 Prototyping Model

This is a cyclic version of the linear model. In this model, once the requirement analysis is done and the design for a prototype is made, the development process gets started. In this methodology, the software is evolved as a result of periodic shuttling of information between the customer and developer. This is the most popular development model in the contemporary IT industry. Most of the successful software products have been developed using this model - as it is very difficult to comprehend all the requirements of a customer in one shot. There are many variations of this model skewed with respect to the project management styles of the companies.

When using the Prototyping Model, the developer builds a simplified version of the proposed system and presents it to the customer for consideration as part of the development process. The customer in turn provides feedback to the developer, who goes back to refine the system requirements to incorporate the additional information. Often, the prototype code is thrown away and entirely new programs are developed once requirements are identified.

Prototyping allows the clarification of user's requirements through, particularly, the early development of the user interface. The user can then try out the system; albeit a (sub) system of what will be the final product. This allows the user to provide feedback before a large investment has been made in the development of the wrong system.

There are two types of prototypes:

- Exploratory programming: Objective is to work with the user to explore their requirements and deliver a final system. Starts with the parts of the system which are understood, and then evolves as the user proposes new features.
- Throw-away prototyping: Objective is to understand the users' requirements and develop a better requirements definition for the system.

There are few kinds of different approaches that may be followed when using the Prototyping Model:

- Creation of the major user interfaces without any substantive coding in the background in order to give the users a "feel" for what the system will look like.
- Use of an existing system or system components to demonstrate some functions that will be included in the developed system.
- Development of an abbreviated version of the system that performs a limited subset of functions; development of a paper system (depicting proposed screens, reports, relationships etc.).

Strengths:

- Allows the rapid development of partial or whole system to capture the requirements of the clients
- Early detection of possible catastrophes, new issues or requirements

Weaknesses:

- Adopting an incomplete system as complete
- Can lead to poorly designed system
- Can lead to false expectations
- Transitions of development stages are unclear
- Quality of the development software may be compromised when build in a hurry

3.2.4 Synchronize-and-Stabilize Life-Cycle Model

This model is Microsoft Life-Cycle Model. The requirements analysis is conducted by interviewing numerous potential clients for the package and extracting a list of features of highest priority to the clients. Synchronize is preformed at the end of each of the day while Stabilization is preformed at the end of each of the builds.

Strengths:

- Various components in the software always work together
- Can obtain early insight into operation of the product and can modify the requirements if necessary during the course of a build
- Can even be use if the initial specification is incomplete
- Future users' needs are meet
- Ensures the components can be successfully integrated

Weaknesses:

- Has not been widely used other than Microsoft

3.2.5 Rapid-Prototyping Life-Cycle Model

The Rapid-Prototyping Life-Cycle Model is a linear sequential software development process that emphasizes an extremely short development cycle. This model is a "high speed" adaptation of the linear sequential model in which rapid development is achieved by using a component-based construction approach.

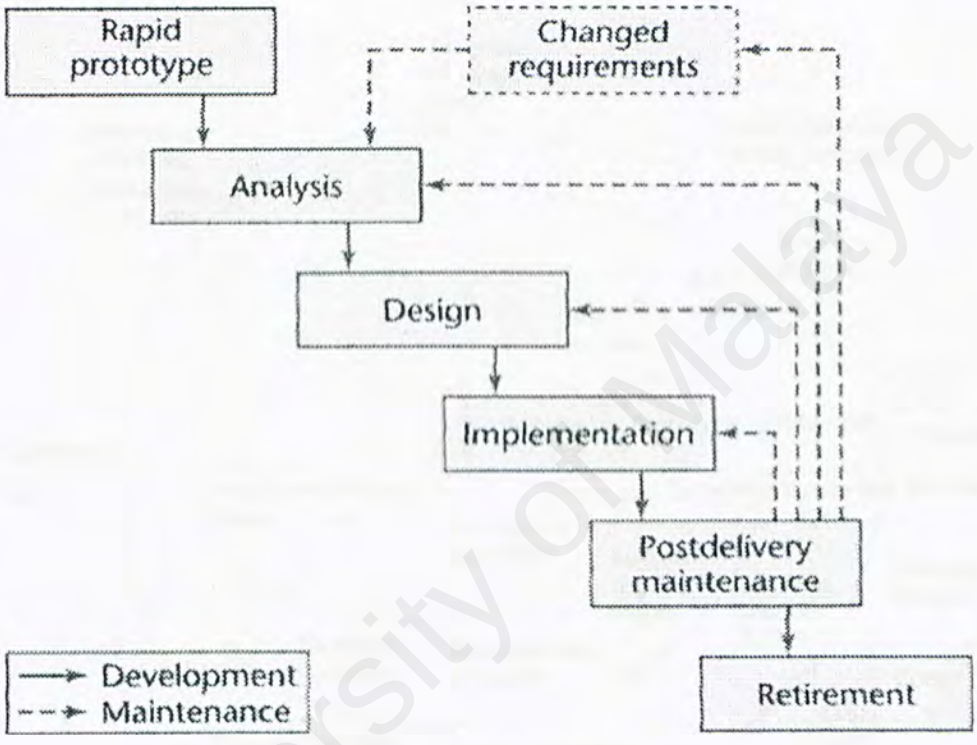


Figure 3.4: The Rapid-Prototyping Life-Cycle Model

Strengths:

- The development of the product is linear, proceeding from the rapid prototype to the delivered product
- Embodied in word rapid
- The prototype is build rapidly and can modify rapidly to reflect the client's need

3.2.6 Spiral Life-Cycle Model

The Spiral Life-Cycle Model underlying the idea of minimizing the risk via the use of prototypes. The Full Spiral Model precedes each phase by alternatives and risk analysis. It follows each phase by evaluation and the planning of the next phase.

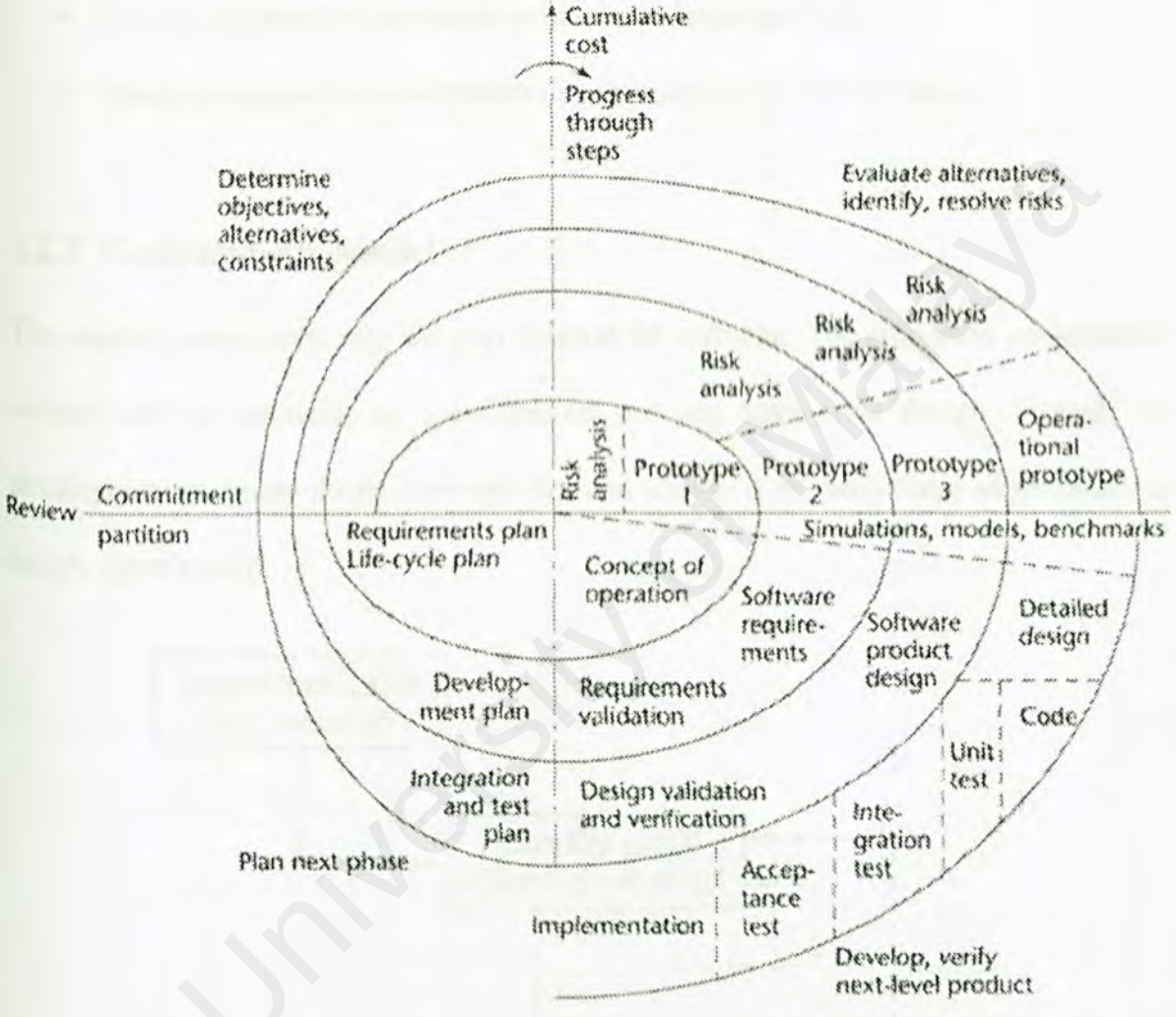


Figure 3.5: Full Spiral Life-Cycle Model

Strengths:

- The emphasis on alternatives and constraints supports the reuse of existing of software and the incorporation of software quality

- Risk driven
- It is easy to judge how much to test
- No distinction is made between development and maintenance

Weaknesses:

- Can be use only for large-scale software, in-house products
- Developers have to be competent in risk analysis and risk resolution

3.2.7 Code-and-Fix Model

This model is the easiest way using to develop the software. The product is implemented without any requirements or specifications nor any attempt at design. Instead, the developers can simply throw code together and rework it as many times as necessary to satisfy client's need.

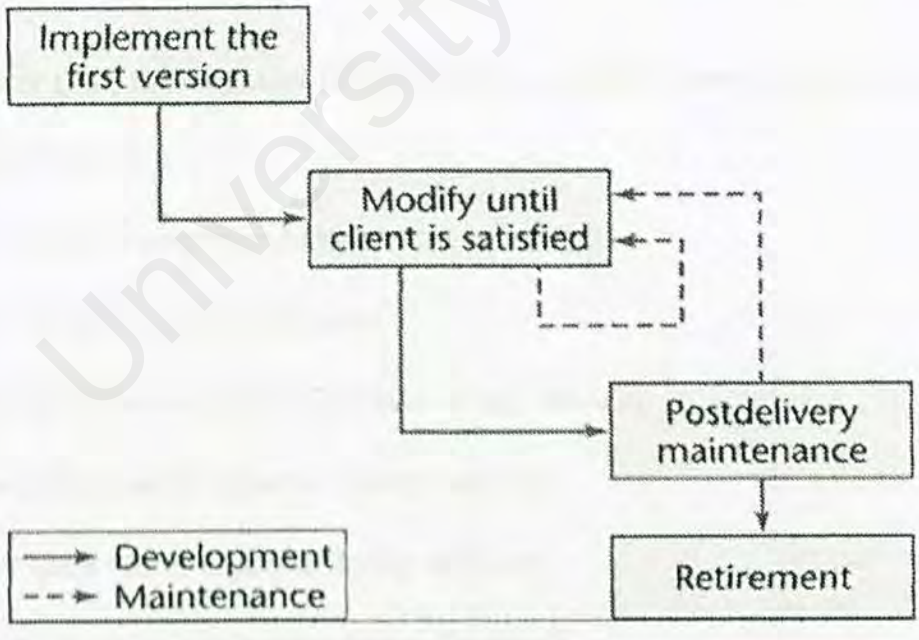


Figure 3.6: The Code-and-Fix Life-Cycle Model

Strengths:

- Easiest way to develop software
- Easy to use for short programs which require no maintenance

Weaknesses:

- Totally unsatisfactory for nontrivial programs
- The most expensive way to develop system
- Maintenance is difficult without specification or any design documents
- Chances of a regression fault occurring are greater

3.2.8 Conclusion

All these different models have their own advantages and disadvantages. As we know, each model has their own procedure in success the project which been developed.

As the matter of it, the important facts that should consider when choosing any of them mostly are as following:

- The model is easy to understand.
- The model is easy to implement.
- The operation can go front and back if any problem.
- Time taken can be expected during each step.
- Cost spent can be expected during each step.
- Schedule can be made according to the model.

By the way, the following complaints from the user are typical:

- Software contains bugs as the system always get hang.
- Doesn't meet the need of the user due to lack of proper system analysis.
- Software run slowly causing delays might due to selecting the wrong type of algorithm.
- Difficult to understand the interface as having poor code designing.
- Software costly as the amount of resource to develop is too high.

The above is symptoms of imperfect software development and management. Some of this will affect the normal works of the software and the user. For the solution, a lot of improvements have to be carried out.

The evolution of system development Process Models has reflected the changing needs of computer customers. As customers demanded faster results, more involvement in the development process, and the inclusion of measures to determine risks and effectiveness, the methods for developing systems changed.

