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CERTIFICATION OF APPROVAL

Web Portal Development Issues: Usability, Site Management and Content Management

By

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CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

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ABSTRACT

This paper is written with the aim to present the concept of integration between usability, content management and site management in order to design an effective tourism website. The study is based on the common problems that surrounds most of the web developers such as useless contents plus poor design that did not reflect the audience needs and poor site management such as broken links and unsorted web pages that are hard to be keep track. The study will cover on the application of the usability techniques to describe what is right and what is wrong with websites seen by millions. It will also covers on how the site management and content management play important roles in achieving high usability of the website. Assessing usability through case studies and following some guidelines on achieving effective site management and good content management will be part of the methods use in this project. The findings from this study highlight the importance of these existing guidelines and the need to modify or implement some of them to suit the requirement of a good tourism website through a prototype developed in this project.

CHAPTER 1

INTRODUCTION

Everyone has opinions on what does it takes to make a good websites. There are a lot to be covered. Website navigation, links, graphic design, setting page layout and user satisfaction have all been discussed widely in different sources and media. But what it has to do with usability then?

Usability has different interpretation for different people. But the concept or objective of it remains the same. Usability is from the user and for the user. The real information that is good to improve the ability and overall performance of a websites is not tips or guidelines, which are set by the web design gurus or professionals from the web development. The best way to understand what really works for a website is from user experiences. But then there are actually other factors that can contribute on enhancing the usability itself. The role of site and content management may and has been proved could actually helped in a way to improved the function of websites to the users.

The role of website management and content and usability in web development in some way is quite interesting as people are still not aware of its necessity. As a result, people end up spending more time managing their content and site than they should do. The losses are more than benefits through the neglect on planning effectively on the development of the content and site management early in design phase. It will only increase the cost, wasting lots of time and valuable resources but does not fulfill what the users really need. Whatever the outcome will certainly somehow affected on the usability of the website which shows that these elements are interrelated with each other.

1.1 Background of Study

The purpose of this project is to perform a research on the concept that lies under these three elements of website development; content management, site management and usability. Since each of these elements is considered big and can stand on their own, the author has pick out the relevant ones with the focus on tourism industry. The task is to uncover what is so important by understanding of these concepts and how do they relate together to make the website usable.

What the author wants to show is how site management and content management are important for the website development in their own context but in the end everything relates to the bigger rule of thumb which is the usability. The author will pick and analyze some of the important factors under these elements and some is shown through the case studies performed to support the findings. The tourism website prototype that is developed concurrently with this project is a commercial website that applies the guidelines and findings elicited from this project.

1.2 Problem Statement

Managing a web site has not been since important after the monstrous growth of a site, which can contain thousands of pages and links and the importance of choosing or creating the right contents that will serve the users need. How can these elements incorporate together to ensure the website is usable to the user respectively? The research of the project is to discover how do site and content management will help to increase usability and act as a guideline for the web developer to build a tourism website specifically.

1.2.1 Problem Identification

Some of the general problems identified when users surf the commercial tourism websites are as follows:

- Some of the websites do not provide the right or sufficient information that the user need.
- The overuses of unnecessary graphics tend to hinder the real message or information to be presented.
- The outdated information dumped on the websites and lots of broken links.
- Complex navigation and links, which cause confusion for the users to surf the websites and end up leaving them frustrated.

1.2.2 Significant of the project

Based on the problem identification, which has been stated earlier, this project focus on the way to understand and implement the three criteria that interrelated, which are the usability, content management, and site management that by this has the following advantages:

- Understanding these three concepts will give advantage for the web developers to understand important aspects in web development rather than relying on what they prefer.
- To promote usability that will actually helps the user to get the information that they need rather that relying on the fads and so called 'cool graphics' which are useless.
- Enable to accomplish the objectives of the website as to serve what the user need
- Reduce the waste of time and cost of the development while improving the performance and presentation of a website overall.

1.3 Objective and Scope of Study

1.3.1 Objective

The objectives of this project are:

- To identify the correlation between usability, site management and content management and integrate them in website development
- To compile guidelines for a web designers/developer to enhance the usability of the content and the performance or presentation overall based on the integration.
- To come out with a website prototype that are being implemented based on the findings from the guidelines.

1.3.2 Scope of Study

The research of study will basically covers on these three main areas of web development, which are usability, site management and content management. The study is basically focus on eliciting the correlation between these three elements and how they affected the overall presentation of a website.

1.3.2.1 Site Management

Under this area, the study will be on the definition of what site management is all about in general. It will answer the question why do we need to implement it and under this project, the author will implement one of the functions of site management using a free tool that is applicable in the Internet.

1.3.2.2 Content Management

For this area, the author will concentrate on what does it take to come out with a good content that will satisfy the user needs. It will cover on the what is consider as quality content, how the information architecture and navigation will ensure the content integrity and the right GUI that is appropriate to suit the content.

1.3.2.3 Usability As the Big Picture

Usability will be the backbone of all the studies conducted under this project, as the outcomes from the site and content management will relate back to this area. Usability in term of this project is on the ability to help the user find the information that they need in easy and quick manner.

1.3.2.4 Design and Development of the Prototype

The prototype is all about a commercial tourism website that purposely intended to give information to the user o the industry. The development will be based on the guidelines from the study of the three elements stated above and implement it in development process.

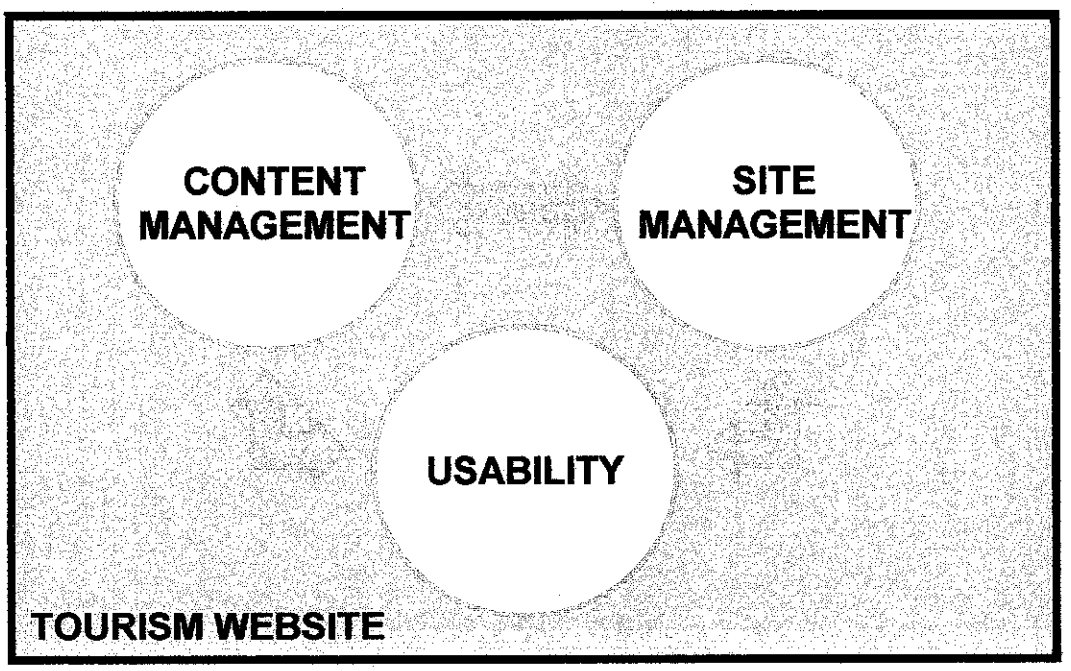

Figure 1.1: The graphical presentation of the project's scope

1.3.3 **Feasibility of the Project Within the Scope and Time Frame**

Based on the topic covered under this project, there are basically three main objectives need to be obtained from this project. After further discussion, the objectives need to be specifically specified based on the big scope covered so that the output is more focused. On this project, the aspects that need to be covered under the three main elements studied which are the usability, site and content management will only the ones that relevant to developing commercial websites. In this case, the author will only pick out the aspects that relevant to help develop a better tourism website.

In fact, the findings will be basically focus on the concept that lies under the three elements and the relation between them in a manner that will be useful to be implemented for the development of the tourism website. The prototype of the commercial tourism website will be based on the presentation which is visible to the user and the architecture lies behind will not be covered.

The scope of the project seems for author to complete on time with two main outcomes; the guidelines for the websites designer to design websites based on the three main elements stated earlier and a prototype of a commercial tourism website that applies the guidelines. The whole project task and timeline can be referred in APPENDIX A.

CHAPTER 2

LITERATURE REVIEW

2.1 Usability Rules the Web

*"Usability rules the web."(*Jacob Nielsen, 1999). Users experience the usability of a site before they have intention to use it or before they spent any money to purchase or do any kind of potential business. For the user, the web is the ultimate environment for the empowerment, and the person who clicks the mouse decides everything. The numbers of websites are growing fiercely every year and therefore users have more choices than ever. Why would they waste their time on anything that is useless, confusing slow and does not satisfy their needs?

Through the years of study and experiences plus continuous interactions with the users, Jacob Nielsen (1999) has come out with series of principles that has the purpose to support his findings on the importance of usability: -

- That the users want to find what they are after quickly
- If they do not know what they want specifically, they still want to browse as quick as possible and access the information that they come cross in a logical manner

The Web Quality of Experience (Web QoE) Workgroup has stated in their white paper that web usability derives from contents and navigation as well as availability and performance. Therefore, company that spends a lot of money on ensuring high performance and availability without taking note on the importance of understanding what the users really needs surely will be wasted eventually.

2.2 Site Management Ensure Systematic Organization of the Website

The perception on how the web design works has change since the growth of the World Wide Web after these past years. It is no more concern only on the ability to build the Web site but also on how do we manage all the contents and the structures, hyperlinks and other Web design process. "When you have your plan and you're ready to build a Web site you will be proud for the people to visit, you will still have a few other decisions to make. Your work is only beginning and it may be never finished." (Brigman, 1996). The same goes as what has been quoted by (D.Stein, 1995)." A good site is constantly changing. One of the great advantages of the Web is that you're not limited to a rigid schedule." You can update, revise, and improve things on a continuous basis. The downside is that your site is never finished. It is always to some extent, under construction.

A website is a detail work. Not only does each page has to work, but also each must work with others. Quality control of all that interactivity must be high on a web designer's priority list. One broke link page can be a disaster for a project, especially if the broken link is the one in the order form. "As any experience Web developer knows, the administration of hyperlinks are the most crucial part and can be a major factor in web site management. As Web sites change, keeping up to date with the latest links can take as much as time as managing the web content."(Effective Site Management with Microsoft FrontPage 2002, 2001). Therefore, managing hyperlink is one of the fundamental, which is important to effective site management.

Scheduling and implementing a project that's likely to involve a number of people and departments requires very good organization and management skills. Just as the individual departments in your company concentrate on their own areas of expertise yet contribute to the company as a whole. Each piece will contribute to the whole. And that necessarily means that each piece must not only work with the rest but also complement

them. They are very much interdependent. So as the size or the complexity of a web site increases, often so does the number of members required to produce the site. "Sites, which were used to develop by a single individual, have quickly grown into projects for the entire teams to maintain. In addition, teams have also often added the dynamic of including remote authors. This situation certainly creates more complexity or problems that will affect a team of developers assigned to a Web project" (Fletcher, 2004).

Based on the reasons above, selecting the right management tool will eventually help the Web developer to manage their Web sites better through effective site management. The ability to easily manage contents and hyperlinks is one of the fundamental which a good management tool should offer and features which enables monitoring team work development would be great advantage. What ever it is, we can no more deny the important role of effective site management, as it will be vital to every Web project development to succeed.

2.3 Why Content Management?

As a technology behind building a Websites become more complex, it is easy to forget that the most important part of any web site is the content. Content management and graphic design are the two key components of any web development project, and quality work in each area helps ensure that the site is usable and useful tool for the audience you define.

The web developer should be able to understand that his view of the web as the medium specifically for design, graphics, animation, and video will not going to last. The online world, as it turns out is not considered as post reading. In fact, current research shows that text is the first and foremost what the users concern when they visit a website. As what has been mentioned by Jacob Nielsen (2000:100):"Usability studies indicate a fierce content focus on the parts of the users. When they get to a new page, they look immediately in the main content area of the page and scan it for headlines and other indication of what the page is about." Based on this, many organizations, professionals and developers tend to hire a specialized web editor or content architect that will ensure the contents are well developed and organized to be published on the web.

As the websites are getting popular as a medium of information distribution and communication, they tend to increase in size and complexity. They are now dependant on databases and internal search engines. However, as information designer Robert Horn (1999:16) points out:

Simply storing large amounts of information on computers and retrieving it does not solve our information needs. In fact, gigantic storehouses of information overload us with too much information and burden us with navigational problems that...sometimes make us feel that we are "lost in cyberspace." What we need is not more information but the ability to present the right information to the right people at the right time, in the most effective and efficient form.

Therefore it is important to manage our information in the right way or in terms in this project is the content itself, as it will make valuable contribution to the process.
The information or the content needs to be organized in a special manner, which is easy and can be understand by the users when being presented. Web navigation specialist Jennifer Flamming (1998:45) notes that organizing information is about showing the relationship between items in such ways that they are easy to find. However, this task is not always easy because "the problem of the knowledge is it is not made up of simple linear relationships. It's a messy interrelated thing."

So is there any way that this information can be group or categorized in such that they are related to each other. According to information architect Richard Saul Wurman (2000:40-41), "While information may be infinite, the ways of structuring if are not." He shows that there are five ways to organize information:

1. **Alphabet:** "This method lends itself to organizing extraordinarily large bodies of information, such as words in a dictionary or names in a telephone directory."
2. **Time:** "Time works best as an organizing principle for events that happen over fixed durations."
3. **Category:** "Category pertains to the organization of goods, different models, different types, even different questions to be answered, such as in a brochure that is divided into questions about a company."
4. **Location:** "Location is the natural form to choose when you are trying to examine and compare information that comes from diverse sources or locales."
5. **Hierarchy:** "This mode organizes items by magnitude from small to large, least expensive to most expensive, by order of importance, etc."

CHAPTER 3

METHODOLOGY

3.1 Procedure Identification

In this section, the discussion will be focus on the different type of methods used to make the objectives possible to be achieved. Different methods will have their own pros and cons and each of the methods chosen for this project has their own purpose in contributing the valuable information to make the project successful.

- **Observation**

Observation is very effective method to analyze current situation related to the topic. It helps to identify the underlying issues regarding the topic and from there, the rough idea on problem statement and objectives can be explicitly extract to support the project. The observation will come from the experiences of the peers or people in the related business the observation process will focus on how the users react on the website that they visited to see what do they expect when they go for a certain purpose. In this case, the author must have good observation on what usually user prefer in order for them to get the information they want from a tourism websites. It includes the way they interact with all the elements on the website such as navigation and GUI.

- **Gathering More Information through Literature Survey**

White papers and journals have the purpose to support all the findings through literature reviews. The survey through different sources such as reference books and articles will help in giving more valuable information regarding the issues especially, which involves previous studies to support the project. Some of the information will help to

reflect the background of the project and the situational problems relating to the topic plus on how we can achieve the objectives on solving the problems.

- **Gathering and Comparing Information from Websites**

The core of all fact-findings process in this research project as the information will be useful to support the issues or problem statement given. Useful tips and guidelines on how we can describe an effective site and content management can also be extracted from some of the web sites which give such information that can relate these elements under the flag of usability and thus shown the correlation between them in order to help designers to build their websites.

- **Case Studies on Several Tourism Websites**

The case studies are focused on several selected tourism websites both locally and international. The studies will cover on the overall presentation of the websites, which include the usability part of the websites and the content. The results from the studies will be the reference to the guidelines compilation for an effective website with good content and site management.

- **Website Development**

For the website development, the overall process of developing the Virtual Perak Online as the prototype of this project has been break down into few major phases.

  - **Planning - Site Map**

A sitemap is a visual representation of a web site that enables to see what pages will be in the completed site and their function. The development of a comprehensive site map greatly aids in providing a visual representation of the structure of a web site. With a site map placed in the center of a table, we can get a "feel" for how the site will work.

- **Mock up designs**

To ensure that the web site that is going to be build encapsulates the business needs and identity, several "Mock ups" of the website homepage are being created. This allows visualization on what a finished site would look like. The mock designs will allow for mix and match until we can get the right design and concept. All designs that are going to be produced will follow standard web practices. By designing a template, the user will experience continuity of look, feel and navigation for use throughout the site.

- **Prototyping**

Prototyping will be used as part of the methodology for the website development. The technique is chosen because of its flexibility and can be quickly construct based on loose requirements. The development of the prototype is fast and can be refined from time to time based on the findings and knowledge brought in from the research. The prototype might be incomplete but functional to support the research and information gathered earlier and can be improved on continuous basis.

- **Data Input and Content Layout**

The text and images will then be entered into the appropriate section based on the storyboard and content editing.

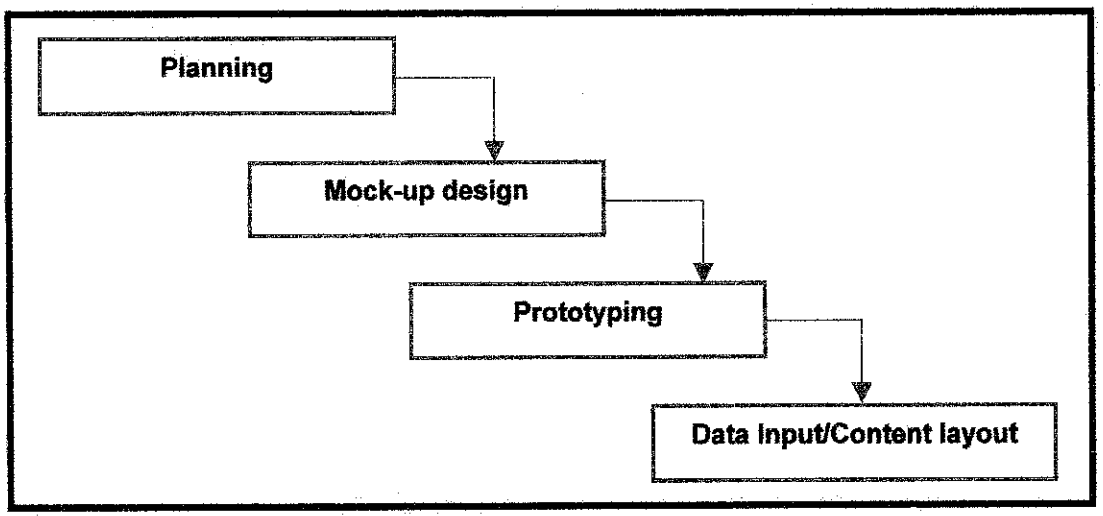

Figure 3.1: The website development process for the Virtual Online Perak prototype.

3.2 Tool(s) required:

Tools and hardware that are required for this project are:

- **Macromedia Dreamweaver MX** – basic software for creating the web pages of the prototype
- **Macromedia Fireworks MX** – main graphic editor to enhance, manipulate and produce the graphics and images
- **Adobe Photoshop 7.0** – graphic editor for image and graphic processing
- **Active Server Page (ASP)** – advanced website program which will be used to create dynamic pages of the website's prototype
- **Microsoft Internet Explorer** – web browser used for testing and viewing
- **Apache Web Server or Personal Web Server (PWS)**
- **Internet connection**
- **Personal Computer**
  - Platform : Windows XP Professional
  - Processor : Intel Pentium IV 2.4 GHz
  - Memory : 128 MB RAM
  - Hard drive : 40 GB
  - CD-ROM Drive : 56X speed (transfer rate: 1200 kbps)
    Average seek time: 200 milliseconds
  - Sound : 16 bit CD quality
  - Peripherals : Mouse, printer, scanner, CD

For the client's side, the requirements are: -

- **Internet connection**
- **Web browser (i.e. Microsoft Internet Explorer, Netscape)**

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Results and Findings

This chapter will conclude on all the findings and research that has been done for within the range of seven weeks from the starting of the project. Most of the findings were gathered through Internet and reference books, which have given great inputs to further on with this project. Other contributions for the data gathering would be from journals, research paper and articles. Most of the progress has been focused on defining the fundamentals of effective site management by trying to uncover the real issues such as the mistakes which commonly done by developers on site management and also some checklist when we plan for effective site management.

4.1.1 Data Gathering and Analysis

4.1.1.1 Top Nine Mistakes of Web Management

To understand how the websites work better is to learn form common mistakes of our web developers normally intend to do. Based on Jacob Nielsen (1997), content and the usability of a website is more a function of how it is managed than of how good its designers are. Please refer to Appendix B to view the list of common mistakes laid out by the writer.

4.1.2 Site Management Planning Considerations

When we are dealing with thousands of pages of data and content as well as numerous people contributing material to the site, there need some planning to ensure that development process going on smoothly. The table list some of the important elements that the web developer should considerate or concentrate on that will have great impact to the overall performance for a specific website.

Management Item	Details
Page Performance	Do the site/ pages download quickly or slowly? Are there broken links to pages that no longer exist?
External Links	Are the links to external locations being checked, updated, and corrected?
Navigation	Is the navigation still appropriate to the overall site? Are the links workings on all navigation bars?
Legal Information	Are the copyright clauses, privacy notices, and other legal statements current and accurate, and located on the correct pages?
Site Structure	Is the site structure at the programming level correct? Who is responsible for managing the servers and the file structures? Who is responsible for archiving or deleting content?
Browser Compatibility	Is the site being delivered for a specific browser? Are browser compatibility checks being done to ensure correct viewing?
Search Engines	Has the site registered on search engines and have the listings been maintained? Are the meta tags appropriate?

Table 4.1: List of some site management planning considerations

The checklist will be handful for developers and other involved in the development as these elements are directly relate to the effectiveness of a web site. Having organized plan will help to ensure better performance of site management overall beside the help of various toolkits in the market which act as supports. Effective site management will surely enhance the performance of the website. Eventually, the high performance will actually support the usability of the website as what the author would like to relate in this project.

4.1.3 Site Management Toolkits

When more people are involved in a growing web project, file management, content publication, and other site maintenance tasks become very important and complex. To avoid problems of unorganized files and improving the teamwork's productivity as the site expand, some of these tools would be useful as they have varying levels of site management capabilities. The most popular and widely used are from the Microsoft family such as Microsoft FrontPage 2002, Microsoft VisualInterDev and Microsoft Site server. Macromedia has also launched series of their web development toolkits that are enhanced with site management capabilities. The latest is the complete toolkit of Macromedia Max Studio, which contains these software: Dreamweaver MX 2004, Fireworks MX 2004 and Flash MX 2004. The author is using Macromedia Dreamweaver MX 2004 as the main platform for creating the prototype of the tourism website.

4.1.4 Content Management

Based on the findings through various books and articles, most researcher said that whatever aspect of content management that we involved should be in line with usability of the site. Two of the areas that must be monitor closely are the quality of the information that goes online and the usability of the interface design.

4.1.4.1 The four C's of quality Web Content

- **Credibility**

Credibility is a highly valued commodity and it differs from one to another. Everyone has different mix of belief, which in turns engenders differing opinions and attitudes. Credibility in terms of text is combination of words and phrases that a writer or editor used to persuade the reader that the intentions of the document are sincere and honest.

The significant of having credibility with the content that we present on our website is to develop content that "sells" the user without appearing to sell anything. The credibility involves not only words, but also on the one who is providing the information, navigation and visual used plus how the information is updated. Some of the general tips that the researchers suggest to be applied as a guideline to develop online credibility are as below.

TEXTUAL ASPECTS	SHOULD..
Tone	• Avoid marketing language. Present the information as factual, relevant and accurate • Avoid being overly chatty and intimate • Avoid convoluted syntax that makes it difficult for users to sort fact from fiction. Easy reading contributes to credibility. • Avoid humor as some readers may get the joke while others may not.
Presentation	• Have a logo or other information on every Web page to identify the site owner(s) or author(s). • Ensure clean, well-presented text whose visuals are also clear and consistent regarding tone, color, and graphics. • Eliminates typos, grammar mistakes, and other errors. • Put the date of publication on every web page to make it relevant to the users

Table 4.2: Tips to developing Online Credibility

- **Clarity**

Clarity is the ability to write and edit text so that it would be clear and easily readable. The main issue regarding clarity in developing web content is that the tendency of the writer to expressed personal writing style. The user is not interested with the writer but with the information that is to be offer.

However, we should not mix up with the term clarity and simplicity. As information designer Nathan Shedroff (1999:281) explains:
Clarity is the best accomplished by focusing on one particular message or goal at a time and not attempting to accomplish too much all at once. Simplicity, on the other hand, is often responsible for the "dumbing down" of information rather tan the illumination of it.
The tips on how to develop Clarity on online writing can be referred to Appendix C.

- **Conciseness**

Conciseness is vital in creating quality online content by providing the most economical manner in presenting a topic but still meeting the user's need for information. The amount of economy required depends on where the text is on the site and how the user will use it. For example, page that contains or primarily acts as navigation page should have less information or text while pages, which the main purpose is to carry the information, can be longer and more detailed.

- **Coherence**

Coherence involves connectivity of all parts of the content in clear and logical ways, enhancing its ability to persuade readers. Content published on web should be coherent to each other or else the user will feel disoriented, frustrated and even annoyed. To develop coherence in website's content, three important must be considered:

- Well-built information architecture
- Internal links that make logical sense
- Web pages that can stand alone as rhetorical units of information

4.1.4.2 Information Architecture (IA)

Information needs to be organized in a logical group with the purpose for the users to navigate effectively through the content and find the information that they seek. In her research, document design and usability specialist Janice Redish (2000:163) notes: "My definition of document design or information design has always been, first and foremost, the 'whole'. It is what we do to develop a document (or communication) that works for its users." Based on this, the information design is an overall process of development of development including planning, organizing, designing, drafting, testing, gathering feedback, and keeping content up to date.

4.1.4.3 Navigation Design

The importance of navigation design in the context of content management is how it acts as connection between IA and the graphical user interface (GUI). The navigation become immediately obvious once the pathways from simple to the detailed have been determined among the group of information. The pathways are represented as several types of links: -

- **Main navigation links** - provide pathways to and from the main sections
- **Shortcut links** - allow users to access important information without drilling through the site.
- **Converging links** – bring users from different locations to the same point
- **Hypertext links** – create additional connections both across site's sections and add layers of information to those that already exist through the main architectural structure
- **Redundant links** – links that are duplicated on one Web page, that is they show up in more than one location on the page.

4.1.4.4 The Graphical User Interface (GUI)

The GUI acts as a function that represent the architecture and navigation of the site and providing access to the site's information without actually revealing the organization of information behind it. A good GUI design will act like a shield that prevent user form getting lost and can identify the purpose of the site. Therefore, GUI has the three major functions:

- Help users develop a mental map of the structure of the site
- Provide a good overall look-and-feel to the site
- Assist users in reaching the information they want.

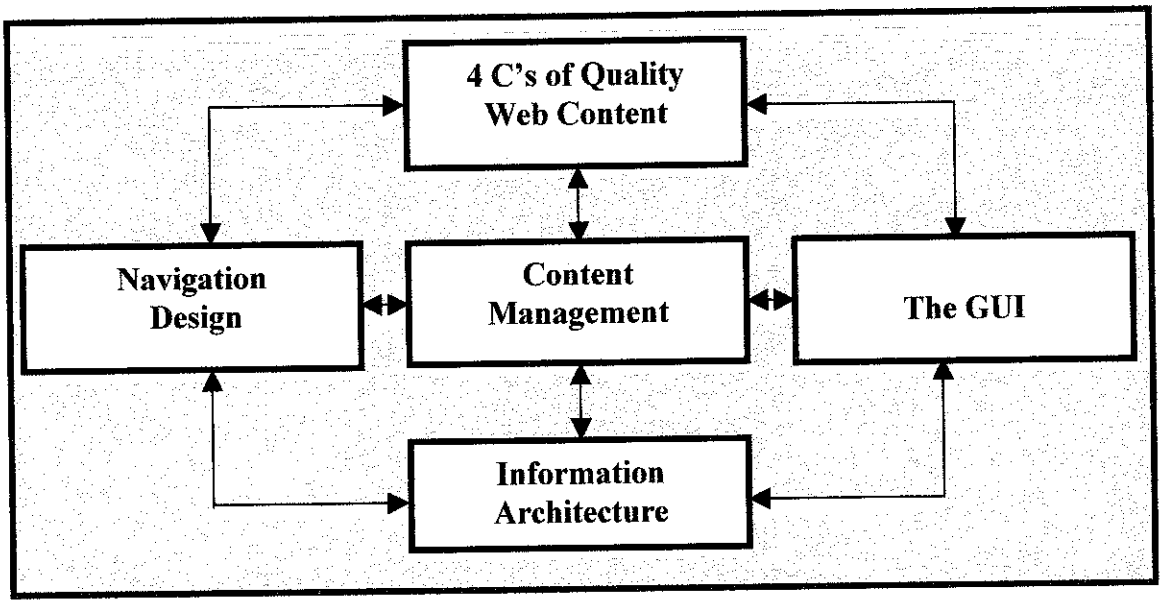

Figure 4.1: Diagram on the major elements that involve in content management.

4.1.5 Case Studies on Tourism Websites

The purpose of the case studies is to provide data for the author on the idea of usability for the websites. It is believed that the real user experience will give more information on what actually makes the site usable rather than depends on the guidelines and tips from the experts alone.

4.1.5.1 The Sites Tested

The author has picked 8 tourism websites to be analyzed to see what kind of content that these websites offered. The studies will also concentrate on how the information is presented based on their objectives to provide information on tourism. Please refer to Appendix G to see the print screen of each website.

Site Name	Content
www.sarawak.com	• Information on interesting places in Sarawak
www.penangtourism.com	• Local places, foods, accommodations available in Penang
www.sabahtourism.com	• Information on tourism activity in Sabah
www.melaka.gov.my	• The main site for tourism in Malacca under government
www.pahangtourism.com.my	• Information on interesting places in Pahang
www.visitheartofengland.com	• Information on interesting places in England
www.visitmelbourne.com	• Information on interesting places and activities in Melbourne Australia
www.tourism.net.nz	• Information on interesting places and info on accommodations, transportation in New Zealand

Table 4.3: List of the websites both local and international involved in case studies.

4.1.5.2 The Categories for Evaluation

The author has identified five categories, each representing an area where usability hazards are common. The rationale behind defining these categories is as follows:

- Verbal or visual rendering of information items make up categories 1 and 2
- The logical coherence between information items at all levels of the site's hierarchy (headings, paragraphs, tables, pages) and the ease of navigating through these levels make up categories 3 and 4.

1. Language

This refers to the choice of words used to present information. Too much good advice has been given on making a text easy to understand. Well-structured are too subjective for the scope of this text. However, spelling, sentence length and use/avoidance of certain words ('cool', 'cyber-', etc.) do lend themselves to more objective judgments.

2. Layout & Graphics

This concern how elements are visually rendered on the page, but the author identify a particular issue only as a layout problem when adding/changing visual features such as size of elements, colors and fonts can remedy it. A long body of text, for example, can pose a layout problem when fonts, bulleted lists, or paragraph breaks could improve it. If it becomes better manageable by breaking it into several linked sections, it is an information architecture issue (see below). Thirdly, it becomes a subjective language problem if we should condense the text itself. In reality it can however be a combination of all three.

3. Information Architecture

Good information architecture means a clear, intuitive division of tasks and topics. The site's content and features can be arranged in more than one way, both with regard to the

number of branching (sub) sections (width) as in the levels of hierarchy (depth). Careful wording of titles, introductions and summaries are features that help emphasize this structure

4. User Interface.

The user interface of a site determines the ease of navigating through its content. Any feature designed to facilitate the user's quest belongs to this category. Aspects of user interface discussed here are specific to the Web and typically of a technical nature, whereas the arrangement of tasks and topics is a question of information architecture, which extends to printed media as well.