In addition, the software and hardware tools used in the industry changed (and continue to change) substantially. Faster networks and hardware supported the use of smarter and faster operating systems that paved the way for new languages and databases, and applications that were far more powerful than any predecessors. These rapid and numerous changes in the system development environment simultaneously spawned the

development of more practical new Process Models and the demise of older models that were no longer useful.

Nevertheless, in the contemporary commercial software development world, the fusion of all these methodologies is incorporated. Timing is very crucial in software development. If a delay happens in the development phase, the market could be taken over by the competitor. Also if a 'bug' filled product is launched in a short period of time (quicker than the competitors), it may affect the reputation of the company. So, there should be a tradeoff between the development time and the quality of the product. Customers don't expect a bug free product but they expect a user-friendly product. That results in *Customer Ecstasy!*

3.3 Methodology Chosen

For this Interactive Resume System (IRS), we have carefully considered many of the software process model and analyzing the system requirements to synchronize the development of this system. Finally, **Waterfall Model with Prototyping** is chosen.

Waterfall Model with Prototyping

After searching the clearer information of each model, I had chosen this model as the IRS developing.

This model is choosing due to:

- A good specification to begin with.
- Easy to use.
- Enables maintenance to be carried out at each stage due to its interactive nature.
- Changes can be done during any of the stages by returning to the previous stages.
- Systematic in the flow of developing stages.
- Scopes of project well understand.
- Project risks have been accessed and are considered to be low.
- Allow the capture of requirements using the prototype.
- Prototyping is included as a sub-process that enhances understanding.
- Most clearly illustrated model.

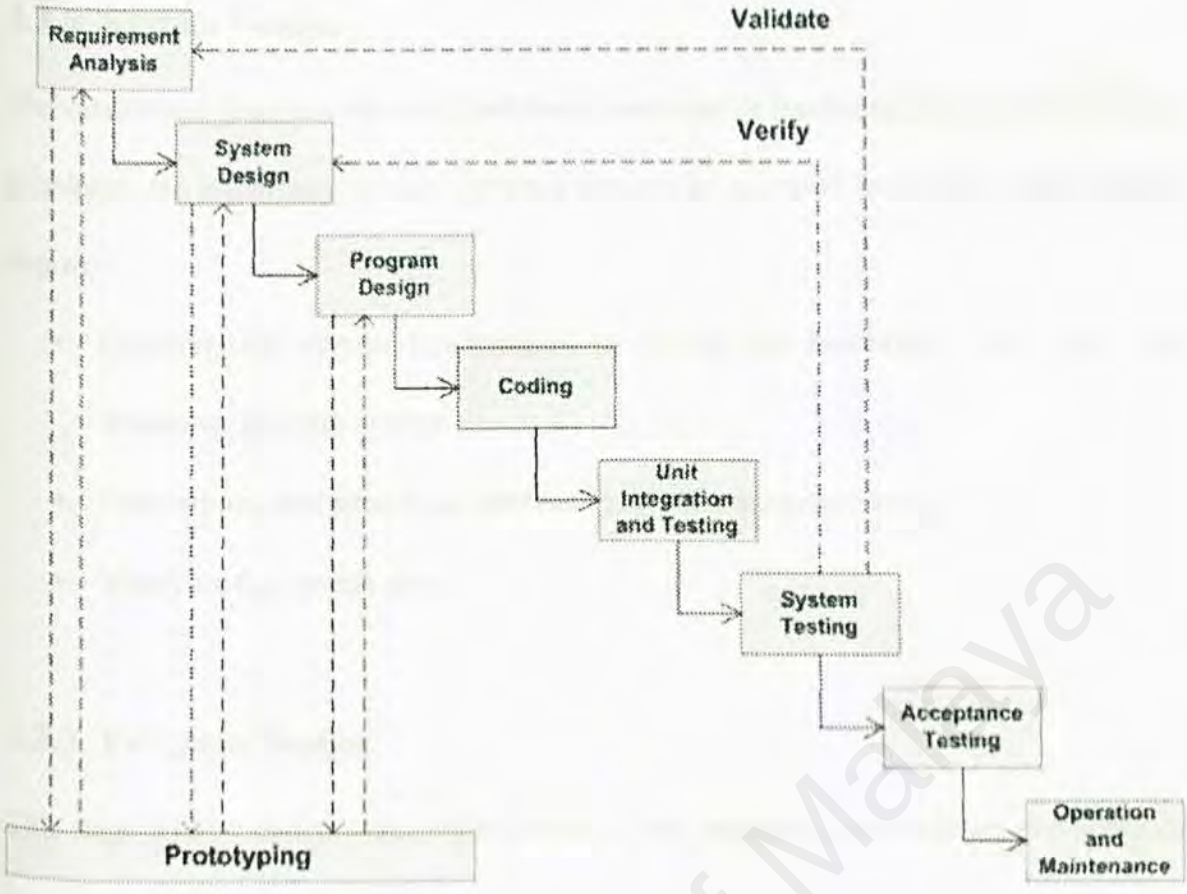


Figure 3.7: Waterfall Model with Prototyping

3.3.1 Requirement Analysis

It has to be for understanding and determining user's requirements and the system requirements.

- Analyzing, brainstorming, and eliciting user's need
- Collecting and specifying the entire of the user's need
- Validating and gathered all requirements
- Runtime requirement for system are determined

3.3.2 System Design

The established requirements are identified as software or hardware. The software is then translated into a representation of software that can be accessed for quality before coding begins.

- Outlining the system functionality by having the feasibility studies and case studies on existing system
- Determining and specifying hardware and software requirements
- Verifying the system design

3.3.3 Program Design

This stage will be concentrate on the design of the program as to establish and stipulate program design.

- Determining and specifying program design
- Designing the database structure
- Verifying the program design

3.3.4 Coding

It will be involving programming language and handle on programming management, personal planning, tool acquisition, database development and component level of documentation

3.3.5 Unit Integration and Testing

It will be tested the units separately as an individual unit. As a fact of it, modules will be form from the integrated of tested units.

- Test on the integrated modules

3.3.6 System Testing

Each program is calling a unit, and unit testing is the verification that every unit meets its specification. The entire units are combined and now the whole are tested.

- Combining all the modules into a system
- Testing the system
- Specifying and updating the system testing
- Evaluate and validating the system to meet the requirements

3.3.7 Acceptance Testing

This is a stage of preparing the system for user to test in order to give correctness and confirmation of the system.

- Proceed with the user testing
- Ensures that the system is free of errors
- Fixed the errors if found
- Testing of the system is completed
- Delivery of the system

3.3.8 Operation and Maintenance

Most system products will be come to this final stage. In this final point, all kinds of errors, weaknesses, problems, correction and insufficiency is traced and identified. Software maintains reapplies of the preceding life-cycle step to an existing program rather than a new one.

- Develop the user manual
- Lay out the maintenance plan
- Control and maintain the system
- Revalidating of the system

The system has to be validated and verified during the stage of system testing. The validation is to ensure that the system is has implemented all the requirements in the specification while the verification is to confirm that the system is working correctly without any problems as to check the quality of the implementation.

3.3.9 Prototyping

Prototyping is a sub-process and a prototype is a partially developed product or a simple simulator of the actual system to examine the proposed system and overview on the functionalities. The aim of having it in the model is to enable input from the end user at the early stage by giving them the look and feel of the application. This is achieved by modeling the user interface while having little or no content behind the interface. Prototyping is especially valuable where requirements cannot be specified clearly.

A prototype of IRS will be build regarding to the project scope and the analysis of the system before start to build the actual system.

Prototyping is needed as following:

- To ensure that the system are practical and flexible
- To ensure that the system meet the performance aim
- To ensure that the system accomplish the user's requirements
- To have an approaching of how the modules and sub modules interact with each other
- Users will felt more involved and had fewer conflicts with the designers

3.4 Information Gathering

The first step of the system analysis is gathering the important, useful and related information need in the development of the system.

3.4.1 Internet Research

It is the most effective method to gather the valuable and rare information. Apart from that, the Internet was searching from time-to-time to gather information on currently available needs on web and to observe the formats and style of the current resume system. Some renowned search engines and meta-search engine is preferred to use as to look up for research materials around the Internet, namely google.com, yahoo.com, metacrawler.com and so on.

3.4.2 Informal Interview

An interview will always be useful and more interactive way to gather information. I had carried out the informal interview session with my friends and my lecturer from time to time. They did provide me with a lot of constructive ideas and advices to aid for advance my system.

3.4.3 Discussion with Supervisor

To better understand the fields of developing an Interactive resume, I have gone through the discussion with my supervisor, Encik Mohamad Nizam HJ Ayub. He gave a very valuable suggestions and opinions for me in order to improve my system. As a result, I get a very understandable idea of the method to use for developing the IRS.

3.4.4 Existing System Analysis

Reviewing and studying on the related existing system will help me to improve my system design and provide me a clear understanding of my system requirements. Analysis on the strengths and weaknesses of each system can be help to progress a better design and have a correct viewpoint of my system.

3.4.5 Research on Pass Year Thesis and Reference Books

Referring to the pass year thesis and related reference books was one of the methods to study about the skills, structure, procedures of development and others relevant information in order to gather and gain more knowledge and information.

CHAPTER 4: SYSTEM ANALYSIS

4.1 Introduction

System analysis is a systematic approach to identify problem, opportunities and objective and analyzing the information flows in system. System analysis examines all aspects of the system including the equipment, people, operating coordination and its internal and external demands in order to establish a basic for designing and implementing a better system. The role of the system analysis can be referred from the step in the system development life cycle.

The purposes of this phase are:

1. To identify the user's needed.
2. To evaluate the system concepts for feasibility.
3. To allocate function to hardware and software, people, database and other system elements.
4. To establish time and schedule constraints.

4.2 Approach

A development method must be chosen in detail to expand the system as to ensure the system operation lucratively. There is no any right or correct way to develop a project or system. Some method may be more successful than others, it is all depends on when they are use, where they to be applied, how they apply, and who will involved in the development progression.

It is important to have these strategies, as it will help developer to systematize the project. Every system development needs user to determine the requirement.

A requirement is a feature that new system should have, both the information of the system should have procedure and opportunity feature such as processing control producing information, controlling a business activity, supporting the management, response time, input and output with. The determination of requirement entails of studying the existing system and collecting details about it to find out what the requirements are. There are four main ways of which requirement about a system can be obtained such as reading, interviewing, observation, and with questionnaire.

4.3 System Requirements Analysis

It is necessary to draw out the System Requirements to provide a guideline for developing the system. A requirement is a feature of the system or a description of something the system is capable of doing in order to fulfill the system purpose.

The system requirement for this project can be determined for the Interactive Resume System is normally detached into the functional requirements and non-functional requirements. The Functional Requirements Definition will be recitation on the functionality of the system, which describing the services that will provide to the user while the Non-Functional Requirements will be given a guide of which the system is to operate.

It does endow with an obvious overview of the overall requirements of the system. Due to this, we will have an understandable of how the system looks like, the way of using the system and an obvious idea of the functionality of the system. As an overall, this document is prearranged in the proper way to offer the user an unproblematic direct.

4.3.1 Functional Requirements

Functional Requirements describes an interactive between the system and its environment. It is also describes how the system should behave given certain stimulus. It is a statement of the service or functions that a system should provide how the system reacts to particular inputs, and how the system should behave in particular situations.

Among the Functional Requirements Modules are:

1. **User Login Module**
    - A security feature that only allow authorized user to access.
    - Authorized users can login using their unique user ID and password through this function.
    - User will be prompt to enter if the user ID and password is not match with the one stored in IRS database server.

2. **User Registration Module**
    - System should be able to provide an online registration.
    - User can apply to be an authorized user in IRS.
    - User's ID is unique and cannot be change.
    - User must enter the email address to allow administrator to send back the user ID and password when the user forgets.
    - User ID and password will be used to identify user in future.

3. **Choose Design**

   - Will be allowing user to preview each of the resume's design templates.
   - Can allow user to select the design template which they want to apply in presenting their resume.

4. **My Profile**

   - Saving user personal details.
   - Will be allowing user to update their personal particulars.

5. **My Resume Content**

   There are four customizable areas in the resume content design. Each area has a suggested title which can be edited to suit the user requirements. The optional titles are Education, Experience, Award and Skill.

   - *Education*
   - *Experience*
   - *Award*
   - *Skill*

6. **Testimonials Module**

   User can send his/her comments and opinions to IRS administration as IRS's testimonial so that the administrator can take further considerations in order to enhance the IRS.

4.3.2 Non-Functional Requirements

A Non-Functional Requirements can be describes as a restriction on the system that limits the choice for constructing a solution to the project. These solutions will narrow down the selection of programming language, platform or implementation technique tools. It will be not functional in nature, that is, these are constraints within which the system must work.

Among the Non-Functional Requirements are:

- Security

  The proposed system must have its security measures to minimize the risk of data exposure to unauthorized people. It is to provide for the user's a secure environment when using the system.

- Maintainability

  The system must be easy to maintain as the project specific coding standards will be followed to ensure maintainability. Proper comments will be added against the code to ensure easy understanding of the code. Development process will go through the relevant phases of the Software Development Life Cycle, with necessary documentation.

- Graphical user interface (GUI)

  A standard user interface across all modules refers to the reliability usage of color, position of text, graphics, and font size and also function menus. It facilitate user

to get the information easily which they desired in and out of the system. The user interface designed should meet its objectives which are effective, efficient, user consideration and productivity. Indirectly, it means will accomplish the aim of being a user friendly as it easier for user to interact with the system even with little or no computer background.