4.1.5.3 The Result

Website: www.penangtourism.com	
Categories	**Evaluation Result**
Language	• Standard language.
Layout & graphics	• Some of the graphics are not very clear but the quality can be improved • The use of font color, which is sometimes hard for the user to read.
Information architecture	• Clear groupings of information
User interface	• Easy to navigate from page to page • Can be improved by using more colors which are not distracting to give more 'feel' to the website

Table 4.4: The result of website's evaluation for the www.penangtourism.com

Website: www.sarawaktourism.com	
Categories	**Evaluation Result**
Language	• Short, clear and very straightforward
Layout & graphics	• Spacious which is good for reading • Some pages need to scroll which is not usable
Information architecture	• Straightforward in organizing the content
User interface.	• Easy navigation but some external links might not be useful

Table 4.5: The result of website's evaluation for the www.sarawaktourism.com

Website: www.sabahtourism.com	
Categories	**Evaluation Result**
Language	• Clear and concise but can be a bit lengthy in some part of the content
Layout & graphics	• High quality graphics and nice setting of images • The color selection really makes the site looks attractive
Information architecture	• Very organized in terms of grouping the information
User interface.	• The navigation quite complex because of the big content • Need to do lots of clicking to get certain information

Table 4.6: The result of website's evaluation for the www.sabahtourism.com

Website: www.visitmelbourne.com	
Categories	**Evaluation Result**
Language	• The language used is standard and clear • Very nice wordings able to persuade
Layout & graphics	• Very spacious and neat in terms of placing the content
Information architecture	• The content is big but the grouping is done in clear manner
User interface.	• Easy navigation and wide space made ease for the eyes

Table 4.7: The result of website's evaluation for the www.visitmelbourne.com

Website: www.pahangtourism.com	
Categories	**Evaluation Result**
Language	• The wordings used are easy to understand but the content are lengthy/long
Layout & graphics	• Some of the graphics are not clear and can be improved • The background color is not
Information architecture	• The groupings are clear but too detailed which is unnecessary
User interface.	• The navigation can be quite confusing because of redundant links

Table 4.8: The result of website's evaluation for the www.pahangtourism.com

Website: www.tourism.nz.net	
Categories	**Evaluation Result**
Language	• Standard but might be complex in terms of wordings
Layout & graphics	• Combination of soft and vibrant colors makes the site catchy • Some pages need to scroll down which is hectic
Information architecture	• Might be complex based on the big content • Complete portal with many useful links
User interface.	• The first time user might feel complicated to surf this website because of many links and sections • Might look a little bit cramped because too many information and links

Table 4.9: The result of website's evaluation for the www.tourism.nz.net

Website: www.melaka.gov.my	
Categories	**Evaluation Result**
Language	• Simple but can be improved by using more engaging words
Layout & graphics	• The overall presentation might be a little dull because the weak use of color and graphics
Information architecture	• Broad in scope and not focus in tourism only • Manage to organize the content but quite complex
User interface.	• The presentation can be improved with the help of better selection of color, graphics and layout

Table 4.10: The result of website's evaluation for the www.melaka.gov.my

Website: www.visitheartofengland	
Categories	**Evaluation Result**
Language	• The language used is very high in credibility to persuade • Some content are too long
Layout & graphics	• Some pages still need scrolling • The font color is easy to the sight and not distracting
Information architecture	• Straightforward and use simple content structure
User interface.	• Nice interface with easy navigation • Useful interactive maps

Table 4.11: The result of website's evaluation for the www.visitheartofengland

Based on the evaluation performed during the case study, some of the results have been analyzed and presented through the graphical presentation. Below are two of the important findings that have been depicted using graphs based on the elements evaluated earlier.

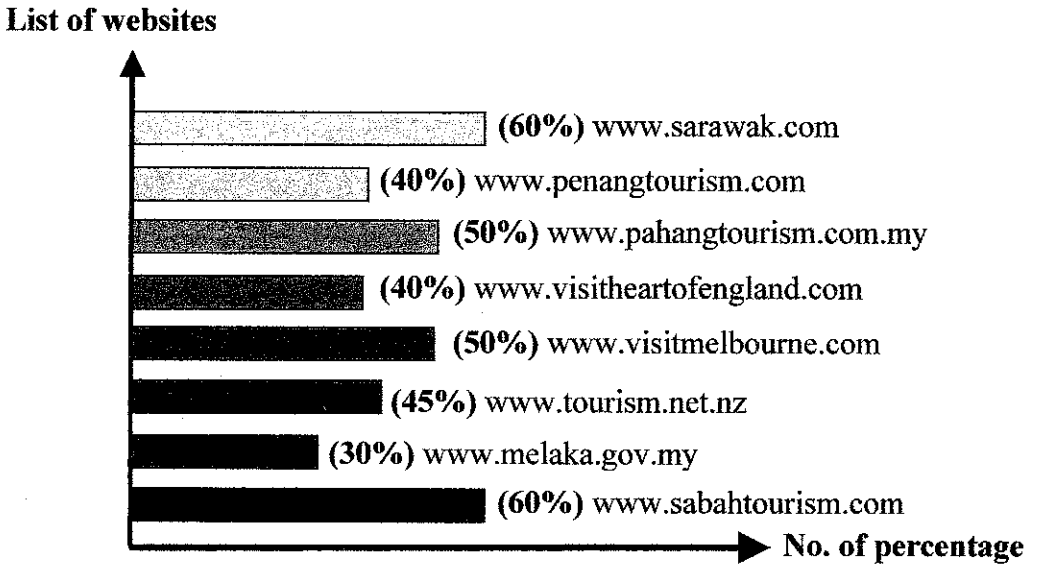

Figure 4.2: The percentage of graphic used in the websites from the case study.

Based on the graph above, the author can conclude that graphic plays major role in tourism website presentation overall by taking note at the percentage of them being used from these websites. It act as alternative way in presenting the information without depending too much on the text, which is suitable.

In the aspect of site management, the author has checked every links on each websites to see whether all of them are working correctly or not. As a result, more than half of the websites have broken links. Number of broken links detected from each website can be retrieved from the graph below.

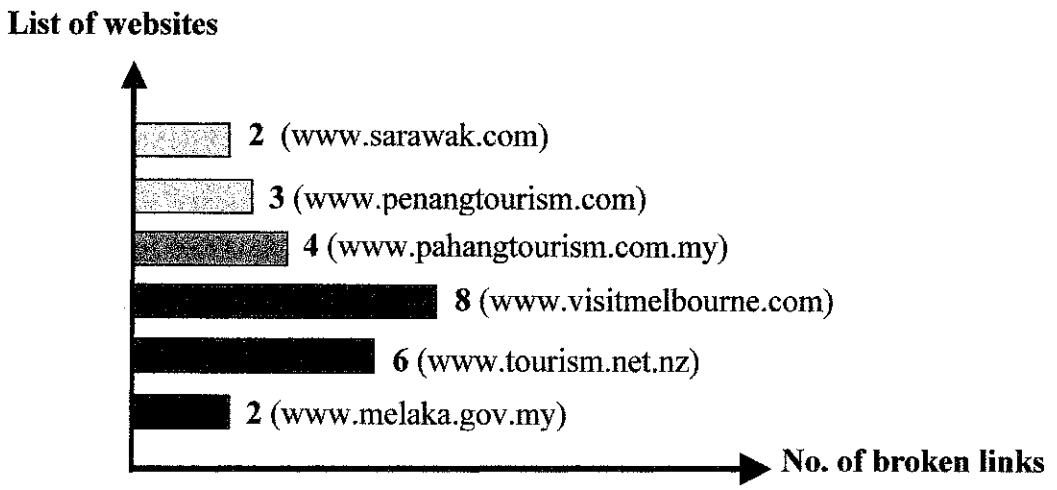

Figure 4.3: Number of broken links detected on some of the websites from the case study.

4.1.6 Product Results and Discussion

The final product for the project is a prototype of a tourism website that focus on giving information of the state Perak. The prototype is a commercial tourism website which is medium in size and the content selection is based on the objective and the checklist done to ensure that the website Perak Tourism Online meets its objective and goals.

The author also has followed some of the guidelines and tips found from the research studies that have been compiled in this project. The development of the prototype however focused on the surface of the website rather than the backend architecture such as database design and technology architecture. The focus is on the selection of the content, what type is suitable and how it can be presented effectively to the user through the use of navigation and interface design. The aim of the author for this prototype is to keep simple but usable.

Other than that, the author has also applied the knowledge of site management through the development of this project. The author picked one of the common problems, which leads to ineffective site management that is broken link. Broken link occurs when the link to a certain page is missing or the page destination is no longer existed. Keeping broken link in the website is a bad practice and affect the usability of the website itself. In this project, the author has select one free site management tool on the Net to check whether the prototype has a broken link or not. The tool that is known as Link Validation Spider that we can get from dead-links.com uses the analogy of a spider and will crawl inside the website which we want to validate and perform this functions:

- Will crawl into each link hierarchal from the main links to the next down line until the link ends.
- Display all the links available or working once it has successfully crawl to one level and the process continue if the user wants to check deeper.
- Display all the broken links

To view the print screens of the tool, please refer to Appendix N.

Website Prototype Design

Below are the findings and outputs during the implementation of each process in developing the prototype.

- **Planning**

In the planning process the author has made some checklist in order to identify the requirements for the Virtual Perak Online website. The objective of the website is to give information regarding tourism industry in Perak in attractive and informative way. Based on this the author has identified the right Information Architecture (IA) model to suit the needs of the website in grouping the content. Below is general description of the architecture model that will be the base for this prototype.

TYPE OF ORGANIZATION	WEB SITE SECTIONS
Small to Medium Sized Businesses Area: **Tourism**	• About Us • Product/Service Information • Product/Service Support • Contact Us

Table 4.12: IA model of the Virtual Perak Online

Based on the model, the author also has made the checklist to ensure that the ideas generated confirmed to the architecture model that is being implemented in this project. To view the checklist for the IA, please refer to Appendix H.

- **Content Development and Site Map**

The author has identified and group the information that will be presented in the website prototype. The grouping is not only based on the IA model chosen earlier but also based on the case studies and observation process on several tourism websites to see the current trend in presenting the information. The group of contents turned out to be like this:

- Home
- About Perak
- Attractions
- Culture and Arts
- Events
- Gallery
- Travel's Toolkit
- FAQs
- Contact Us
- Directory
    - Accommodation
    - Food and Dining
    - Shop
    - Business

From this group of contents, the author then construct the site map to make the content more sensible in terms of relationship and navigation. For the site structure, the author has picked the tree model to show the levels of hierarchy of the content. The first level of hierarchy will be the main website sections while the narrower branches have been transformed into second and third level information. To view the site map please refers to Appendix J.

- **Mock up design**

The mock up design started from the mind mapping process where the author visualized the website in informal way. The author only used sketch drawings using papers and pencil to create the mind map. From this activity, the main elements or content of the tourism website can be identified. The attributes that linked to each main element also had been identified easily.

The same process had been done to produce the storyboard. The sketch of the storyboard had been done on papers before it had been digitized. It helps the author to visualize the navigation and the layout of the website overall before export the design to html pages. The mind map and the storyboard of the website prototype can be viewed in Appendix I, K and L.

- **Prototyping**

In prototyping, all the design in the storyboard has been transferred to html pages. The main concern in this phase is the layout of the page where the author need to determined the size of each graphics or the placement of buttons and links on the pages. It is also set to check the pages are connected correctly to the tight link.

In this phase, the content is not yet finalized and the placement might be changed according to suitability of the design and guidelines gathered from the research done earlier. For this tourism website prototype, the size or number of pages are not as big as what has been planned because of the limitation of time and resources. The sections will contain information based on the elements stated in the site map but it will not be complete. The reason for this is just to show the purpose of each element included and how to present it. To see the results from the prototype development, please refer to Appendix M.

- **Data Input and Content Layout**

In this phase, after all the pages have been created in html, the process of transferring real information took place. The resources for the website has been organized into separate folders and files for easy retrieving and more systematic. For example, the images have been placed in different files from the text files and others.

From the data input, the website looks more complete and understandable. The concern in this phase is more on the selection of content and images to be inserted at which place. The use of color and font also must be considered to ensure that the website is usable rather than depends solely on the attractiveness. These selections have been made based on the some guidelines of good design and usability gathered from the data collection

process. This is a continuous phase, as some changes will still be made if some data are not suitable or the design is bad.

4.2 Discussion

Based on the research done so far, author can conclude that issues and facts about site management are not somehow new but yet not being taken seriously. Site management has become vital in web design and development by looking at the current situation where a website can contain thousand of pages and links which need some good management and maintenance in order to work effectively. Based on the research, the author has managed to identify some of the common mistakes on website management and also some considerations to look at when we want to plan on site management. The author also has tried to implement on of the site management tools available in the Net to get more understanding on this topic.

The same goes for content management. The needs to get the right and quality information is vital to make the website useful in conveying them to the users. The reason is that based on findings and researches done by usability and design experts noted that the first thing that the users notice or look upon when they surf to a website is text. It is important to choose the right content based on the objectives of the website itself. One-way to build a good website based on the findings made by the author is by having a good information architecture, easy navigation and good user interface.

Based on the case studies done during the data-gathering phase, the author managed to understand and see the trend on common presentation of different tourism websites. It is important to uncover these trend as again based on the findings regarding usability, creating a website that is too abstract or run from the conventional way will also distract user attention and thus affect the usefulness of the website. The key is to keep up with the trend but ensure the presentation is worth what the users looking for. Thus for the development of the prototype, the author has learned so many things regarding the concept lies behind all these elements that the author studied on. It is a very good thing

for the author as having to know the right concepts and guidelines will help the development process to be much faster and efficient.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Relevancy To the Objectives

Based on the earlier part of the report, the author has mentioned three main objectives to be achieved. The first objective is to identify the correlation between usability, site management and content management and integrate them in website development. Author had done the research and documented some of the findings in the literature review and also in the findings and discussion section. The result was good as most of them are quite new and thus the author has learned so much from it. Although trying to get into each of the three elements were quite tricky as they involved a lot of things, the author managed to pick only the relevant ones according to the scope.

The second objective is to compile all the guidelines gathered from the research or studies made from other researchers who had conducted tests on the real users. Other sources also had contributed a lot for this part especially from the journals, articles and resources from the Internet. Some of the guidelines also were amend or added by the author resulted from the case studies and experience when developing the prototype of the tourism website. The guideline has been successfully complied and can be reviewed in the appendix.

The last objective of this project is to come out with a prototype of a tourism website that is usable for the users. The development is based on the findings and research done throughout this project as to show that the author does understand what her project is all about.

5.2 Recommendations

There are several areas that the author believed could be further enhanced or improve in the future. Since the author has covered three elements which have direct effect to the website development, the results are more general and what relate all of them is the scope on tourism.

5.2.1 Site Management

For this project, the author only stressed on the basic concepts underlies under each of the elements and find the relationship, which make them related to each other. In the future, it would be better that the research will focus intensively only on one area such as maybe solely on site management. For example, maybe based on the fundamentals of site management, the author may come out with a framework or prototype of the tool that enable effective site management according to the business needs rather than relying on the tools provided on the internet.

5.2.2 Content Management

The author would also like to go more in depth on the content management by highlighting the process of selecting the right mechanism or tool to handle the content from scratch until the maintenance. It will also covers how does an organization plan on deciding how the information will be handled, who will be involved and the tasks.

5.2.3 Usability

In terms of usability, the author only manage to cover on the availability of the information that the user need from a website. Since usability itself is considered as one big element, there are some other elements that the author can relate or covered in the future such as: -

- Accessibility to different user needs
- Usability on technology used

5.2.4 Prototype of Virtual Perak Online

For the prototype, there are still many parts that need to be improved. The prototype created for this project is intended for small to medium organization. There are many other things that should be added or expand but due to limitation of time and resources, they are not included. For example, it would be better for the user to see the result based on the working application with a complete functionality and back end architecture. The improvement may be expanded in term of these components: -

- Add extra features such as GIS map of the places or virtual tour to add more interactivity in the website
- Provide additional information which relate to the website such as links to any related services such as transportation, medical and health and traveling organizations.

As a conclusion, all the facts and findings included in this project will hopefully meets the expectation based on the objectives stated earlier. The project has somehow highlighted the importance of understanding the role of site and content management which do affect on the usability of a website. This would be good for web development team to understand the basic needs to make the web usable to users rather than developing based on their preferences and lost the real objective in the end.

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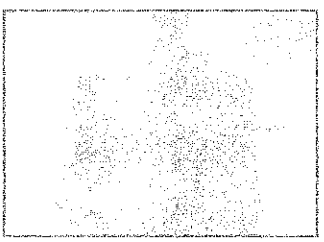
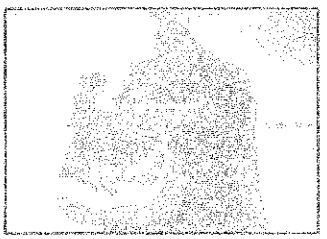


APPENDIX I: PROJECT TIMELINE



APPENDIX II: COMPILATION OF GUIDELINES AND TIPS

APPENDIX B: TOP 9 WEB MANAGEMENT MISTAKES

1. Not knowing Why

Most of the websites are built simply because some executive told somebody to do it without telling them what the site should achieve. Most companies should start their web design project by finding out ways in which they can provide true customer value on their site. They should give user benefits from spending time on the site, allow them to do the business with you and their money will follow.

2. **Designing for Your Own VPS**

Internally –focused sites cause companies end up with home pages full of mission statements, photos of the CEO, and corporate history. The site should be designed with customer's needs in mind and not to promote grandiose ideas of self –importance.

3. Letting the Site Structure Mirror Your Organization chart

User should not care how your company is organized, so they should not be able to deduce your organizational structure from the structure of your website. Admittedly, it is easiest to distribute responsibility for the site divisions and departments according to already established chains of command and budget categories, but doing so results in an internally centered site rather than a customer-focused site.

A classic sign of mismanaged website is when the homepage has a button for each of the Senior Vice Presidents in the company.

4. Outsourcing to Multiple Agencies

If every new Web project being outsource to new agency, the site will end up looking like one of those quilts assembled from patches by each of the participants in a protest march. Users get very annoyed when they move between pages on a site and find drastically varying designs at every turn. Consistency is the key to usable interaction design: when all interface look and function the same, users feel more confident using the site because they can transfer their learning from one sub site to the next rather than having to learn everything over again on the next page.

5. Forgetting to Budget for Maintenance

As a rule of thumb, the annual maintenance budget for a website should bear about the same as the initial cost of building the site, with 50 percent as an absolute minimum. Obviously, ongoing costs are even higher for new sites and other projects that depend on daily or real-time updates. If the money is simply spent to build a glamorous site but do not keep it up to date, the investment will very rapidly turn out to be wasted.

6. **Wasting Linking Opportunities**

The web is a linking medium: the hypertext links are what ties it together and allow users to discover new and useful sites. Most companies have recognized this phenomenon to the extent that they religiously include their URLs in all advertising, TV commercials, press releases, and even in the products themselves. Unfortunately, most of these URLs are overly generic and do not provide users with any payoff that is related to the context in which user found d the URL do not link to the homepage in the ads. If a potential customer gets interested in a new product or a special offer, they should not be forced to find out how to navigate the site from the homepage to the product page. Instead, link directly to the product page fro the ad.

7. **Treating Internet and Intranet Sites the same**

Internal intranet Web sites need to be managed very differently from public Internet sites. The key difference is that each company only has a single intranet and thus can mange it to a much greater degree of consistency and predictability. Also, employees use the intranet for corporate productivity, meaning that any waste of user's time is direct hit to the bottom line.

8. Confusing Market research and Usability Engineering

Many sites have embraced the value of customer data for design, but unfortunately many of them rely solely on traditional market research like focus group. Most of these methods relate to creating desire for a product and getting it sold and do not provide detailed information about how people operate the product. A Web design is an interactive product, and therefore usability-engineering methods are necessary to study what happens during the user's interaction with the site.

9. Underestimating the Strategic Impact of the Web

It is a huge mistake to treat the Web, as it is an online brochure. The Web should be considered one of the most important determinants for the way our business will do in the future.

The two classic errors in predicting the future of a technology shift are to overestimate its short-term impact and underestimate its long-term impact. The web has been hyped to such extent that people overestimate what it can do the next year or two. The impact of networks grow s by at least the square of the number connections, and the true value of the Web will be only be seen after extensive business process reengineering.

APPENDIX C: TIPS ON CLARITY

Tips to developing Online Clarity

TEXTUAL ASPECTS	SHOULD..
Structure	• Keep sentence short – no more than one or two clauses. • Keep paragraphs short and discuss only one topic per paragraph
Words/Phrases	• Use the active voice such as *The CEO held a meeting*, not *The meeting was held.* • Do not use adverbs unless you deem it necessary • Avoid puns and other jokes that will not be understood by a global audience
Presentation	• Use a web page title that condenses and explains the page's content. • Use short and informative headers frequently. • Put spaces between paragraphs for easier reading. • Highlight keywords either through bolding or italics. However, be careful not to overdo highlighting as it will detract from readability • Put captions both above and below tables and figures. Remember that users often scroll fast and use the PgUp and PgDn buttons. Putting captions above and below helps users identify content easily

APPENDIX D: 10 USABILITY PRINCIPLES TO GUIDE THROUGH THE WEB DESIGN

10 Usability Principles to Guide Through the Web Design

1. **Motivate**
   Design your site to meet specific user needs and goals. Use motivators to draw different user "personae" into specific parts of your site.

2. **User task flow**
   Who are your users? What are their tasks and online environment? For a site to be usable, page flow must match workflow.

3. **Architecture**
   It's 80% of usability Build an efficient navigational structure. Remember – if they can't find it in 3 clicks, they're gone.

4. **Affordance**
   Make controls understandable. Avoid confusion between emblems, banners, and buttons.

5. **Replicate**
   Why reinvent the wheel? Use ergonomically designed templates for the most common 8-12 pages.

6. **Usability test along the way**
   Test early in design using low-fidelity prototypes. Don't wait until the end when it's too late.

7. **Know the technology limitations**
   Identify and optimize for target browsers and user hardware. Test HTML, JavaScript, etc. for compatibility.

8. **Know user tolerances**
   Users are impatient. Design for a 2-10 second maximum download. Reuse header graphics so they can load from cache. Avoid excessive scrolling.

9. **Multimedia**
   Be discriminating Good animation attracts attention to specific information, then stops. Too much movement distracts, slowing reading and comprehension.

10. **Use a stats package**
    Monitor traffic through your site. Which pages pique user interest? Which pages make users leave? Adjust your site accordingly.

APPENDIX E: TIPS FOR DESIGN

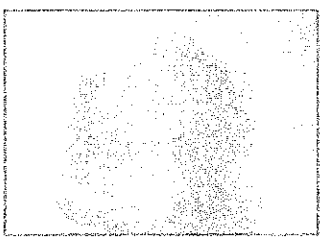
Design Tips

AREA	GENERAL TIPS FOR IMPROVED USABILITY
Fonts	• Use san serif typefaces such as Arial or Helvetica • Use 12- to 14-point type for continuous text • Avoid putting text in all caps • Avoid overuse of bold and italicized text • Limit the number of different typefaces and sizes
Words, Lines, and Spacing	• Don't hyphenate words • Type for extended reading should be flush left, ragged right • Provide extra space between lines of type • Put spaces between paragraphs
Color in General	• Use color emphasis. • Overuse of color detracts from usability. • Colors should be sued consistently to create relationships among objects. • Colors are affected by brightness and surrounding colors.
Background	• Create a clean look-and-feel by avoiding distracting backgrounds such as those with patterns. • Ensure that watermarks are not too strong. • Make sure the background color doesn't interfere with link color
Images	• Make sure all images are large enough to be seen and understood • Add text labels to images to enhance understanding if necessary • Use common style for all iconic images.

APPENDIX F: TIPS TO LEARNING ABOUT NAVIGATION

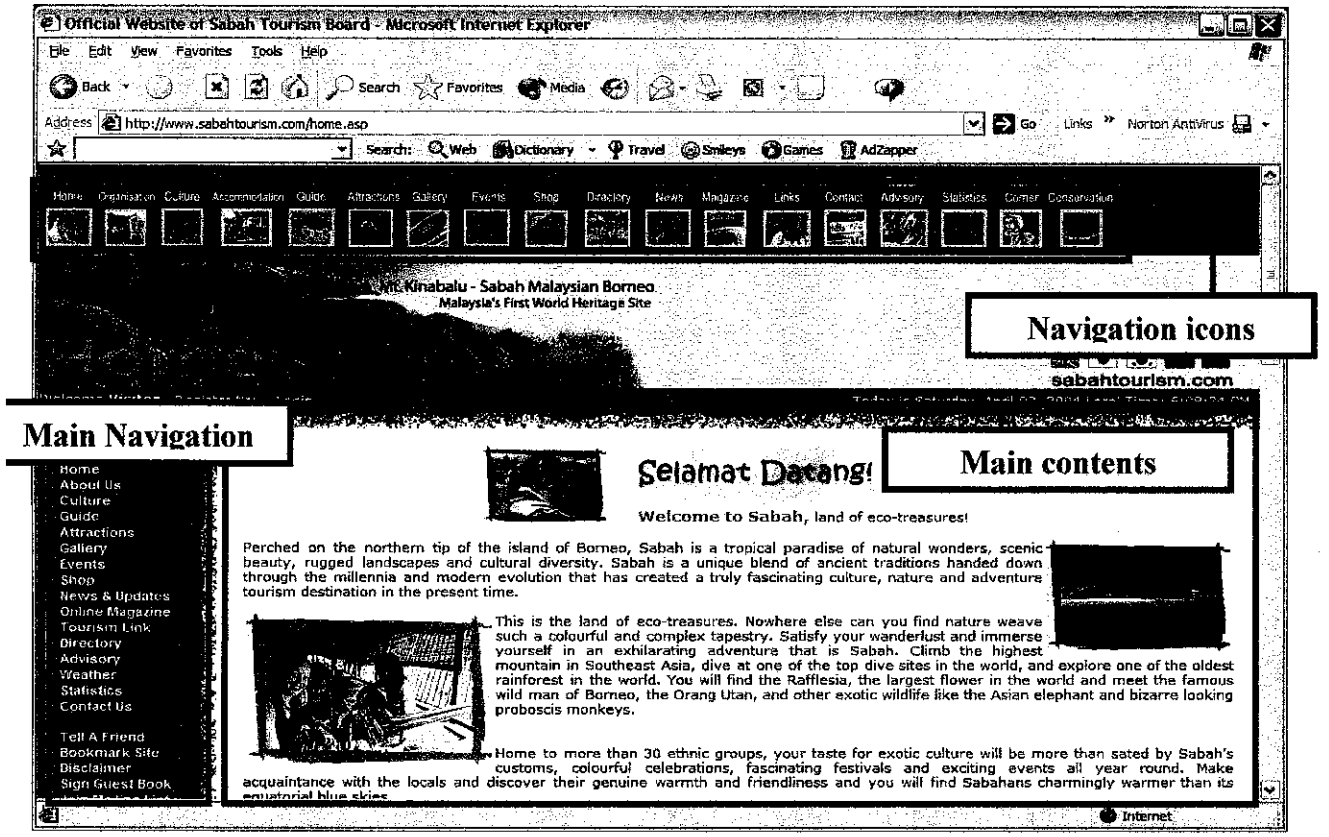
Tips to Learning about Navigation

ASPECT OF NAVIGATION	LEARNING TIPS
Navigation Design	• Pick a site and first draw a chart of its high-level menu items. • Take one site section and follow a flow of information stream down to its deepest page. By repeating this exercise for a variety of sites, you'll be able to see how navigation is linked to the IA. • Keep an eye out for the dead-end spots where users find themselves with nowhere to go except by using the 'Back' button and loops of content where users can get caught nd can only exit the loop by leaving the site.
Links	• Determine how well main navigation links are titled and whether they accurately reflect the content of the main sections. • To spot redundant links, look for similar link titles on navigation bars and in the body of the text. Trace them to their respective pages. If the pages are identical, you have found a redundant link.
Site Maps	Look at many site maps as you can. For each one, ask: • Does the site map help me understand the content of the site? • Does the site map help me understand the breath and depth of the site? • If the site map is graphical, does the type work well? Could there be a different way of visualizing the site that would be preferable?
Search Engines/Databases	• Check whether sites have search engines instead of site maps. Is the search engine more useful for the site? Do you think a site map would also help users? • To determine the complexity of the database, click on a link to bring up a web page. Now using a keyword from the Web page title or contents, use the search engine. Do you get the same page?