- Functionality

  The functionalities stressed here are the searching and retrieving capability, which is very important in any web application that deals with data retrieval from existing database. Besides, navigation and browsing features as well as application domain-related features will be taken into account.

- Correctness

  A program or a system must operate correctly without any errors or it provides little value to its users. Correctness is the degree to which the software performs its required functionality. It is to ensure that the application quality, lots of testing and trial-and-errors will be carried out.

- Usability

  It should be develop in the trouble-free way to use. Users should be able to retrieve the information effortlessly. Prototype will be basis for the user interface and functionality. The interface should be friendly and it should be easy for the user to either access or input the information. While designing the user interface

care will be taken to attention. Besides, reduce the number of keystrokes required to input data into the system. The system should be able to provide a pre-defined path for the cursor (tab order) to follow when the user inputs the data.

- Reliability

  It is extending to which system can be expects to perform it intends function with requirement precision and accuracy.

- Readability

  Terminology used in the tools should be easily understandable by the user.

- User friendliness

  Associated to the previous request, this function also allow user to operate the system with straightforwardly. The system must be able to provide the necessary command due to the situation. This system provides an effective error holding and validation procedure so that user can use this system without difficulty. The system will be able to develop an error message or warning if an error occurs.

4.4 Development Requirements

Every development has its own suggestion and proposition of Hardware Requirements and Software Requirements to use as to make certain of the victorious of the system.

4.4.1 Hardware Requirements

Hardware includes any physical device that is connected to the computer and is controlled by the computer's microprocessor.

In developing IRS, the required hardware is as following:

- Intel Pentium 4 CPU 1.50GHz
- 384MB of RAM
- 20.0GB of Hard disk space
- Screen resolution in 1024 x 768 pixels
- 256-color display and 32-bit color video card
- C-Media Wave Sound Card in 16 bit
- Sony CD-RW in 48x/24x/48x speed
- Canon S100SP printer
- Interscan Scanner
- C-One 128MB Tiny USB handy drive
- A4 Tech Scroll Mouse and Keyboard

4.4.2 Software Requirements

4.4.2.1 Platform - Microsoft Windows XP Professional

For IRS, Microsoft Windows XP Professional is chosen as the development platform. The most important reason for using this platform is because more peoples are more familiar with the Microsoft's operating system. Therefore, windows platform is choosing instead of other such as UNIX or LINUX. In addition, this will reduce the training required for using the system. Being the latest model in Microsoft's operating system, Microsoft Windows XP Professional brings more personalized look to the desktop compared to the previous models.

4.4.2.2 Web Server - Internet Information Sever

Internet Information Server (IIS) has been chosen as the web server for developing IRS. Since IIS comes with the windows operating system, its compatibility will be higher compare to other web servers. It handles the basics well, good as both a first time web server as would be more familiar and comfortable with windows operating system.

4.4.2.3 Database Server - MySQL

MySQL has been claimed to be the world's most popular open source database. MySQL can be freely obtained from its website without paying. Therefore, it is the most cost-effective database server compare to other commercial database server. Despite this, MySQL offers a rich and very useful set of functions. The connectivity, speed and security make it highly suited for accessing databases on the internet.

4.4.2.4 Programming Language

4.4.2.4.1 PHP

PHP is an ideal language for IRS as it is designed expressly for the dynamic and interactive web site. It has a very high performance in developing and creating dynamic web sites from the ground up. The compatible with a variety of other key web technologies such as Macromedia Flash make it the priority language to be chosen. Since the IRS exploits MySQL as its database management system, the use of PHP for the web development is indeed a great combination to provide interoperability feature.

4.4.2.5 Scripting Language

4.4.2.5.1 JavaScript

JavaScript's greatest potential gift to a Web site is that scripts can make the page more immediately interactive. JavaScript is being chosen to embed into an IRS as it can bring the page to life in any number of ways. It provides functionality such as data validation, forms and interaction with form elements.

4.4.2.5.2 VBScript

VBScript is an ultimate scripting language for IRS as to enhance interactivity of the web page by making them active, as compared to a simple static display. Moreover, VBScript is easier to use for windows- based application development. As using it, problems with data validation in forms can be easily straightened out.

4.4.2.6 Tools and Technologies

4.4.2.6.1 Macromedia Dreamweaver MX

Macromedia Dreamweaver MX is chosen as the main tool for designing the dynamic web site for IRS as it is a dynamic HTML editor available off the shelf. It provides a lot of powerful advanced features and tools which helping in designing an interactive resume. Moreover, with the existing build up database management system, MySQL, in it, is increasing the ease of using when connecting.

4.4.2.6.2 Swish v2.0

Swish v2.0 is chosen as an excellent choice for building Flash animations using pre-defined effects. It is emerge with more advanced pre-defined motion effects, such as 3-D Spin, Explode and Vortex can be apply into IRS to enhance its interactivity.

4.4.2.6.3 Macromedia Flash MX

Macromedia Flash MX has been chosen to be one of the design authoring tools in the development of IRS. The most important reason for using this tool is because it allows the embedding of images, sounds, movies and simple HTML files. These abilities are making it a good multimedia platform. Moreover, embedding flash in web site will increasing the interactivity presentation of a page for being more professional.

4.4.2.6.4 Adobe Photoshop 7.0

Adobe Photoshop 7.0 is chosen to edit images and photos which use in web site of IRS as it provides powerful image-editing tools.

4.4.2.7 Summary

Platform	Microsoft Windows XP Professional
Web Server	Internet Information Server (IIS)
Database Server	MySQL
Programming Language	PHP
Scripting Language	JavaScript VBScript
Tools and Technologies	Macromedia Dreamweaver MX Swish v2.0 Macromedia Flash MX Adobe Photoshop 7.0

Table 4.1: Summary of Development Environment

CHAPTER 5: SYSTEM DESIGN

5.1 Introduction

System Design is a phase where the actual system is develops according to all the information gathered from the previous phases. It translated the entire requirements for the system into system characteristics.

System Design is done to:

- Meet user's requirements in term of applying appropriate of procedures performance, appropriate of interaction method.
- Detailed design specification with specific logical design elements that describe features of a system such as the design of the structure, architecture, functionality, database, user interface and the output of the required information.
- Build an ease of use application, physically comfortable and attributes to user's effectiveness.
- Confirm the readability of the program structure as it would accessibility the maintenance in the future.

5.2 System Architecture Design

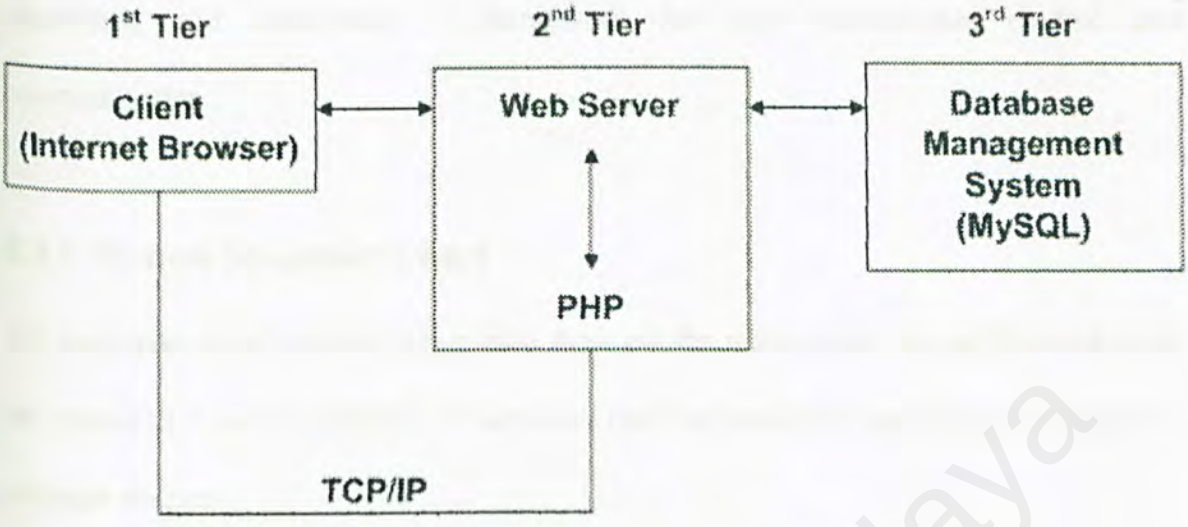


Figure 5.1: Three-Tier Architecture of IRS

The conceptual architecture of the three-tier application applies when we split an application across three tiers into three logical components, user interface, computational logic and database management system. The three-tier application basically consists of a internet browser for the user interface, a web server connected to a middle-tier application and a constant store that is commonly a database management system.

The main point of having three-tier architecture is to assign main functionality to each tier to ensure no function overlapping. Consequently, the system faults or errors will be able to detected and fixed easily without interfering to other tier.

5.3 System Functionality Design

In System Functionality Design, a large system will be developed into sub-systems as for identifying and establishing a framework for each sub-systems control and communication.

5.3.1 System Structure Chart

The main purpose of structure chart is to show out the relationship among the modules in the system. It is used to identify the activities that composite the system and to model the program structure.

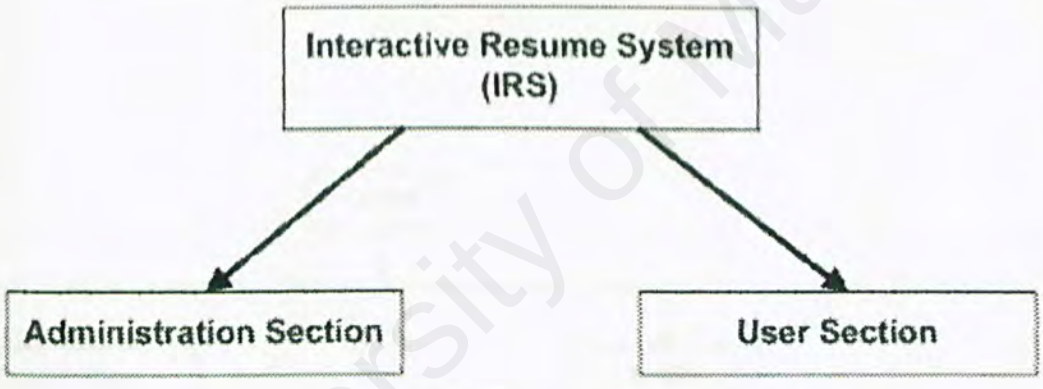


Figure 5.2: Main Structure Chart for IRS

IRS consists of two major parts, which are Administrator Section and User Section. Basically, the Administrator Section is the main controller to manage and maintain the IRS system. The Administrator Section has completely control over access to the firm's database. The User Section is mainly on the user's side of keeping up and maintaining user's information. It is the main section for lets user to access and to use the system as the end-users.