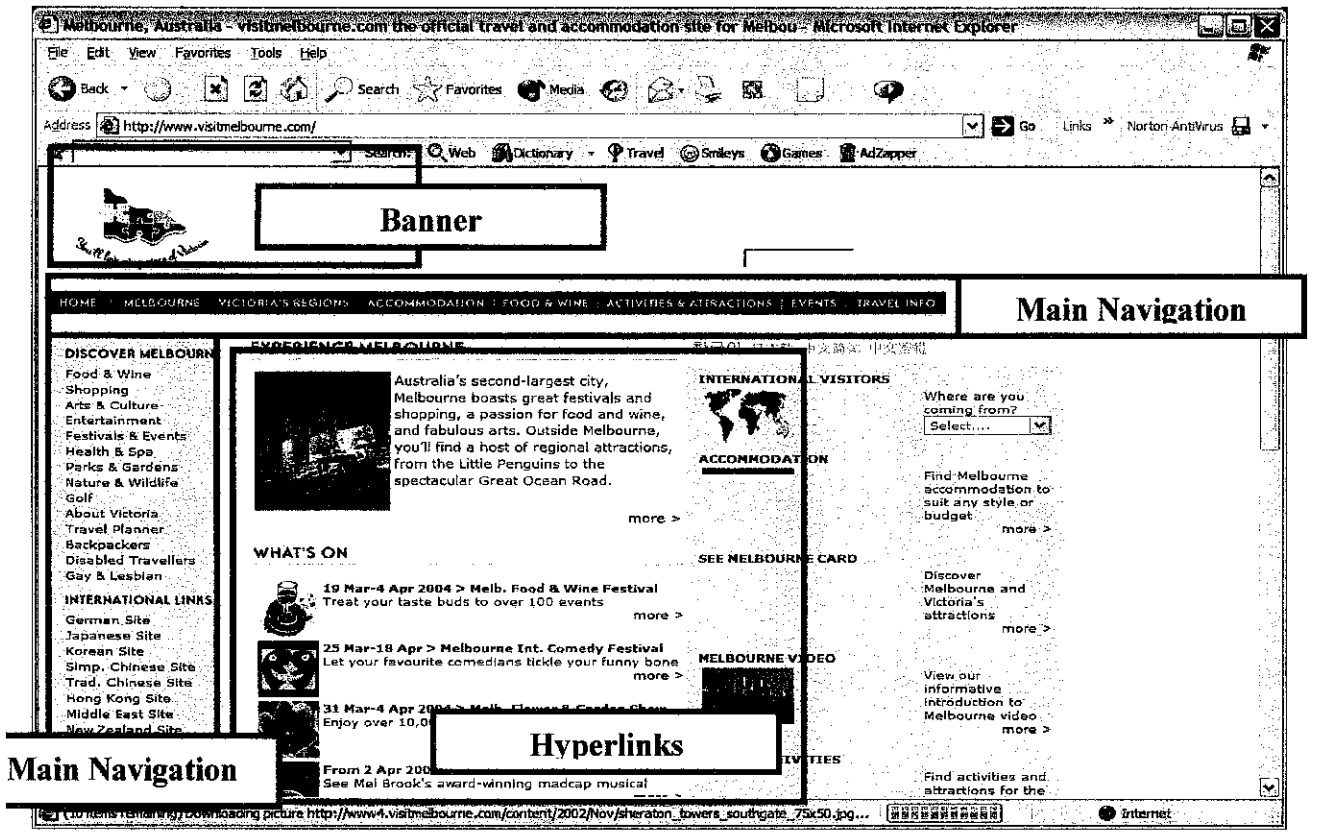


APPENDIX III: VIRTUAL ONLINE PERAK'S DEVELOPMENT

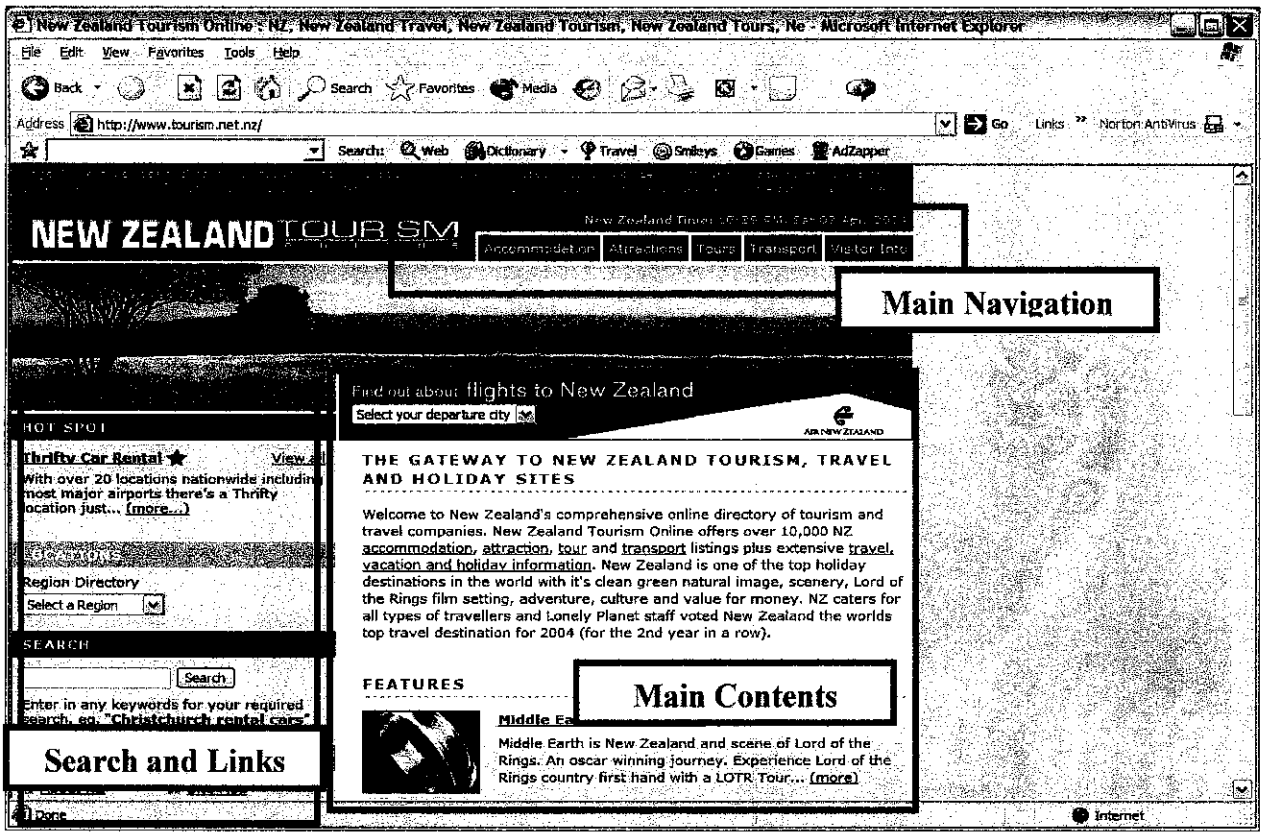
APPENDIX G: PRINT SCREENS OF THE CASE STUDIES



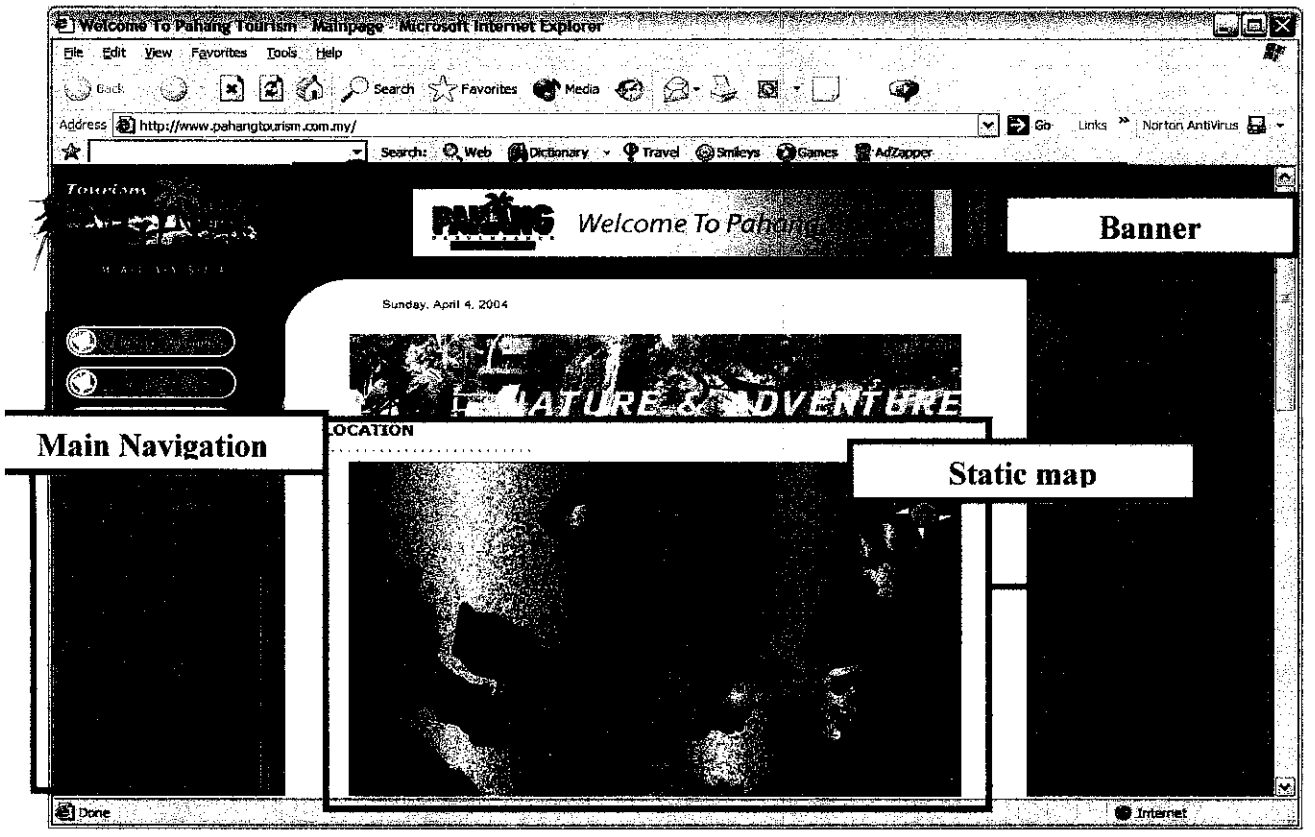
Print screen of the Sabah Tourism main page



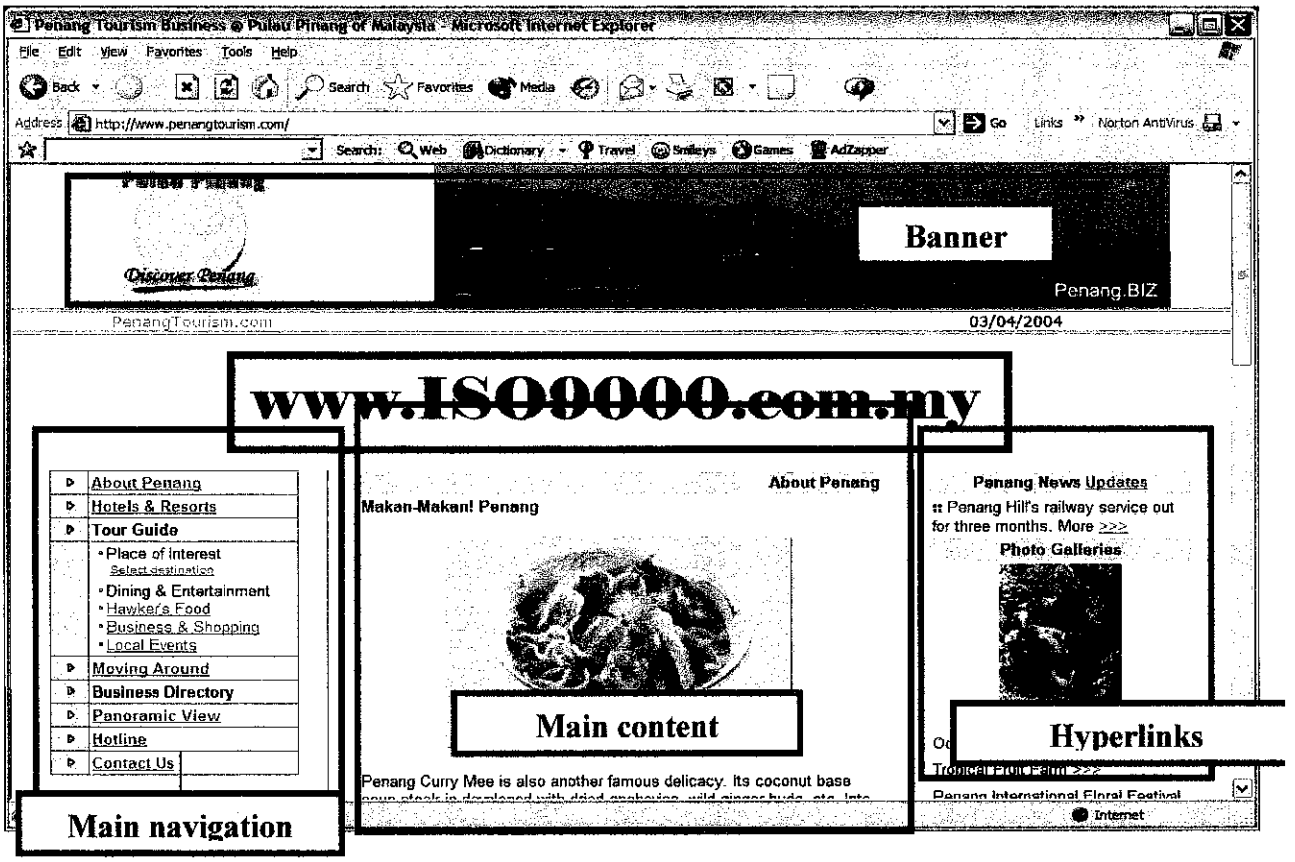
Print screen of the visitmelbourne.com main page



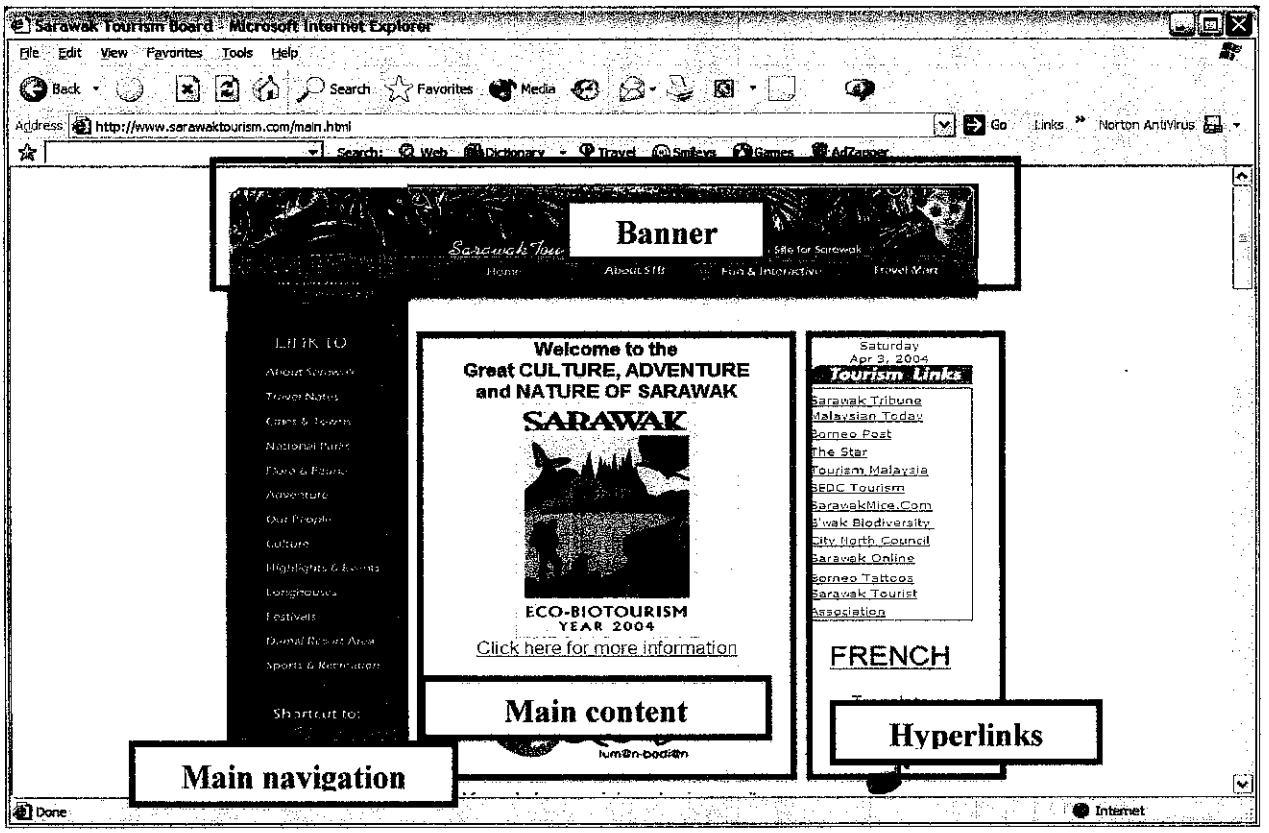
Print screen of the New Zealand Tourism Online main page



Print screen of the Pahang Tourism main page



Print screen of the Penang Tourism Business main page



Print screen of the Sarawak Tourism main page

APPENDIX H

Checklist for the Information Architecture model of the Virtual Perak Online Prototype

'Who's the Audience' Checklist

□ Who is the target audience(s)? How have we determined this?

□ What are the needs, concerns, and goals of members of the target audience? How do we know this?

□ Is the audience local, regional and/or global?

□ How computer literate will your target audience be?

□ Is the content delivered in a way that appeals to people with different learning styles such as preferences for content that is delivered visually or through audio?

□ Are members of the target audience elderly and likely to require special types of text formatting and/or sizing fonts and icons?

An Information architecture Model Checklist

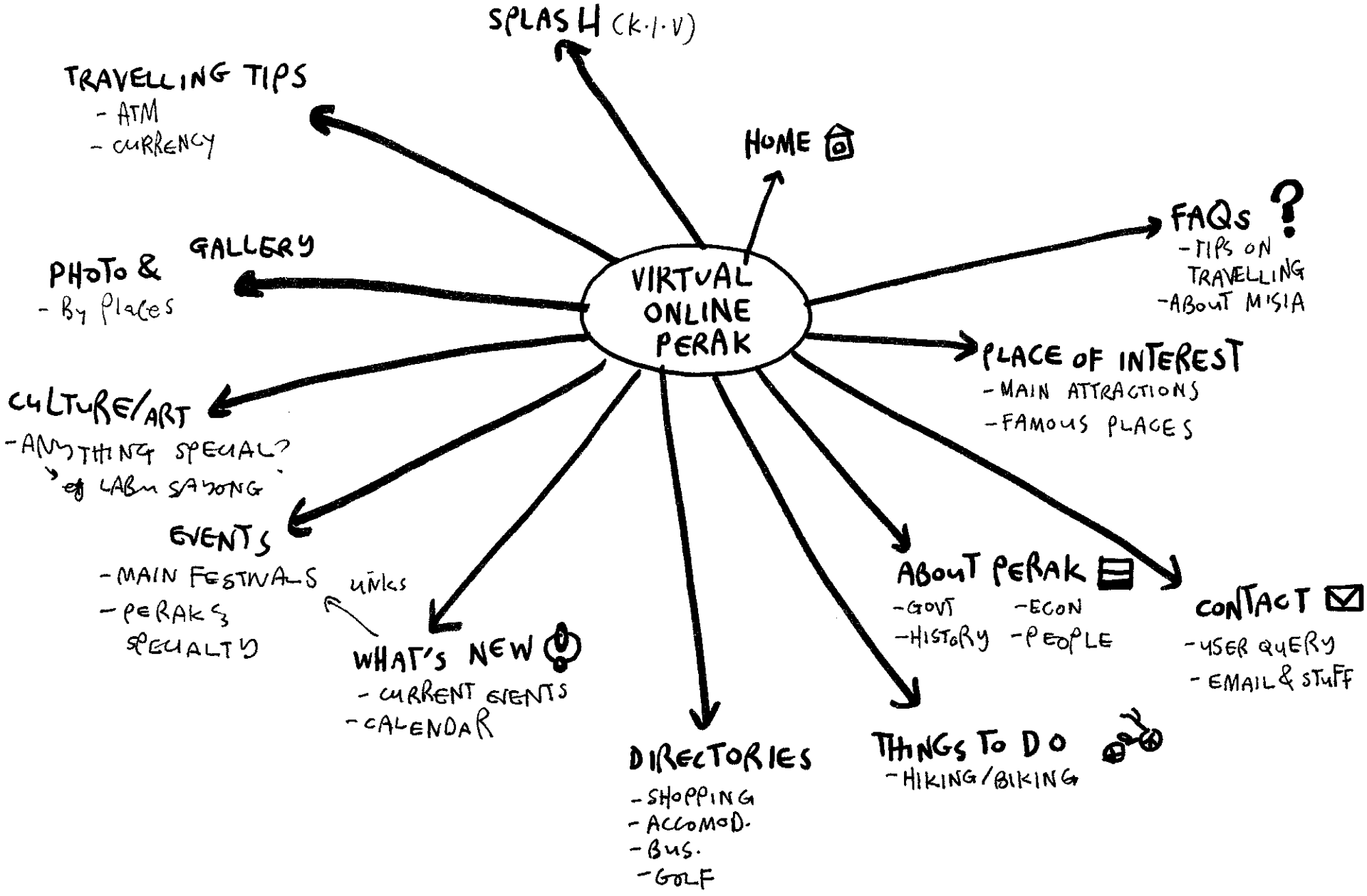
□ Match the organization to its model

□ Surf the web to find other organizations of the same generic type to see what variations exist.

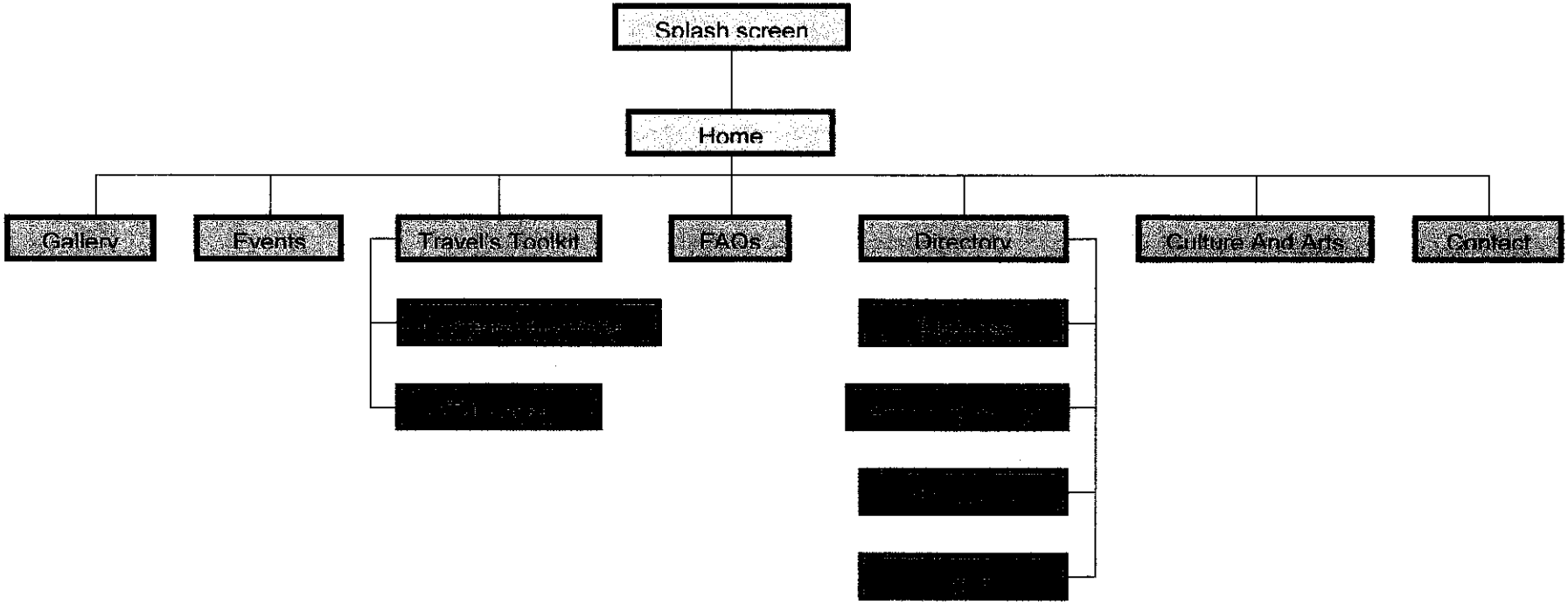
□ Surf the web to check other organization within the same industry because variations on the models can often be industry-specific.

□ Consider what you already know about the organization, its goals, and potential audience, and how its information would fit into the model's typical site sections, or vary from it.

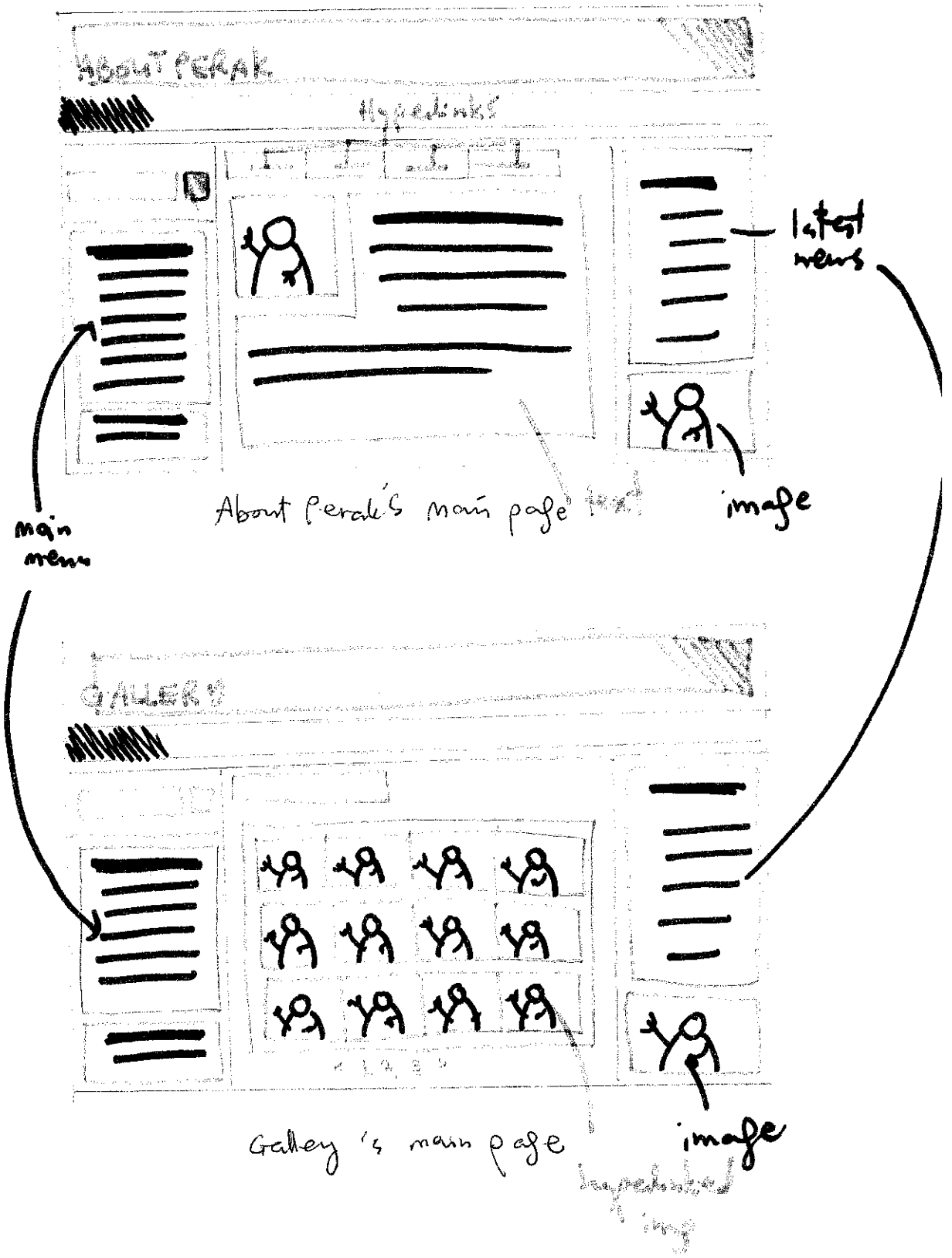
□ Prepare a rudimentary information architecture plan for the site

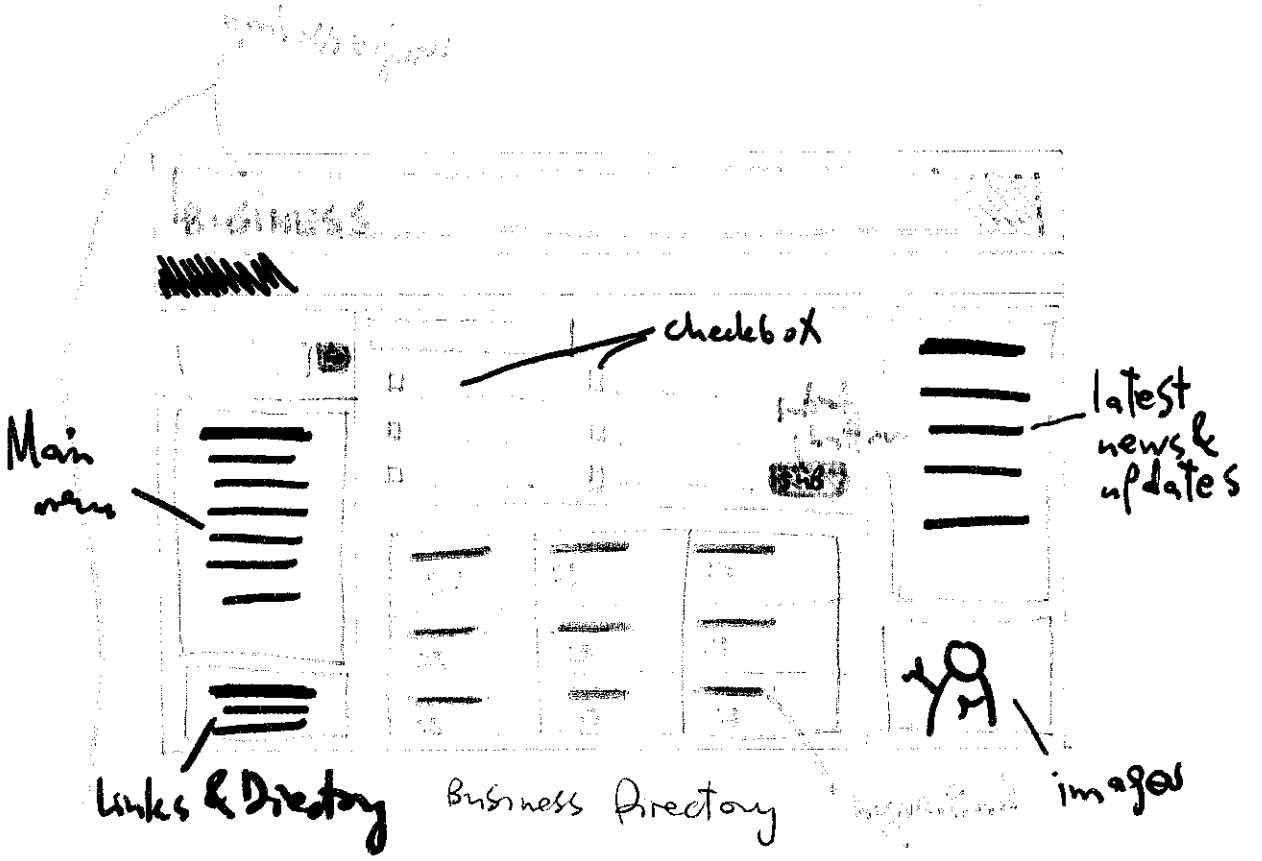

SPLASH (K·I·V)
TRAVELLING TIPS
- ATM
- CURRENCY
HOME
FAQs
- TIPS ON TRAVELLING
- ABOUT MISIA
GALLERY
PHOTO &
- By Places
VIRTUAL ONLINE PERAK
PLACE OF INTEREST
- MAIN ATTRACTIONS
- FAMOUS PLACES
CULTURE/ART
- ANYTHING SPECIAL?
eg LABU SAYONG
EVENTS
- MAIN FESTIVALS
- PERAK'S SPECIALTY
links
WHAT'S NEW
- CURRENT EVENTS
- CALENDAR
DIRECTORIES
- SHOPPING
- ACCOMOD.
- BUS.
- GOLF
THINGS TO DO
- HIKING/BIKING
ABOUT PERAK
- GOVT
- ECON
- HISTORY
- PEOPLE
CONTACT
- USER QUERY
- EMAIL & STUFF

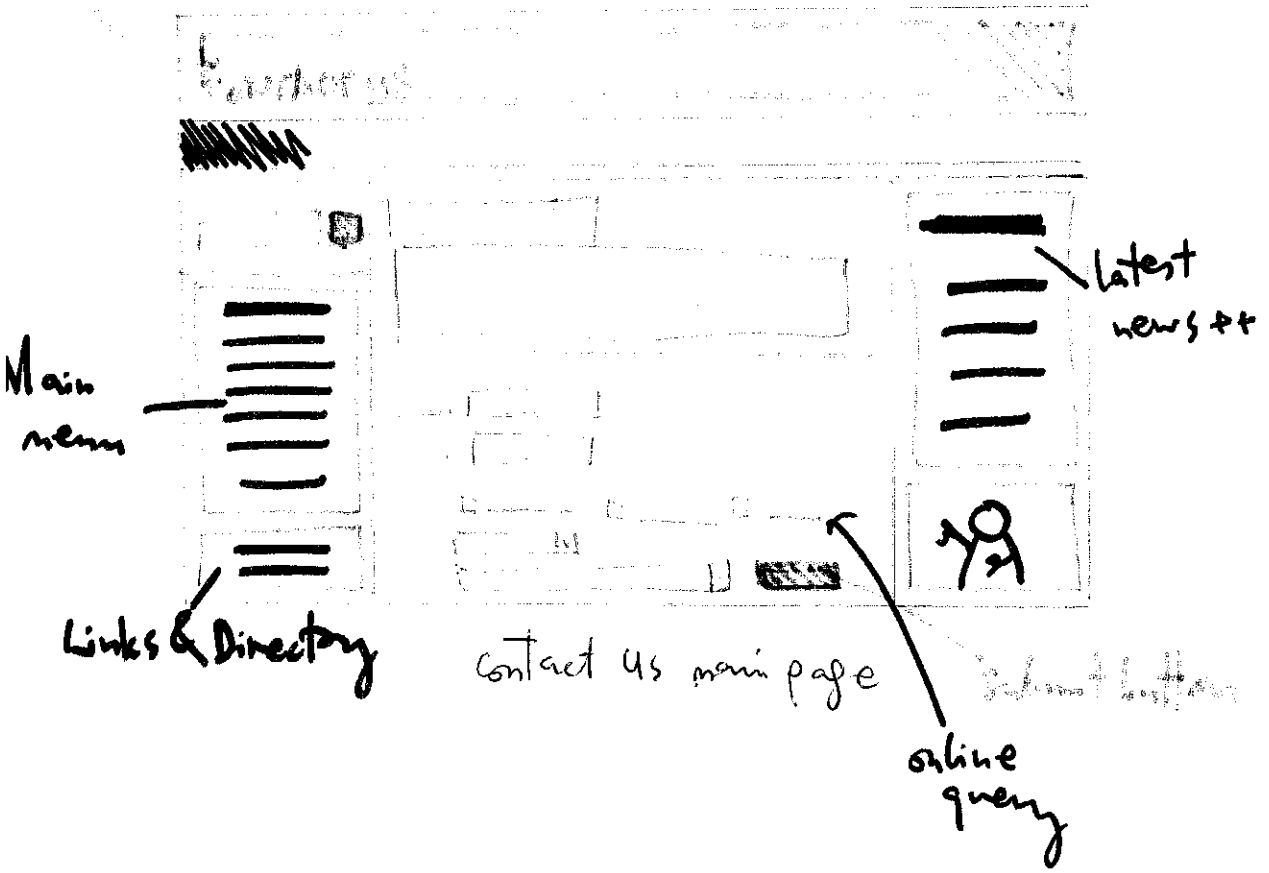
Site Map of the Virtual Online Perak prototype