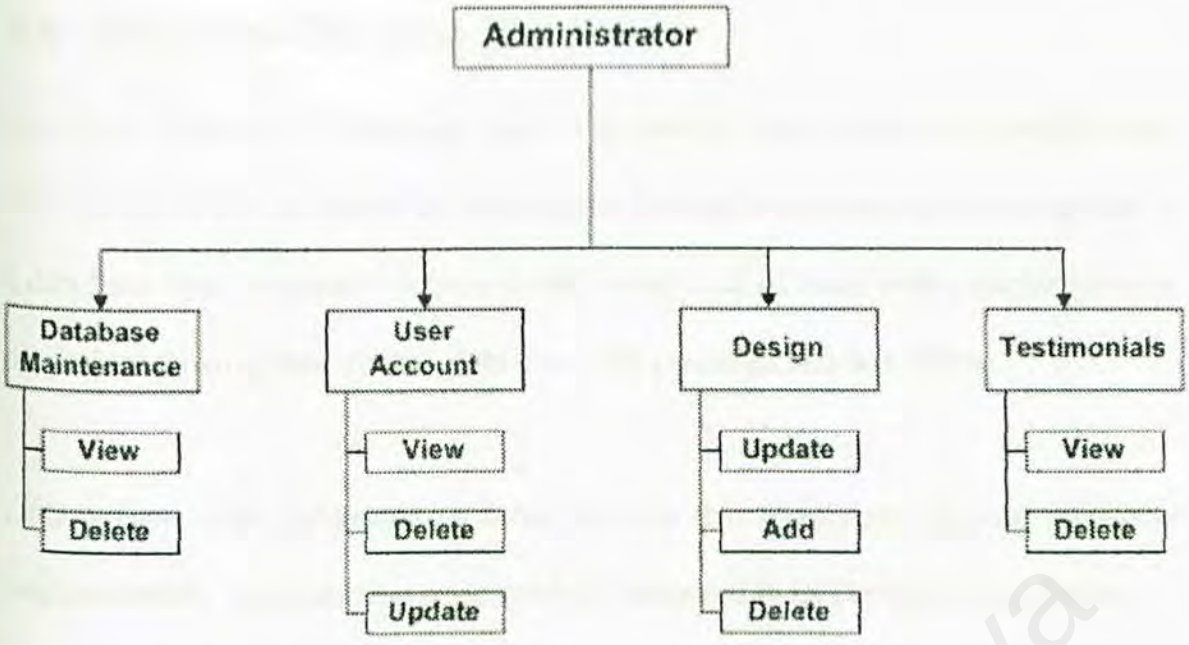


Figure 5.3: Structure Chart for Administrator Section

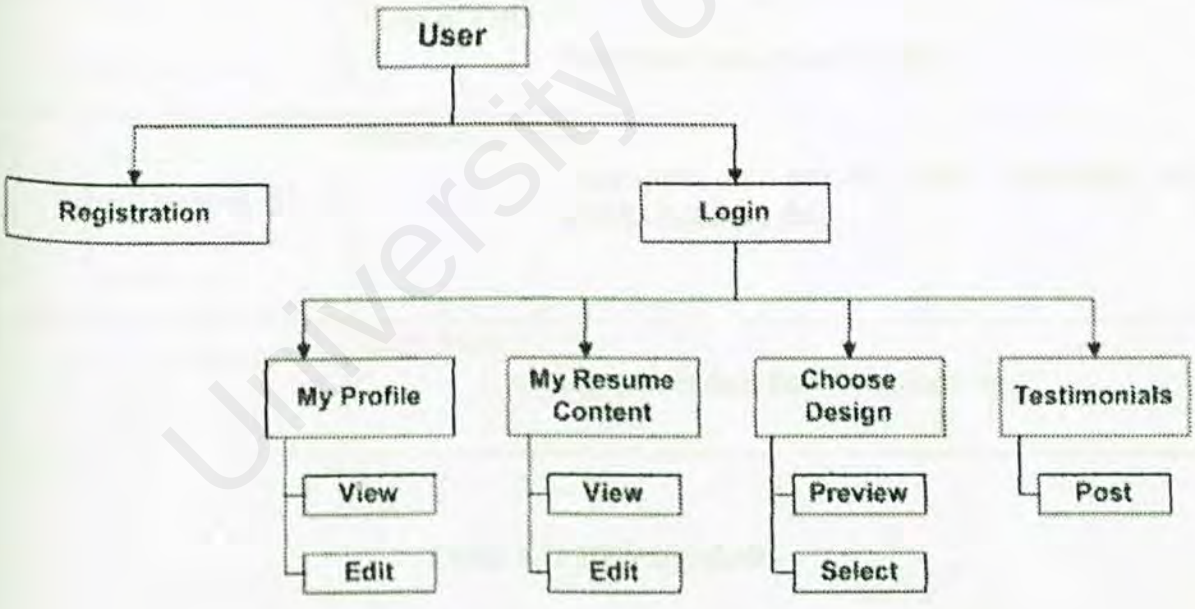


Figure 5.4: Structure Chart for User Section

5.4 Data Flow Diagram (DFD)

Data Flow Diagram is a technique used to graphically characterize data processes and flows in IRS. DFD will depict the information flow and transformation that is applied as a data from input to output. It represents IRS at any level of detail with a graphic network of symbols showing data sources, data flow, data processes and date stores.

DFD is easy to be understood as it has symbols that specify the physical aspects of implementation. There are four basic symbols composed in DFD which shown below.

Symbols	Attributes
	Entity - represents sources of data to the system or destinations of data from the system
	Flow of Data - represents movement of data
	Process - represents an activity that transforms or manipulates the data
	Data Store - represents data that is not moving

Table 5.1: DFD Symbols

The purposes of using DFD are:

- graphical, eliminating thousand of words
- hierarchical, showing systems at any level of detail
- further understanding of the interrelatedness of modules and sub-modules

The goal of data flow diagramming is to have a commonly understood model of a system. The convention, which is used to design DFD are based on the work by C.Gane and T.Sarson. The data flow is conceptualized with a top-down perspective. So, the Context Level Diagram will be drawn to show the entire system as a single processes surrounded by the external entities, followed by the Diagram 0. Diagram 0 is an overview process of all major modules in IRS that includes all the data stores, entities and process involved.