APPENDIX K: MOCK-UP DESIGN OF VIRTUAL ONLINE PERAK

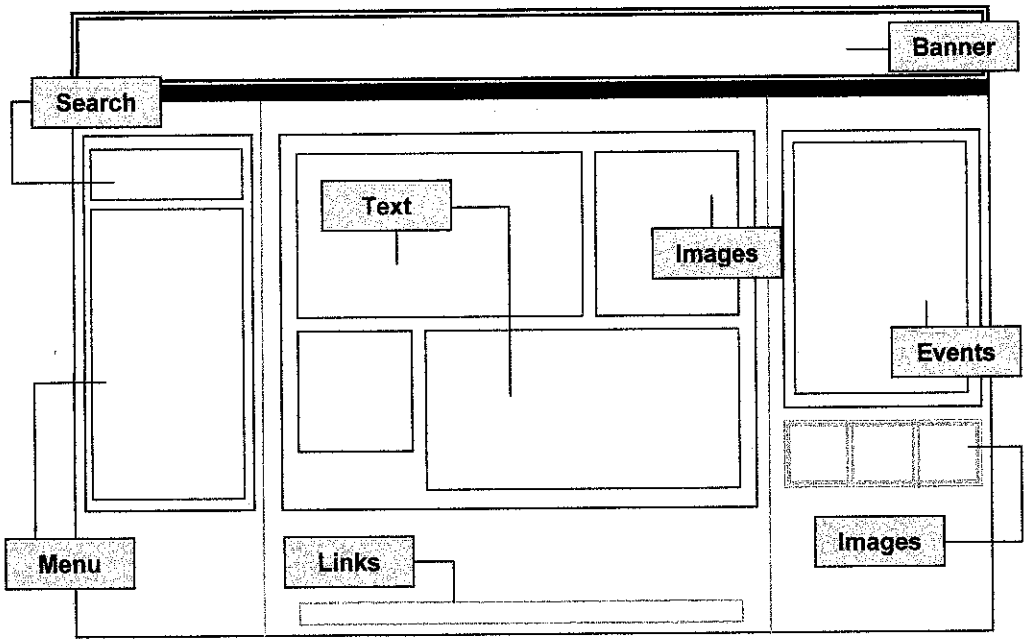



checkbox
Main menu
latest news & updates
Links & Directory
Business Directory
images

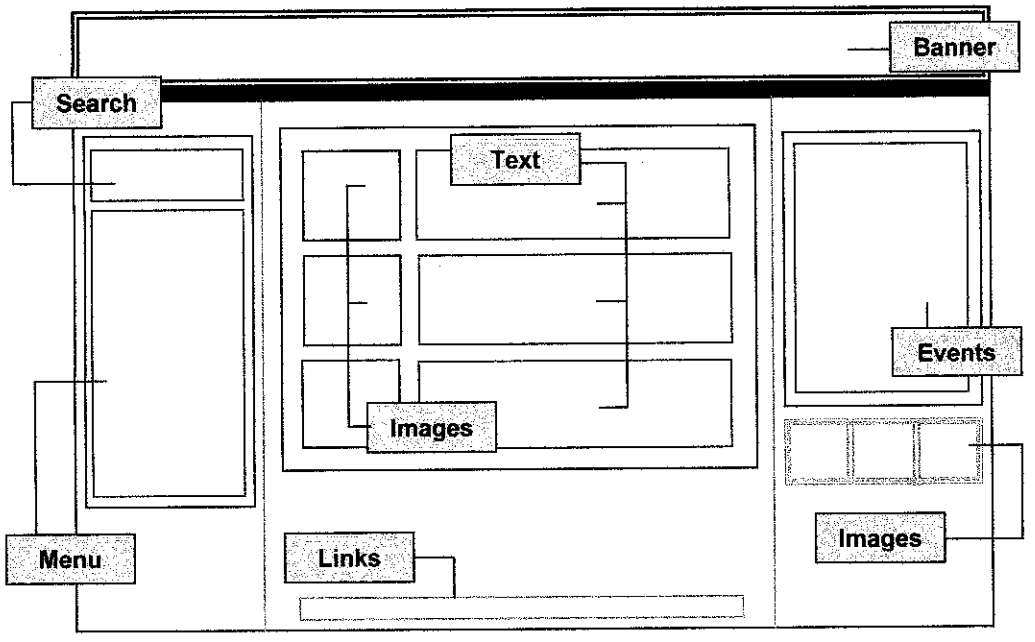

Main menu
latest news etc
Links & Directory
Contact Us main page
online query

APPENDIX L

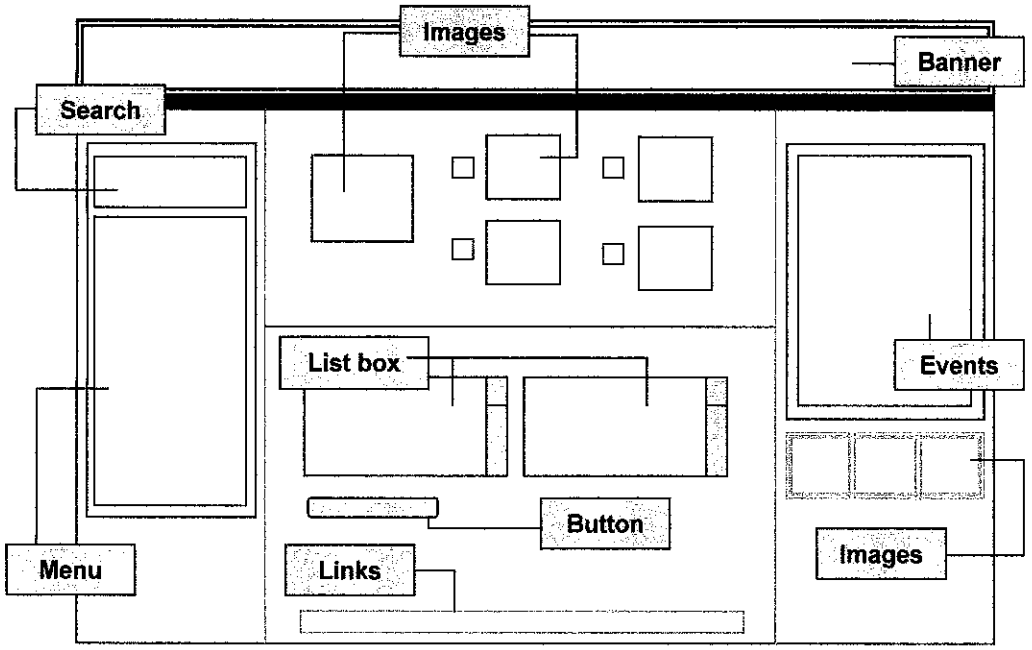
STORYBOARD (PORTION) OF VIRTUAL PERAK ONLINE PROTOTYPE (BETA DESIGN)



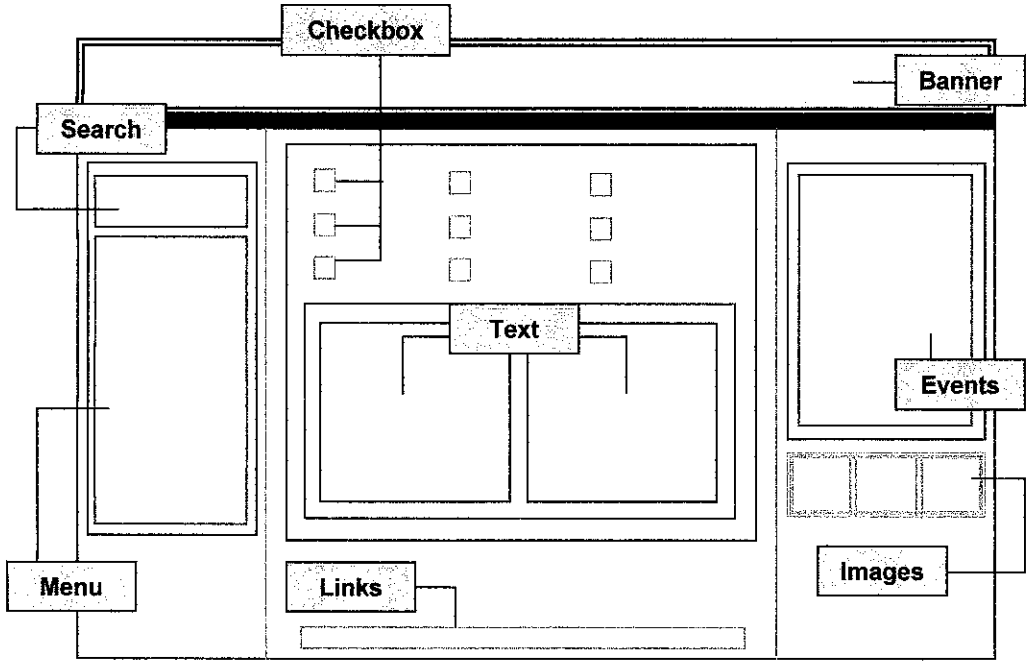
Main page for the Virtual Online Perak (Home)