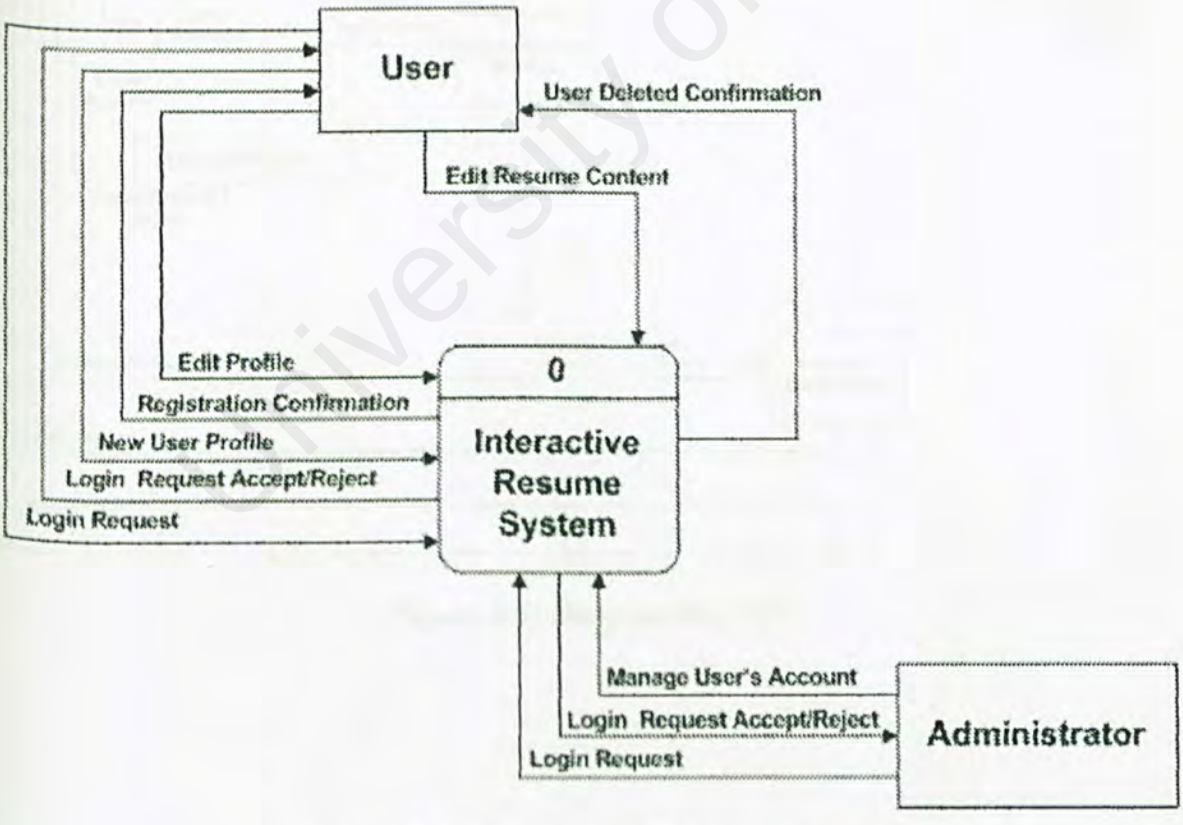


Figure 5.5: Context Level Diagram of IRS

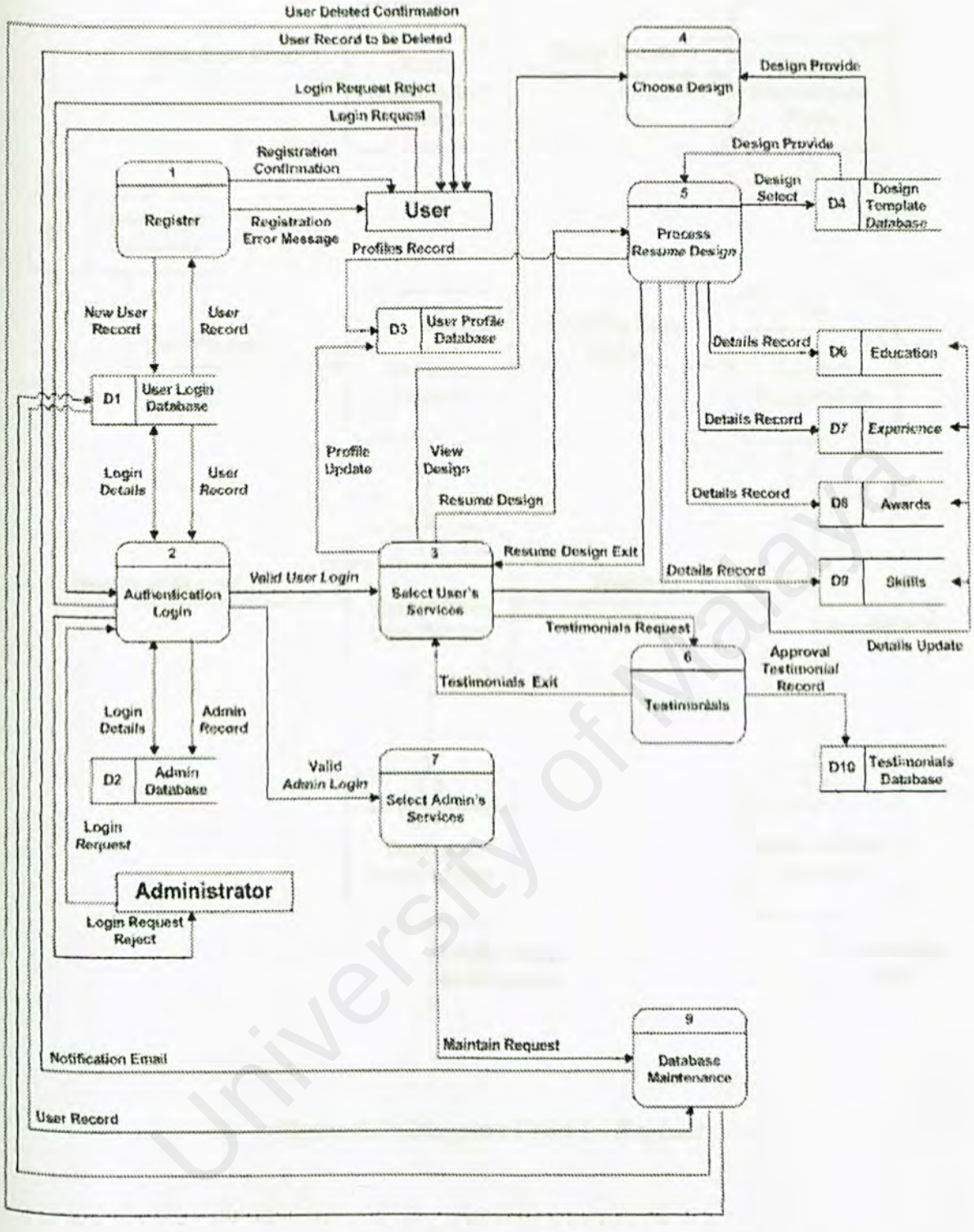


Figure 5.6: Diagram 0 of IRS

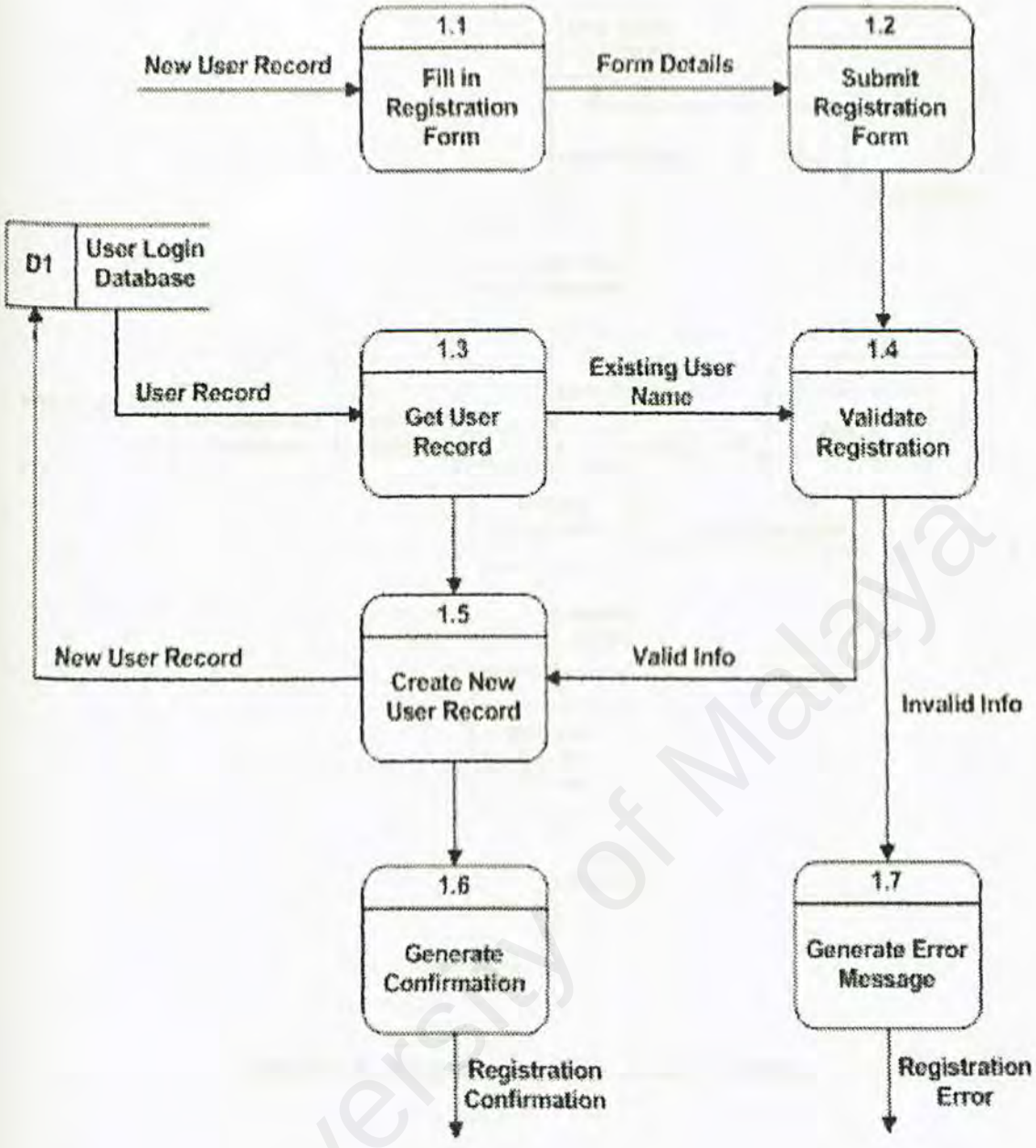


Figure 5.7: Diagram Level 1 - Register

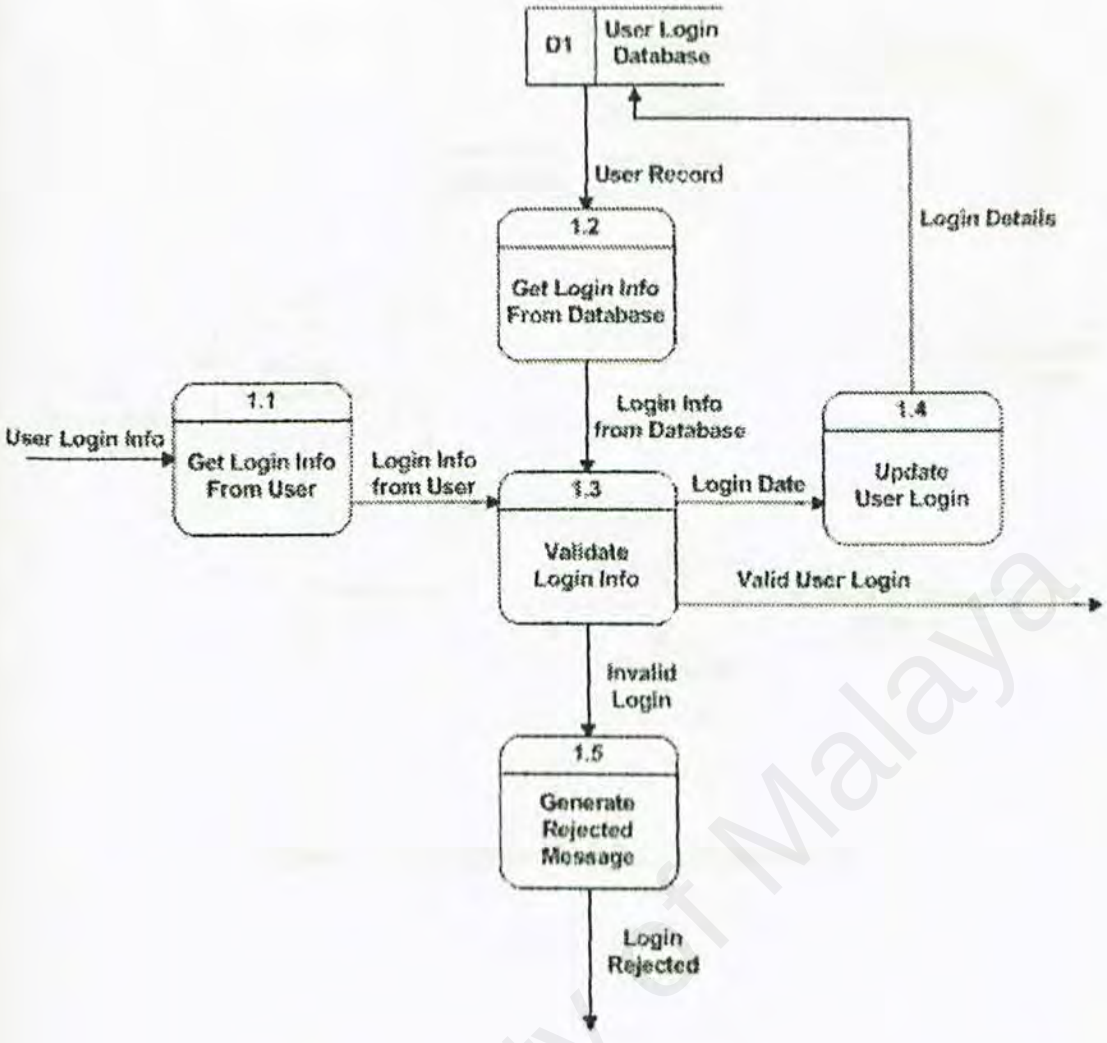


Figure 5.8: Diagram Level 1 - Authentication

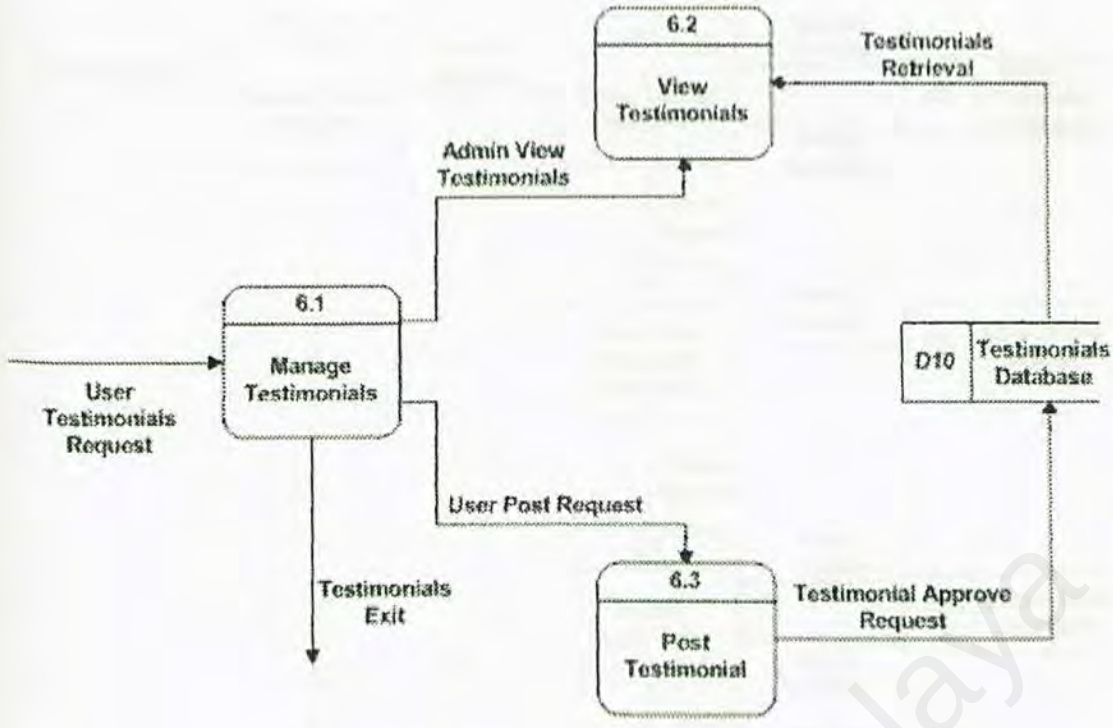


Figure 5.9: Diagram Level 1 - Testimonials

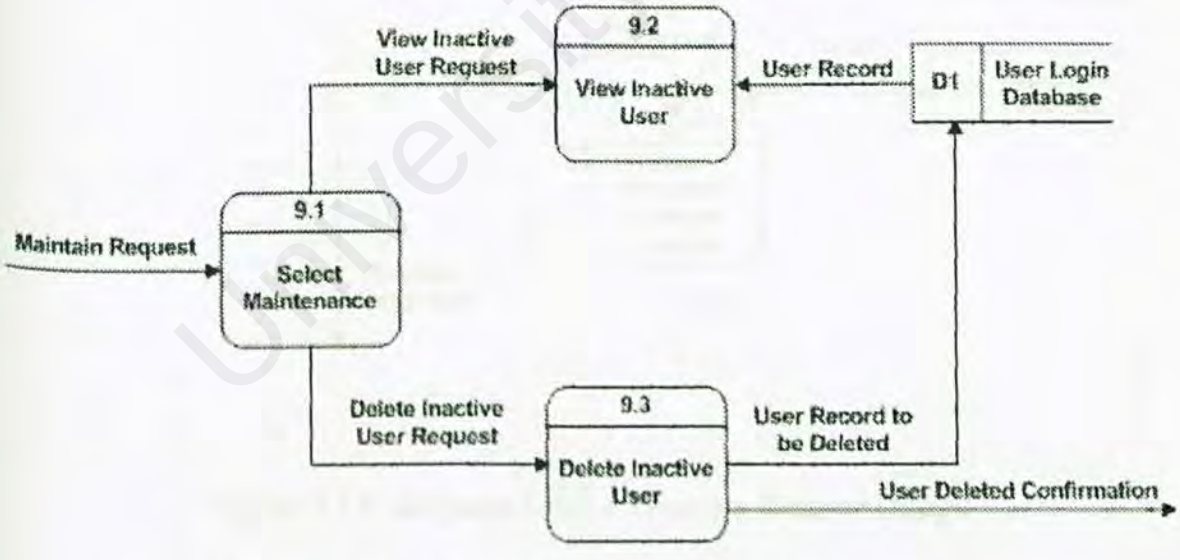


Figure 5.10: Diagram Level 1 - Database Maintenance

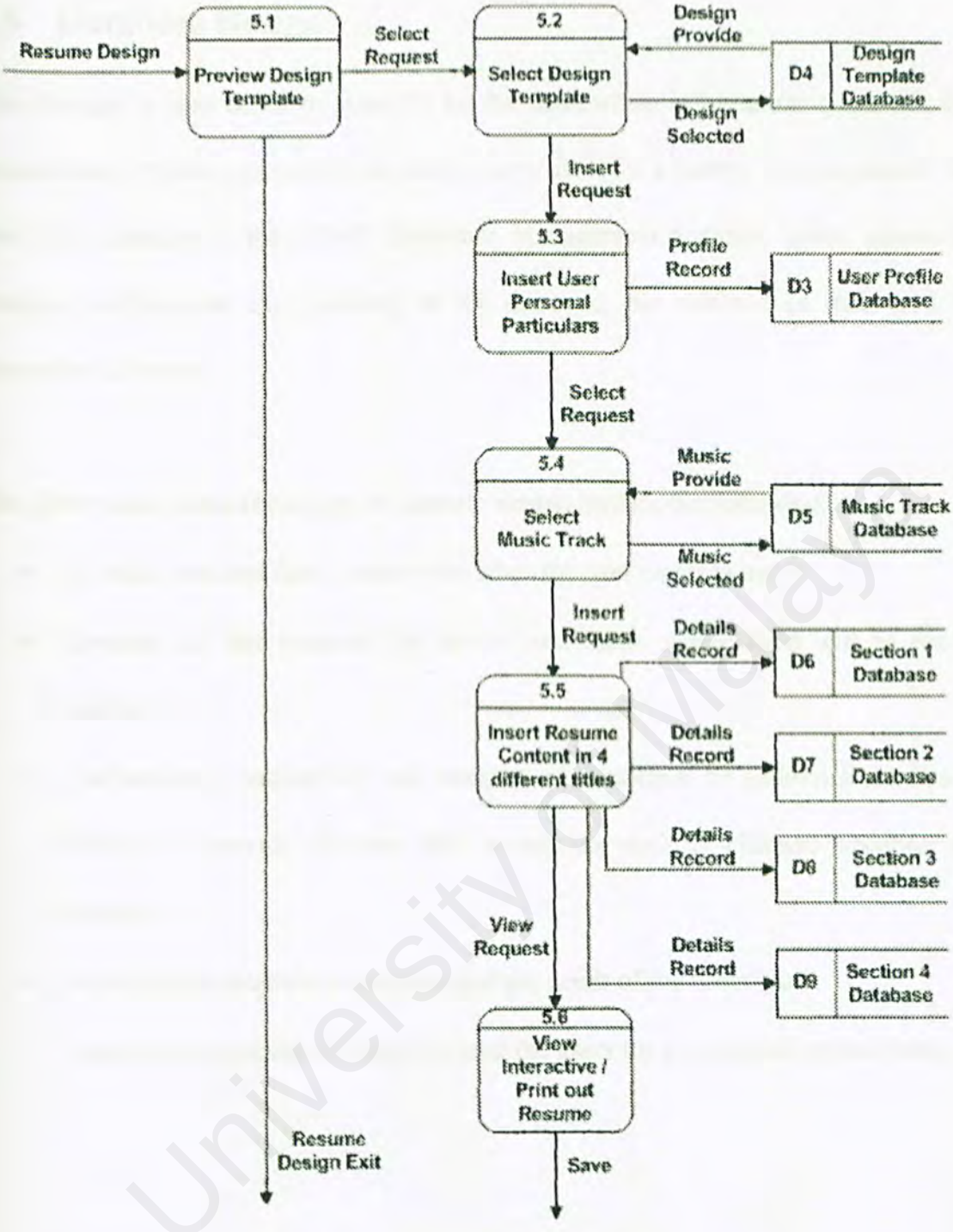


Figure 5.11: Diagram Level 1 - Process Resume Design

5.5 Database Design

Data Storage is considered by some to be the heart of an information system. It is a central source of data meant to be shared by many users for a variety of applications. The heart of a database is the DBMS (Database Management System), which allows the creation, modification and updating of the database; the retrieval of data; and the generation of reports.

The effectiveness main objectives of database design include the following:

- To make sure that data is accessible when the user wants to use it.
- Ensuring all data required for current and future applications will be readily available.
- The accuracy, consistency and integrity of data must be assured from time to time as to provide efficient data storage as well as efficient updating and retrieval.
- Allowing the database to progress and the needs of the users grow.
- Ensuring the data can be shared among the users for a variety of applications.

5.5.1 Relationships - The Class Diagram

There are three types of established inter-table relationships which are one to one (1:1), one to many (1:N) and many to many (M:N). The diagrammatic representation of the IRS database relationship is illustrated in the Class Diagram in figure below.

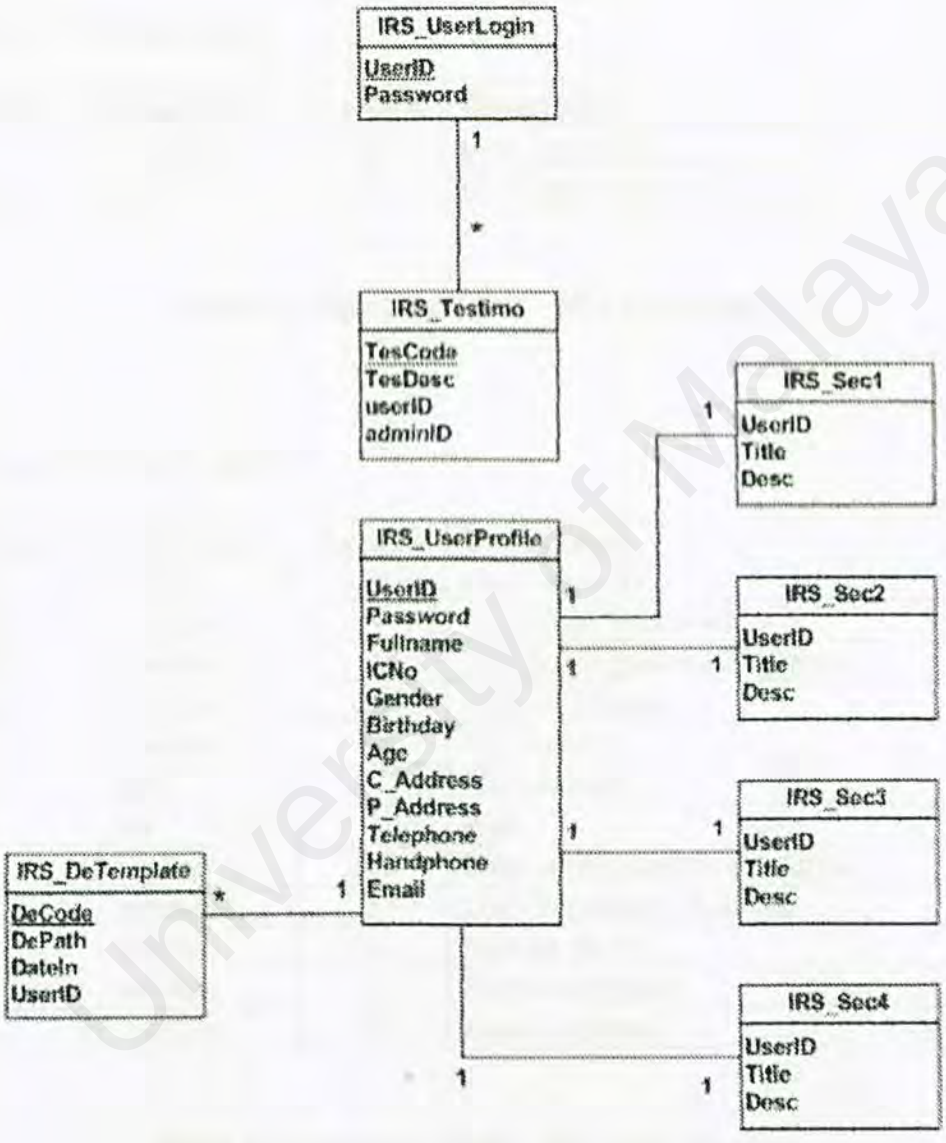


Figure 5.12: Class Diagram of IRS

5.5.2 Data Dictionary

Data Dictionary or metadata can be defined as descriptions of the database structure and contents. Data Dictionary defines the field, field type and descriptions of each table.

Database Name: **IRS**

Table Name: **IRS_UserLogin**

Field Name	Data Type	Length	Description
userID	varchar	10	User login ID
password	int	6	User login password

Table 5.2: Database Table - IRS_UserLogin

Table Name: **IRS_user_account**

Field Name	Data Type	Length	Description
login_id	varchar	10	User login ID
password	varchar	10	User login password
password2	varchar	10	User login password confirm
full_name	varchar	30	User full Name
ICNo	varchar	15	I/C Number
d_birth	date	-	Data of birth
age	int	2	Age
c_add	varchar	255	User correspondence Address
p_add	varchar	255	User Permanent Address
tel_hp	varchar	11	Mobile phone
tel_home	varchar	11	Home telephone
email	varchar	50	Email address

Table 5.3: Database Table - IRS_user_account

Table Name: **IRS_DeTemplate**

Field Name	Data Type	Length	Description

deCode	varchar	5	Design template code
dePath	varchar	50	Design file path
dateIn	date	-	Date created
userID	varchar	10	User login ID

Table 5.4: Database Table - IRS_DeTemplate

Table Name: **IRS_Sec1**

Field Name	Data Type	Length	Description
userID	varchar	10	User login ID
title	varchar	50	Title's name
desc	varchar	500	Description

Table 5.5: Database Table - IRS_Sec1

Table Name: **IRS_Sec2**

Field Name	Data Type	Length	Description
userID	varchar	10	User login ID
title	varchar	50	Title's name
desc	varchar	500	Description

Table 5.6: Database Table - IRS_Sec2

Table Name: **IRS_ Sec3**

Field Name	Data Type	Length	Description
userID	varchar	10	User login ID
title	varchar	50	Title's name
desc	varchar	500	Description

Table 5.7: Database Table - IRS_Sec3

Table Name: **IRS_ Sec4**

Field Name	Data Type	Length	Description
userID	varchar	10	User login ID
title	varchar	50	Title's name
desc	varchar	500	Description

Table 5.8: Database Table - IRS_Sec4

Table Name: **IRS_ Testimonial**

Field Name	Data Type	Length	Description
TesCode	varchar	10	Testimonial code
TesDesc	varchar	500	Testimonial description
userID	varchar	10	User login ID
adminID	varchar	10	Admin login ID

Table 5.9: Database Table - IRS_Testimonial

5.6 User Interface Design

User interface design concerns how effectively users complete tasks and how well they enjoy their work. A good interface makes it easy for users to tell the computer what they want to do, for the computer to request information from the users, and for the computer to present understandable information. Clear communication between the user and the computer is the working premise of good UI design.

Figure 5.13: Interface of Front-end System

CHAPTER 6: SYSTEM IMPLEMENTATION

6.1 Introduction

To meet the requirements stated in previous chapter – System Design, the development of the project has been developed carefully to turn all requirements into real system. The subsequent phase following the completing of the system design stage in the system development life cycle is the actual implementation of the system. Even though careful planning during the system design phase will bring about easier implementation of the system, this phase should still be carried out meticulously and cautiously.

Implementation should be carried out by following the system design rigorously as the design is a direct result of thorough research on the topic of the project, not forgetting the goals, objectives and taking into consideration other issues such as the targeted system users and the system's operating environment.

Once a design model is created, the next step is to implement the design to produce the programming codes. There are many ways to implement a design and many languages and tools are available. Even though careful planning during the system design phase will bring about easier implementation of the system, this phase should still be carried out meticulously and cautiously. This phase will describe the software and hardware configuration which are the basic preparation for the system development. It will also cover the interface development, database development,, database connection and development of system documentation.

6.2 System Development

The system development depicted here are the settings, conditions and surroundings where the actual system development takes place. It is important to take note of the environment in which the development was carried out because it may have effect on the speed and effectiveness of the system's implementation.

6.2.1 Hardware Configuration

This system is developed using the following hardware as described below. It was found to be suitable and satisfactory for the entire period of the development stage.

- Intel Pentium 4 CPU 1.50GHz
- 384MB of RAM
- 20.0GB of Hard disk space
- Screen resolution in 1024 x 768 pixels
- 256-color display and 32-bit color video card
- C-Media Wave Sound Card in 16 bit
- Sony CD-RW in 48x/24x/48x speed
- Canon S100SP printer
- Interscan Scanner
- Network Interface Card (NIC)
- C-One 128MB Tiny USB handy drive
- A4 Tech Scroll Mouse and Keyboard

7. Install Macromedia Flash MX for template design purpose.
8. Install Swich v2.0 for template design purpose.
9. Install Adobe Photoshop 7.0 for user interface design.
10. Word processor for system documentation – Microsoft Word 2002.

*Note: Step 3 to 5 and step 6, 7, 8, 9 can be interchangeable.

6.3 Interface Development

Attractive and user friendly interface is very important for a web application system. IRS interface is developed to have Graphic User Interfaces (GUIs). GUIs support high-resolution color screen and interaction using a mouse as well as a keyboard. In this section, HTML and Macromedia Dreamweaver are used for develop the IRS web pages' interface. Adobe Photoshop 7.0 is used to design graphic and image that used in the web pages such as images of the buttons. Macromedia Flash and Swish are used for design template purpose as it will show out the presentation flash resume.

6.4 Database Development

6.4.1 Create Database

MySQL is used as the database Management System (DBMS) for this system. Database is created according to the database design in chapter 5. The data structure of each table is declared and the primary key is set. Therefore, the database is able to be maintained from time to time by add in some necessary constraints.

The following is an example of create table command in MySQL.

```
CREATE TABLE user_account(
id int(10) NOT NULL auto_increment,
login_id varchar(10) NOT NULL,
password varchar(10) NOT NULL,
password2 varchar(10) NOT NULL,
full_name varchar(50) default NULL,
ic_no varchar(14) default NULL,
d_birth varchar(10) default NULL,
age int(2) default NULL,
c_add varchar(255) default NULL,
p_add varchar(255) default NULL,
tel_hp varchar(11) default NULL,
tel_home varchar(11) default NULL,
email varchar(255) default NULL,
edu varchar(255) default NULL,
expe varchar(255) default NULL,
award varchar(255) default NULL,
skill varchar(255) default NULL,
PRIMARY KEY(id)
) TYPE = MyISAM;
```

* The names with *italic* are fiels's name in user_account table.

6.4.2 Accessing Database For Website

Any PHP Script accessing a MySQL database does the following:

1. Connect to the MySQL Database Server.
2. Send the SQL query to the MySQL Database Server and get the result.
3. Use the set of API's to get the data from the result that is returned in step 2.
4. Generate the HTML page, for displaying the contents.

Function "mysql_connect" is used to create a connection to MySQL Server.

```
int mysql_connect (string[hostname [:port] [:/path_to_socket] ], string[username],
string[password] );
```

The first argument specifies the hostname (optionally port, else default port is assumed) or the UNIX domain socket, on which the MySQL server is listening for the client requests. If the PHP program and the database server are running on the same machine, then they can communicate using the UNIX domain socket.

All the SQL (and other) commands are set to the MySQL Server using this connection will be executed with the privileges of the username. The function returns a link identifier (a positive number which references the connection) on success, or false on error. This link identifier will be used in all the function calls, which send requests to the MySQL Server. If another mysql_connect call is made with the same arguments, a new connection will not be created to the server. The link identifier of the connection already open will be returned. The connection (between the PHP client program and the MySQL Server) will be closed when a mysql_close call is made or when the PHP Script exits.

Function "mysql_pconnect" is used to create a persistent connection to a MySQL Server.

```
int mysql_pconnect (string[hostname [:port] [:/path_to_socket] ], string[username],
string[password] );
```

The function arguments and the return value are same as these for mysql_connect. The difference between mysql_connect and mysql_pconnect is that the connection created with mysql_pconnect is not closed when the PHP program exits or a mysql_close call is made. The PHP interpreter maintains the connection with the MySQL Server. When a mysql_pconnect call is made, the PHP interpreter first finds out if there is an existing open connection with the same function arguments. If it finds one then link identifier of the existing connection is returned, instead of creating a new connection. The mysql_pconnect function should be used in PHP applications where, over a short period of time, a large number of connections will be made to the MySQL Server using the same username and password. Mysql_pconnect will work only if PHP is configured as a module in the web server.

Funtions "mysql_close" will end the MySQL Server and is optional. It returns true on success or false on error.

```
int mysql_close(int [link_identifier] );
```

In this system, all the PHP Scripts connect to the MySQL database as user "root". The following is the PHP Script file, "db_conn.php" which the "db_conn" is the name created

ourselves in managing the site in MySQL Server. It contains the specifies variable definitions that are used across the whole application to connect to the MySQL database.

```
<?php
# FileName="Connection_php_mysql.htm"
# Type="MYSQL"
# HTTP="true"
$hostname_db_conn = "localhost";    //machine on MySQL database is running
$database_db_conn = "irs";          //Database name
$username_db_conn = "root";         //Database user login
$password_db_conn = "";             // Database user password
$db_conn = mysql_pconnect($hostname_db_conn, $username_db_conn,
$password_db_conn) or trigger_error(mysql_error(),E_USER_ERROR);
?>
```

The file is included in "db_conn.php" which store in Connection folded that generated automatically when managing the sites for MySQL Server in Macromedia Dreamweaver MX 2004. At the beginning of every PHP pages, a statement with "require" is included to read and execute code from the db_conn.php file.

```
<?php require_once('Connections/db_conn.php'); ?>
```

6.5 Programming Language Used

6.5.1 Structured Query Language (SQL)

SQL is the structured programming language for accessing and manipulating information from a relational database. After connecting to database, a SQL statement is used to insert, delete, update and retrieve data. The following SQL structure is to insert information into table user_account in IRS database.

```
$insertSQL = sprintf("INSERT INTO user_account (id, login_id, password,
password2, full_name, ic_no, d_birth, age, c_add, p_add, tel_hp, tel_home, email,
edu, expe, award, skill) VALUES (%s, %s, %s, %s, %s, %s, %s, %s, %s, %s, %s, %s,
%s, %s, %s, %s, %s)",
                GetSQLValueString($_POST['id'], "int"),
                GetSQLValueString($_POST['login_id'], "text"),
                GetSQLValueString($_POST['password'], "text"),
                GetSQLValueString($_POST['password2'], "text"),
                GetSQLValueString($_POST['full_name'], "text"),
                GetSQLValueString($_POST['ic_no'], "text"),
                GetSQLValueString($_POST['d_birth'], "text"),
                GetSQLValueString($_POST['age'], "int"),
                GetSQLValueString($_POST['c_add'], "text"),
                GetSQLValueString($_POST['p_add'], "text"),
                GetSQLValueString($_POST['tel_hp'], "text"),
                GetSQLValueString($_POST['tel_home'], "text"),
                GetSQLValueString($_POST['email'], "text"),
                GetSQLValueString($_POST['edu'], "text"),
                GetSQLValueString($_POST['expe'], "text"),
                GetSQLValueString($_POST['award'], "text"),
                GetSQLValueString($_POST['skill'], "text"));
```

6.5.2 Hypertext Preprocessor (PHP)

PHP is server side scripting that makes the web pages more dynamic and interactive. It also processes requests from the users with different authority.

Session Handling Functions

The session support in PHP allows us to register arbitrary numbers of variables to be preserved across requests. When a user accesses this web site, PHP will check automatically (if session.auto_start is set to 1) or on your request (explicitly through session_start()) or implicitly through session_register() whether a specific session id has been sent with the request. If this is the case, the prior saved environment is recreated. When working with sessions that a record of a session is not created until a variable has been registered using the session.register() function.

In IRS, some of the user information such as login_id, password, user full name and others are registered as global variables with the current session. The following is the sample codes in login.php script:

```
<?php
// *** Validate request to login to this site.
session_start();

$loginFormAction = $_SERVER['PHP_SELF'];
if (isset($accesscheck)) {
  $GLOBALS['PrevUrl'] = $accesscheck;
  session_register('PrevUrl');
}

if (isset($_POST['txtLogin'])) {
  $loginUsername=$_POST['txtLogin'];
  $password=$_POST['txtPass'];
```

```
  session_register("userid");
  $userid = $loginUsername;
  $MM_fldUserAuthorization = "";
  $MM_redirectLoginSuccess = "Login.php";
  $MM_redirectLoginFailed = "Fail.php";
  $MM_redirecttoReferrer = false;
  mysql_select_db($database_db_conn, $db_conn);

  $LoginRS__query=sprintf("SELECT login_id, password FROM user_account
WHERE login_id='%s' AND password='%s'",
    get_magic_quotes_gpc() ? $loginUsername : addslashes($loginUsername),
get_magic_quotes_gpc() ? $password : addslashes($password));

  $LoginRS = mysql_query($LoginRS__query, $db_conn) or die(mysql_error());
  $loginFoundUser = mysql_num_rows($LoginRS);
  if ($loginFoundUser) {
    $loginStrGroup = "";

    //declare two session variables and assign them
    $GLOBALS['MM_Username'] = $loginUsername;
    $GLOBALS['MM_UserGroup'] = $loginStrGroup;

    //register the session variables
    session_register("MM_Username");
    session_register("MM_UserGroup");

    if (isset($_SESSION['PrevUrl']) && false) {
      $MM_redirectLoginSuccess = $_SESSION['PrevUrl'];
    }
    header("Location: " . $MM_redirectLoginSuccess );
  }
  else {
    header("Location: ". $MM_redirectLoginFailed );
  }
}
?>
```

When user logout, system will free all session variables and destroys all data registered to the session. The following is the logout.php script:

```
<?php
//initialize the session
//session_start();

// ** Logout the current user. **
$logoutAction = $_SERVER['PHP_SELF']."?doLogout=true";
if ((isset($_SERVER['QUERY_STRING'])) && ($_SERVER['QUERY_STRING'] !=
"")){
  $logoutAction .="&". htmlentities($_SERVER['QUERY_STRING']);
}

if ((isset($_GET['doLogout'])) &&($_GET['doLogout']=="true")){
  //to fully log out a visitor we need to clear the session varialbles
  session_unregister('MM_Username');
  session_unregister('MM_UserGroup');

  $logoutGoTo = "Index.php";
  if ($logoutGoTo) {
    header("Location: $logoutGoTo");
    exit;
  }
}
?>
```

6.5.3 Hypertext Markup Language (HTML)

All the Web Pages in IRS are created using HTML. By putting text, scripts and other contact inside table cells, table's structure can be used to "force" a browser to stay within a particular layout. It is useful to create form based data entry for this application. When the form code is enclosed in a table, a structure and pleasing appearance will be made. For example, in the user login section, user will enter his/her login_id and password in this "loginform". This HTML form can hold the user login data and "post" it to the server side PHP Script, "login.php" for futher processing. The following is the <form> tag in user login session.

```
<form action="<?php echo $loginFormAction; ?>" name="form1" method="POST">
  <label>Login ID: </label>
       <input name="txtLogin" type="text" size="10" maxlength="10">
  <label>Password: </label>
       <input name="txtPass" type="password" size="10" maxlength="10">
       <input type="submit" name="Submit" value="Login">
</form>
```

Designing the HTML and PHP Web Pages involves testing by loading the file in the browser for viewing and validating. The HTML and PHP codes will be modifying the when necessary.

The web page template will contain only the fundamental interface and layout of the application. Every page coding will start out with this template. The code below is the page template of IRS application.

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN">
<HTML><HEAD><TITLE>Interactive Resume System</TITLE>
<META http-equiv=Content-Type content="text/html; charset=windows-1252">
</HEAD>
<BODY vLink="#444444" link="#222222" leftMargin="0" topMargin="0">
<LINK href="includes/general.css" type="text/css" rel="stylesheet">
<TABLE cellSpacing="0" cellPadding="0" border="0" width="100%">
<COLGROUP>
<COL align="left" width="20%">
<COL align="left" width="40%">
<COL vAlign="top" align="left" width="10%">
<COL align="right" width="30%">
</COLGROUP>
<TBODY>
<TR>
<TD><IMG src="images/nav1_2b.gif" align="top"></TD>
<TD> </TD>
</TR>
<TR>
<TD class="SideMenu" vAlign="top">
<?php
include("menu/SideMenu.inc");
?>
</TD>
<TD class="Contents" vAlign="top" width="100%" colSpan="4">
<!-- Start Of Contents -->
<!-- End Of Contents -->
</TD>
</TR>
</TBODY>
</TABLE>
</BODY>
</HTML>
```

6.5.4 VBScript

VBScript is used as a client side scripting language. Some of the user input's validations in this system were done by VBScript codes. The following example shows the codes to validate user login's data.

```
<SCRIPT LANGUAGE="vbscript">
<!--
sub cmdcheck_onclick
        dim msg
        If document.form1.login_id.value=""then
                msg = msg & "Login ID?" &vbcrlf
        End if
        If document.form1.password.value=""then
                msg = msg & "Password?" &vbcrlf
        End if
        If document.form1.password2.value=""then
                msg = msg & "Confirm Password?" &vbcrlf
        End if

        If document.form1.password.value<>document.form1.password2.value then
                msg=msg & "Password not match!"
                End if
        If msg <> "" then
                msgbox msg
        Else
                document.form1.submit()
        End If

end sub
-->
</SCRIPT>
```

6.5.5 JavaScript

In IRS, JavaScript is used as a client side scripting language. With a client side script, all that processing can be done on the user's computer without the need to send anything to the server. It allows scripting of objects, properties and methods to create interactive interent applications. The following example shows the codes for additional used for designing the web pages.

```
<script language="JavaScript">

<!--
var current = 0
var x = 0
var speed = 100
var speed2 = 2000

function initArray(n) {
 this.length = n;
 for (var i =1; i <= n; i++) {
  this[i] = ''
 }
}
typ = new initArray(5)
typ[0]="Interactive Resume Designs"
typ[1]="Customized, Professional appealing resume"
typ[2]="Attention-grabbing with EYE CATCHING designs"
typ[3]="POWERFUL designs with REAL IMPACT"
typ[4]="Matching with your right career and it starts here..."

function typewrite() {
var m = typ[current]
window.status = m.substring(0, x++) + "_"

if (x == m.length + 1) {
x = 0
current++
```

```
if (current > typ.length - 1) {
current = 0
}

setTimeout("typewrite()", speed2)
}

else {
setTimeout("typewrite()", speed)
}
}
typewrite()
//-->

</script>
```

6.5.6 Programming Principles

The IRS application implementation includes code generation that translates all the rules into PHP programming language statements. To ensure the system consistency, maintainability and readability, some programming principles have been applied in coding. The following are 4 principles:

1. Meaningful variable names, procedure names and parameter variable names are used to help a program to be more readable and understandable without the user of comments.
2. All declarations are placed at the top of procedure. Executable statements are separated from declarations in that procedure with a blank line to increase readability.
3. Keeping the program simple.

4. Revising and rewriting, not patching, when writing code, design always been re-examined to see whether the problems encountered are inherent in the design or in the translation to code.

6.5.7 Cascading Style Sheet (CSS)

Cascading Style Sheet (CSS) has been used to apply the web page formatting and layout to the document without modifying the underlying HTML. Depending on the design needs, Cascading Style Sheet can be used in three ways:

1. By **linking** to a style sheet from the HTML file.
2. By **embedding** a style sheet in the HTML file.
3. By adding **inline** styles to the HTML file.

In this project, the CSS is using for style of text which showing below:

```
<style type="text/css">
<!--
.style1 {font-family: "Century Gothic"}
.style2 {font-size: 14px}
.style4 {font-family: "Century Gothic"; font-size: 14px; }
.style5 {
        color: #0000CC;
        font-size: 10px;
}
.style9 {color: #FF0000; font-size: 10px; }
-->
</style>
```

6.6 System Documentation

The progress of the project can be determined by the system documentation. It includes all of the documents describing the implementation of the system from the requirement analysis to the final test phase.

User manuals are prepared for user. User manual is a reference guide for the user. It includes the instruction of installing the application system, the procedures and explanations to operate the system. This will help users to seek for the information while using the system.

6.7 Conclusion

This chapter discusses the techniques that guarantee a better implementation of the system and the actual development of the system itself. It is no less important compared to the other stages in the software development life cycle. The next chapter will be an elaboration on system testing and how the testing is carried out.

CHAPTER 7: SYSTEM TESTING

7.1 Introduction

Testing is the process of establishing the existence of errors. A good test is one that has a high probability of finding an undiscovered error. However, testing cannot show the absence of defects, it can only show that software defects are present.

System testing is also the testing of a complete system prior to delivery. The purpose of system testing is to identify defects that will only surface when a complete system is assembled. That is, defects that cannot be attributed to individual components or the interaction between two components. System testing includes testing of performance, security, configuration sensitivity, startup and recovery from failure modes.

Testing enhances the integrity of a system by detecting deviations in design and errors in the system. Testing aims at detecting error-prone areas. This helps in the prevention of errors in a system. Testing also adds value to the product by conforming to the user requirements. It can be used to compare the expected outcome with the actual outcome and debug it to enhance the functionality, performance, readability and capability.

As a overall, an appropriate approach must be chosen to reduce the possibility of errors in a program.

7.2 Objectives of System Testing

Before we determine the types of testing that needs to be carried out on the system, we must first decide the objectives of carrying out the testing in the first place. This can help in pin-pointing the goals that the testing process needs to achieve. The objectives of the testing process have been determined as below:

i. *Software Reliability*

Making sure that the system performs critical tasks or core functions as pre-determined in the system design phase. Furthermore, specific user requests and business rules must be fulfilled.

ii. *Software Quality*

Software quality is characterized by the correctness of program logic and implementation. It begins with testing the software during development. Each module must be tested to make sure that it functions correctly at the time it is written or modified. Test values and boundary conditions must both be verified. Next, the module should undergo interface testing to check for functional errors.

iii. *System Assurance*

The main purpose of system assurance is to deliver a quality product. Conformance to requirements increases the organization's confidence in the system.

iv. *Optimum Performance and Capacity Utilization*

Another purpose of testing is to ensure optimum performance and capacity utilization of e-commerce system components. The purpose of stress or capacity testing/planning is to make sure that the system is able to perform acceptably at peak usage.

v. *Price of non-conformance*

The main purpose of testing is to detect errors and error-prone areas in a system. Testing must be thorough and well planned. A partially tested system is as bad as an untested system. And the price of an untested and under-tested system is high.

7.3 Testing Process

For this project, there are five main applications that have been developed. Since there is more than one system to be tested, a well-designed flow of testing is needed to ensure the integrity of the entire IRS. In this project, a hybrid of bottom-up and top-down approaches has been used to make the testing for the entire IRS more effective and efficient.

The bottom-up approach has been used from the beginning till the end of development. Whereas the top-down approach has been used after then entire system has been completely developed. The testing will then be carried out from top-level and narrow down to the lowest level.

7.3.1 Unit Testing

In unit testing, several processes will be gone through to find faults in every module's components.

1. First, code is examined with the specification and with the design to make sure that all relevant cases have been considered.
2. Next, compile the code by loading the file in the browser for viewing and validating.
3. Finally, test cases were developed to show the input is properly converted to the desired input.

Two approaches, white box testing and black box testing were used for the unit testing for the system.

7.3.1.1 White Box Testing

White Box Testing is just like a transparent glass, in which the tester can see both side of the glass clearly. It is a powerful software testing technique. White Box Testing strategies include designing tests such that every line of source code is executed at least once, or requiring every function to be individually tested. One type of White Box Testing is fault injection testing, a technique used to verify fault-tolerant systems. Highly-reliable systems, will not fail under black-box stimulus. Code written to handle infrequent failure conditions can only be verified by injecting a fault through white-box testing.

Another use of white-box testing is to test interfaces for robustness. This is good practice when you open up that interface to truly external devices that may not properly implement according to an interface specification. Analysis of the code may indicate possible weaknesses related to violations of the spec, guiding the selection of test data to exercise specific cases that might cause an undesirable failure state.

7.3.1.2 Black Box Testing

Black Box Testing is testing technique having no knowledge of the internal functionality/structure of the system. This testing technique treats the system as black box or closed box. Tester will only know the formal inputs and projected results. Tester does not know how the program actually arrives at those results. Hence tester tests the system based on the functional specifications given to him. That is the reason black box testing is also considered as functional testing. This testing technique is also called as behavioral testing or opaque box testing or simply closed box testing. Although black box testing is

a behavioral testing, Behavioral test design is slightly different from black-box test design because the use of internal knowledge is not illegal in behavioral testing.

Advantages:

- Efficient when used on Larger systems
- As the tester and developer are independent of each other, test is balanced and unprejudiced
- Tester can be non-technical.
- There is no need of having detailed functional knowledge of system to the tester.
- Tests will be done from a end user's point of view. Because end user should accept the system.
- Testing helps to identify the vagueness and contradiction in functional specifications.
- Test cases can be designed as soon as the functional specifications are complete

7.3.2 Module Testing

Each sub-system in IRS project consists of several modules. During the development, these small modules are tested to ensure that they function correctly. The module testing is always done in a controlled environment. So that, the predetermined flow of actions can be taken on the module. The result produced by the module will be observed to verify that it function correctly in most situation.

Regardless of the application being developed, the individual module and function has been tested during coding. The test data will be passed to that module and the result will be observed. The common sources of errors found are: -

- Improper or inconsistent typing
- Erroneous initialization or default values
- Incorrect variable names
- Inconsistent data types
- Overflow, underflow, address exceptions.

7.3.2.1 PHP Script Debugging

For those web modules, testing is always a complicated and time-consuming task due to the lack of clear and specific error message. Therefore, there are several ways to simplify debugging: -

1. First and foremost, make a backup. This is because when I experiment, it is far too easy to accidentally overwrite or delete necessary sections of code.
2. Attempt to identify the line or lines of code generating the error. Isolate the code by comment out those lines of code. Then, browse and see if the error still occurs.
3. Print out the suspected variables' value and exit the program at the middle of code by using the *exit()* function. Check whether the variables' value is correct as expected.

7.3.3 Integration Testing

When one of the module has been fully tested, it will then be tested along with other modules, namely integration testing. This is to ensure that the interfaces among the modules are defined and handled properly.

The incremental integration has been used for testing. It means that there will be more modules integrated together for testing from time to time as most of them are developed towards the end of development. However, the critical modules have been given priority to be tested and integrated early. The reusable or shared components are considered as critical modules. Basically, the integration test will be focused on these:

- Interface integrity

  Internal and external interfaces tested as each module added to software structure.
- Functional validity

  Test for functional errors.
- Information content

  Test local and global data structures
- Performance

  Test performance and compare to bounds specified during design.

7.3.4 Subsystem Testing

After all the modules of the IRS sub-system have been tested, they will now integrate into a sub-system. The sub-system is viewed and tested as a whole, rather than as separate pieces. Basically, there are two types of testing can be carried out at this phase.

There are: -

- Security Testing

  Systems with sensitive information can be a target for improper or illegal use. This can include:

  - attempted penetration of the system by individuals for fun or personal gain
  - disgruntled or dishonest employees

  The purpose of security testing is to ensure that the applications being developed are able to provide fundamental security.

- Stress Testing

  Stress testing is designed to test the software with abnormal situations.

  Stress testing attempts to find the limits at which the system will fail through abnormal quantity or frequency of inputs. For example the sensitivity testing can be carried out to determine if particular combinations of otherwise normal inputs can cause improper processing.

7.3.5 System Testing

While all the sub-systems have been tested, all these sub-systems will be integrated to form the entire system – IRS System. In this testing phase, all the sub-systems are operated together and tested to ensure that there is no integrity problem arises.

7.3.5.1 System Testing Considerations

i. The Event List

All the possible triggers must be exercised and the expected results compared with the actual results. Every function should be tested by one or more events in the event list.

ii. Specific Scenarios

The entire set of possible scenarios or user profiles should be specified for a given application. This can be done by defining meaningful user profiles and restrict the testing to them.

iii. Documentation Testing

All examples used in user manual must be tested for correctness and for whether or not the manual give the exact answers users will obtain when they run the examples. All the functionality should be available through both parts of the manual and through effective, accurate index. Further, all accessible terminology in the manual should be understood by end-users.

iv. Testing Transactions

A list of possible transactions, either extracted from the scenarios or from the event list, is tracked through the software system to ascertain that they function correctly from input to output.

7.4 Fundamental Tests

Usability

- The system is based on building user interfaces that have common features with the existing system. This will help the user to master the system faster through pattern matching and paradigm shifts.

Performance Testing

- Performance Testing is based on the requirements. It is conducted to ensure that the system response time meet user expectations and does not exceed the specified performance criteria under heavy stress or volume. During these tests, response time and the transaction rate are measured. The purpose of performance tests is to test-run the performance of various functions of the software within a specified hardware configuration.

Readability

- Software readability is the probability that a system will operate without failure under given conditions for a given time interval. Readability tests are conducted

to monitor the mean time between failures in this system. Consistency is measured for the system behavior (inputs, outputs, response time).

Acceptance Testing

- Function and performance testing is done by the system developer. Before the system is fully ready to roll out, it is a best thing if the system is also tested by the end-user. This test, called an acceptance test, assures the end-users that the system they requested is built for them. The end-user testers are selected to test out the application.

7.5 Conclusion

System Testing is a critical phase in analyzing logical errors in the system and to test system's liabilities. Several objectives of this chapter have been identified to achieve the testing goals. The test cases are not formulated by using the conventional way of arranging by different modules. A new approach is used by abiding to data integrity and data validity rules and these rules encapsulate all modules. With the completion of the testing phase, basically the system is ready to be deployed. The next chapter ends this report by rounding up the system's limitations, strengths, weaknesses and suggestions on further enhancements.

CHAPTER 8:

SYSTEM EVALUATION AND CONCLUSION

8.1 Introduction

At the end of the System Development Life Cycle, after the product has been delivered and deployed, the system developer is left with one final task: evaluate the system, the processes involved to develop the system and most importantly lessons learnt from the entire lifetime of the system development.

This is important as it can help us identify best practices which have been applied and remember to use it again in the future. Besides that, we must also take note of the less than perfect events that happened and remember NOT to repeat the same mistake again.

Every system should go through the system evaluation phase, for the benefit of the system and also the system developer. It is only through experience that system developers can learn and enhance their skills. Therefore, a thorough evaluation should always be carried out at the very end of every system's life cycle.

Throughout this chapter, the system will be evaluated to reveal its strengths, weaknesses, limitations and possible future enhancements which may be added on to the existing system. Besides that, a brief explanation of the personal problems encountered during the development of the system will be given.

8.2 Problems Encountered and Solutions

The development of the system was definitely not problem-free. With a time constraint impended on the system, it is important to overcome problems as fast as possible and with the best available solutions. The project schedule should be followed stringently amid problems to ensure the system will be delivered on time.

8.2.1 Lack of Knowledge in the Chosen Programming Language

I did not have any experience before in the chosen programming language: PHP and ASP.NET. Again, there was no sufficient time to learn everything entirely from scratch. Thus, I had to pick up pieces from time to time as I moved on through the development stages of the system. Due to lack of full understanding on the concept of these two languages (plus the fact that they were very new languages themselves), I encountered some unavoidable problems during the coding of the system.

Solutions:

I turned to the Internet for the possible solutions to my problems. I limited myself to not spending more than three days on the same problem. If the same problem persists, I will look for alternative solutions. It is just not feasible to hang on to the same problem, even if I might eventually manage to solve it three weeks later. There was a deadline to consider.

8.2.2 Inexperience in PHP and MySQL

Though I had chosen PHP and MySQL as my web development tools, I did not have any knowledge in both of them. Therefore, I need to learn up both of them by myself in shortest possible time. Moreover, there is no reference book on MySQL around that can be referred to.

Solutions:

I had started my study on PHP and MySQL during the semester break. This has gained me some concept and experience in both of them. Owing to the lack of reference books, I had tried to download some electronic books for off-line reference. Internet is indeed a good way to fasten the learning process for any programming language since there are many forums and resources available for reference. Besides that, with my knowledge in both ASP and Microsoft SQL Server, I was able to learn up both of them in shortest possible time.

8.2.3 Inexperience in programming for IRS

Before the development of this project, I had never exposed to the interactive resume. Since my project required the use of interactive way to present, I had pushed myself to learn more about the smart card and its reader. I was facing the problem to understand how the interactive resume works during while the development started.

Solutions:

I had gone through a lot of research of resume design in internet, and make a lot of literature review to encounter the problem. Besides that, I had tried to get more technical information of the resume being created. After having a complete understanding, I had tried to code some simple read and write operation to the resume. This had helped me to familiarize myself with the resume system programming.

8.2.4 Tight Schedule

The project time frame is very short and tight, as all the development and documentation need to be done in less than 4 months. Since I still had to do the assignments and attend lectures, the time allocated for the development process is very short. Furthermore, the allocated time is fragmented, as I had to attend lecture in the middle.

Solution:

I had planned a development schedule for each sub-system and its module. By following the schedule tightly, there should be no problem for me to hand in my project on time. Besides that, I had tried to jot down all the inspired ideas in a notepad from time to time. Writing comment blocks within the coding had also helped me to continue my coding without wasting time recall and review the code again.

8.3 System Strengths

MASCC System is proposed to user while they wish to write their resume. While looking as a whole, the IRS has the following strengths: -

- Strong Security

  The system utilized "forms" authentication which forces the user to login and be authenticated at the login page. It is only when authentication at this login page succeeds that you will have subsequent access to the rest of the application. For example, an unauthenticated user cannot access the accounts module page directly and will be redirected to the login page if he/she tries to do so.

- Retrieve Information Easily

  User easy to retrieve their data of profiles and resumes contents easily as no need to enter their data all over again.

- User Friendly Graphical Interface

  The graphical user interface design is tailored to the average user capabilities and promises easiness of usage. Even a novice user will have no problem navigating through the web application.

- Reusability

  Source codes are organized into reusable classes in an object oriented environment. Interface codes are separated from the logic processing clearly.

This advocates for easy reuse of the different components of the system or while adding future enhancements to the source codes.

- Easy Generate Resume

  User will be easy to generate their resume in printing easily by just enter their data by following the steps included.

8.4 System Limitations

The finished system is not without its limitations. There are described as below:

- Unable to Upload Photo

  User is unable to upload their photo in the resume as the template doesn't have that function.

- Database Backup

  The system should provide a database backup, so that the data can recover if the database is corrupted.

- Unable to auto-generate

  The resume output is unable to auto-generate by the user after they finished inserting their contents.

8.5 Future Enhancements

There are a few suggestions for further enhancements to be made to the system to rectify its weakness. These suggestions are described as below:

- Auto-Generate output by user

  The user will be able to generate the resume by them after they inserting their resume details and save in their local drive as a .swf file.

- Able to upload photo

  User is able to upload their photo in the resume.

8.6 Conclusion

The development of the system is finally finished. The system evaluation denotes the final stage of the system development life cycle. This project has given me many insights on the true nature of developing a system, from its initial stage of determining the user needs, targeted users, coming up with a design of the system and actually implementing the system itself.

Throughout the development of the project, a lot of precious knowledge and skills are gained. I have learnt on how to fully utilize various technologies into a system development. The development of this project has been a very wonderful experience, which exposes the idea of project and time management to me.

APPENDIX A

The Informal Interview Questions

1. Do you prefer an interactive resume than paper printing resume? Why do you think that?
2. Do you think that a resume that presenting in flash method will be accept by the employer company instead of handling by paper resume?
3. Do you face any problems when writing your resume contents?
4. Are you using any software or system to help you to writing out the resume?
5. What features or applications may you think to include in the interactive resume presentation?
6. What do you think about IRS?

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