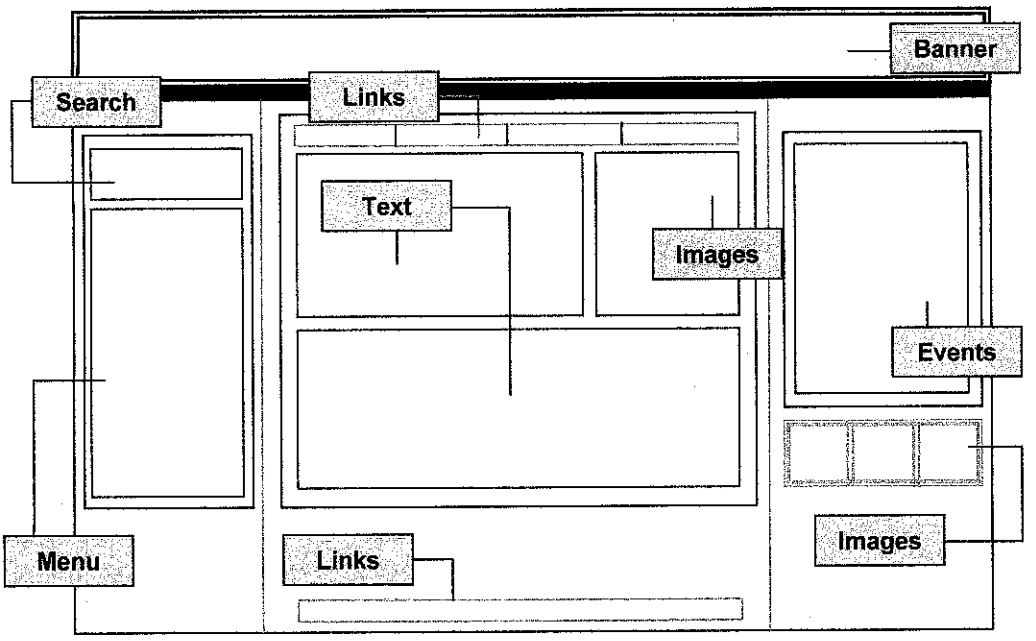
Attraction's main page



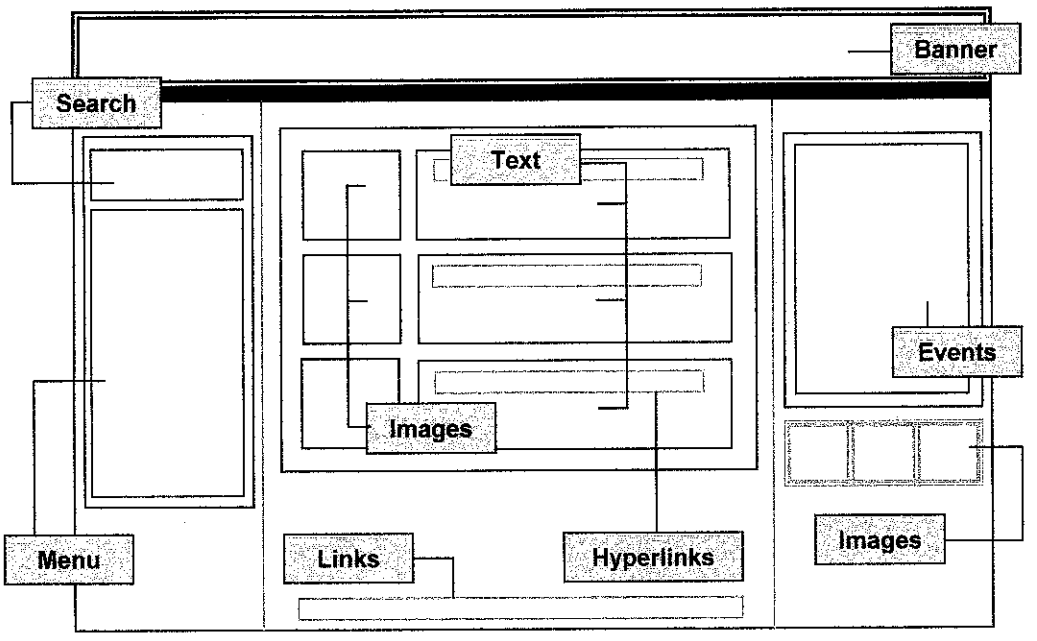
Travel's Toolkit's main page



Accommodation's main page



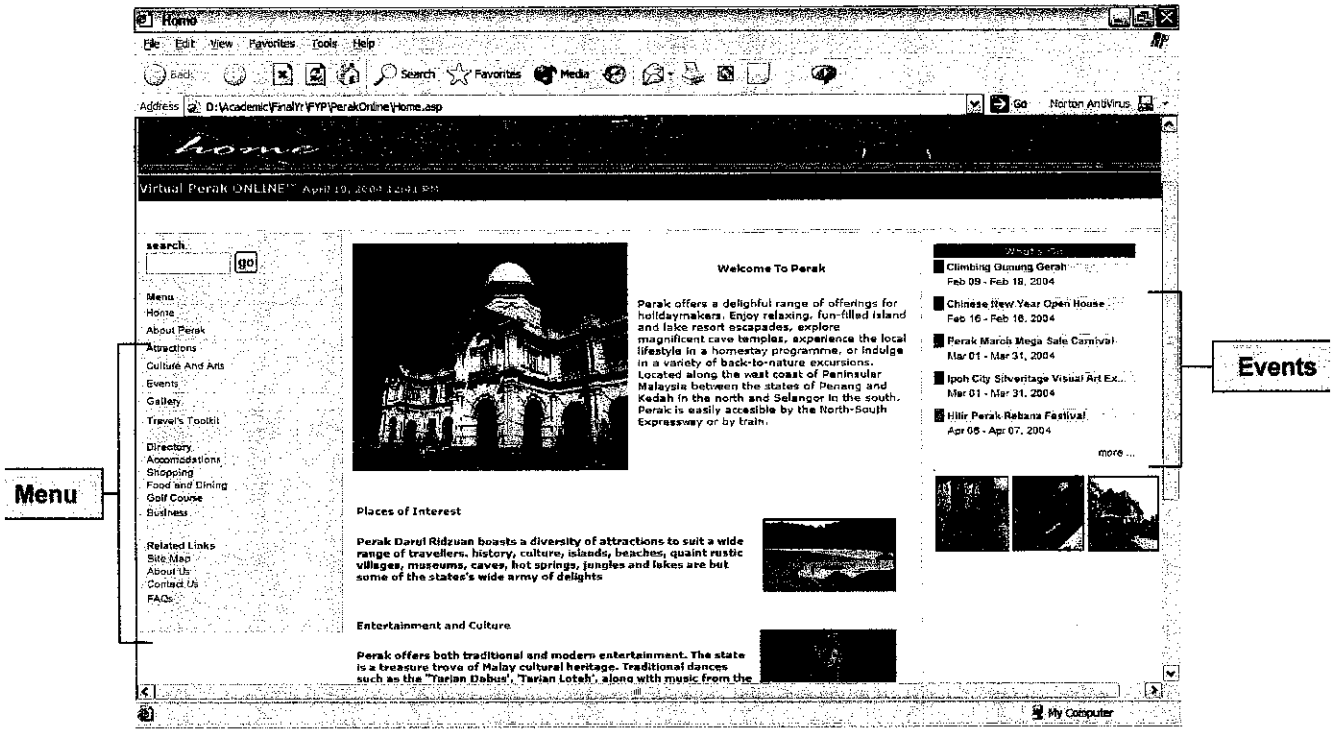
Main page for the About Perak



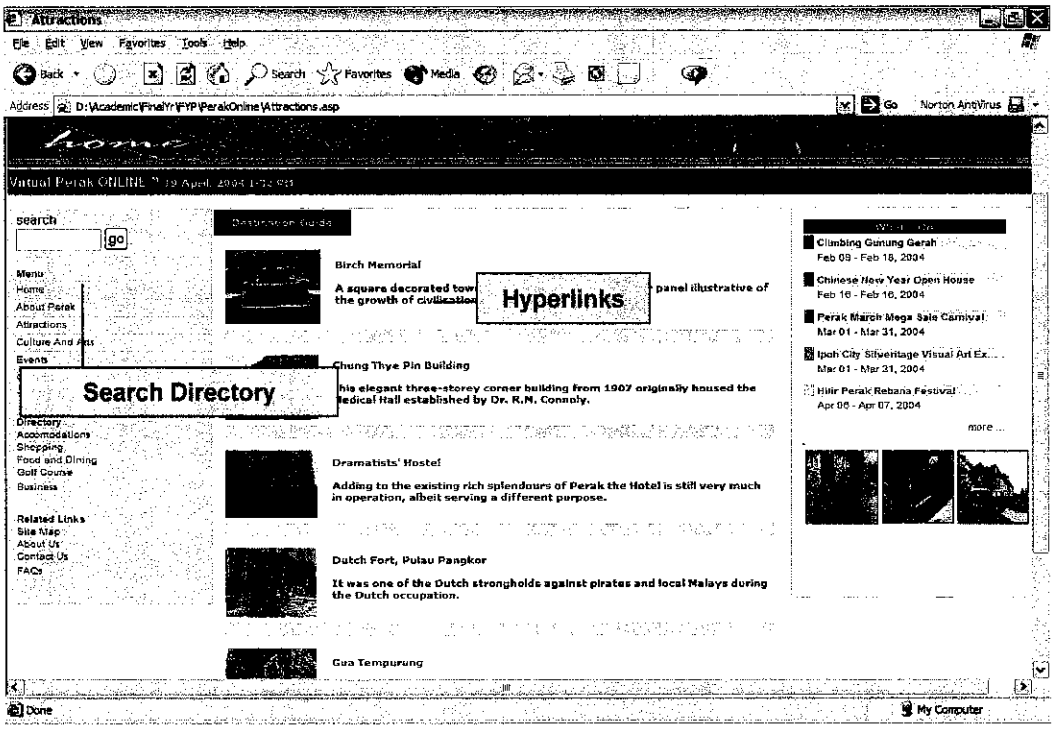
Culture and Art's main page

APPENDIX M

PRINTSCREENS OF VIRTUAL PERAK ONLINE PROTOTYPE



Main page for the Virtual Online Perak (Home)



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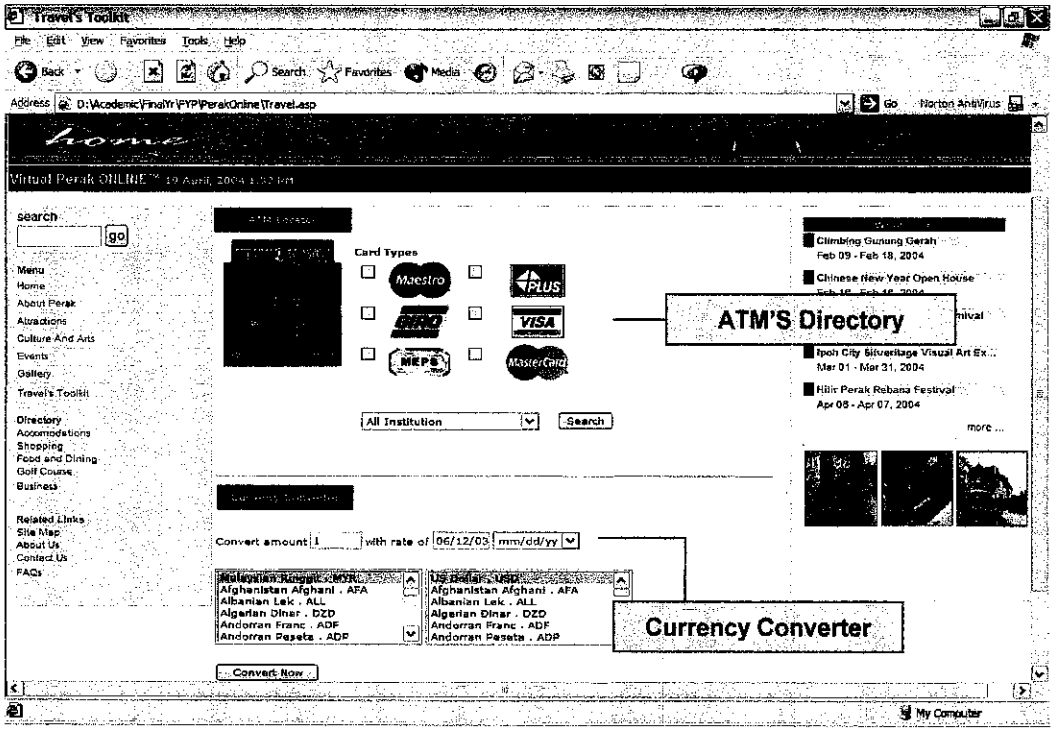
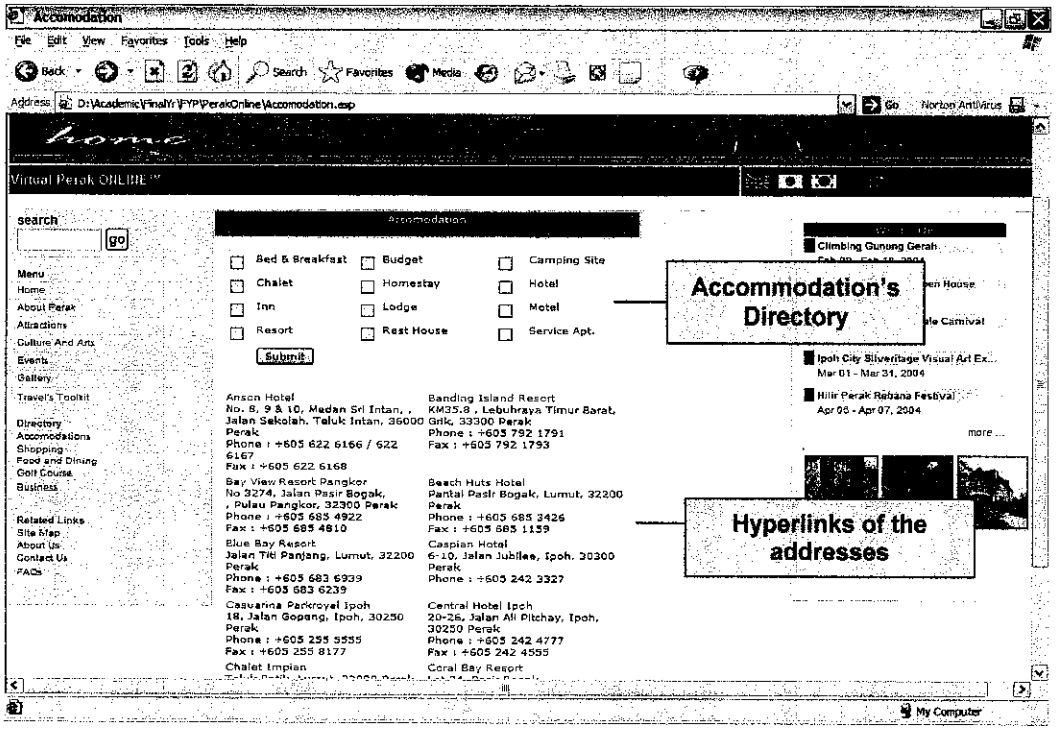


Travel's Toolkit's main page



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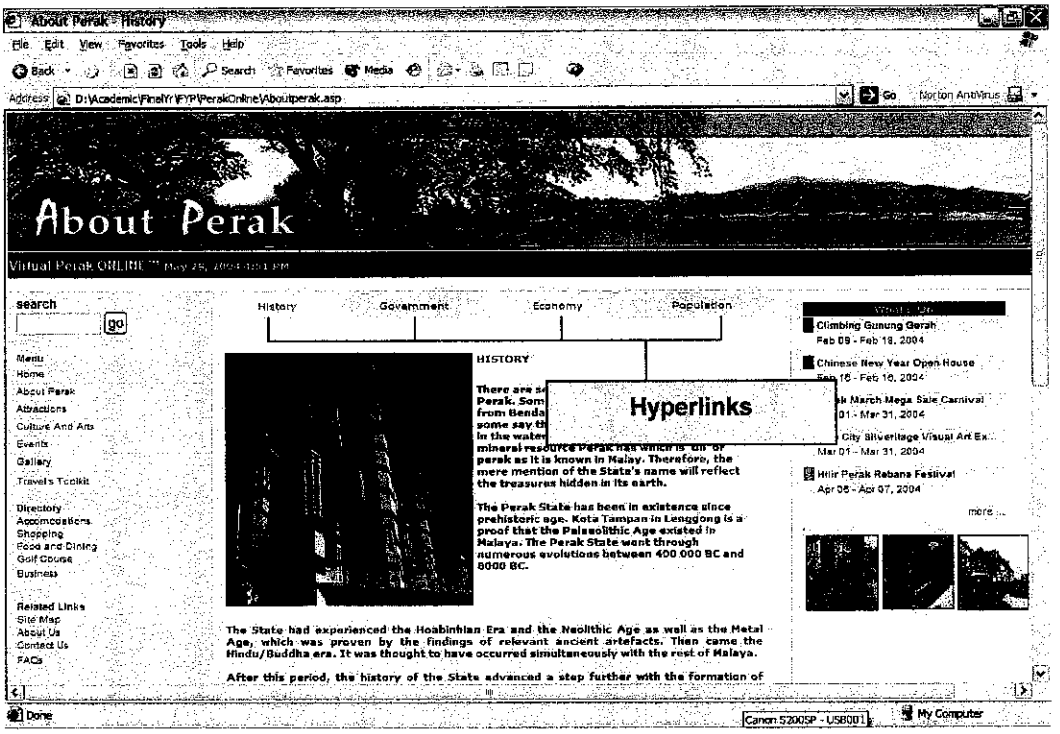
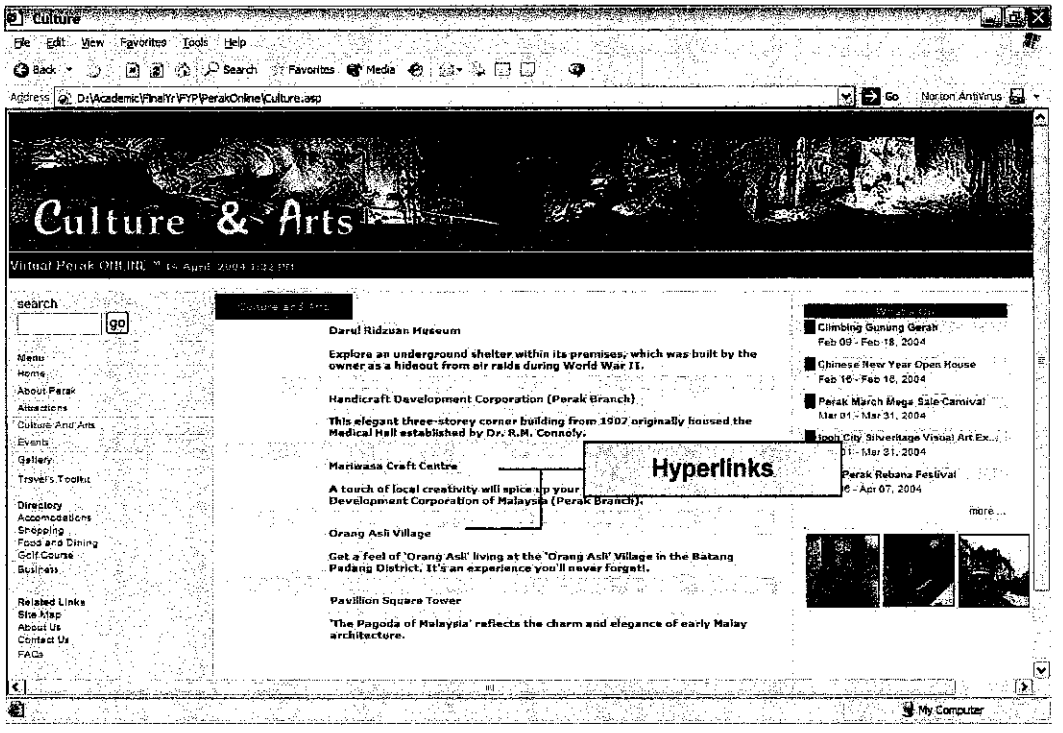
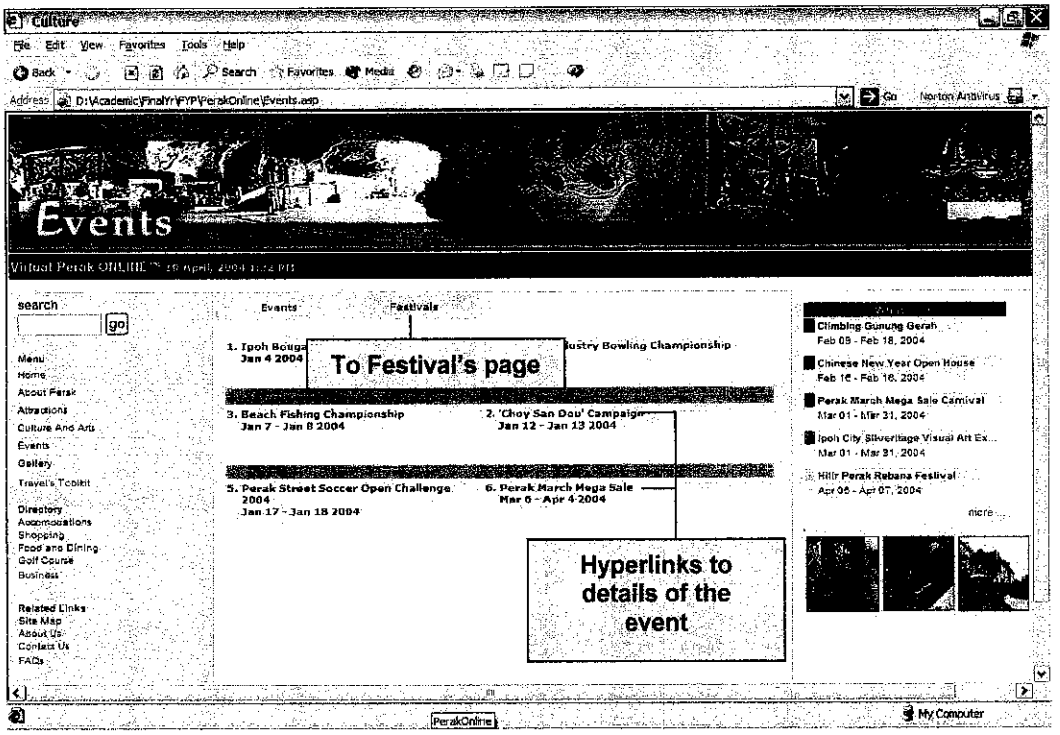


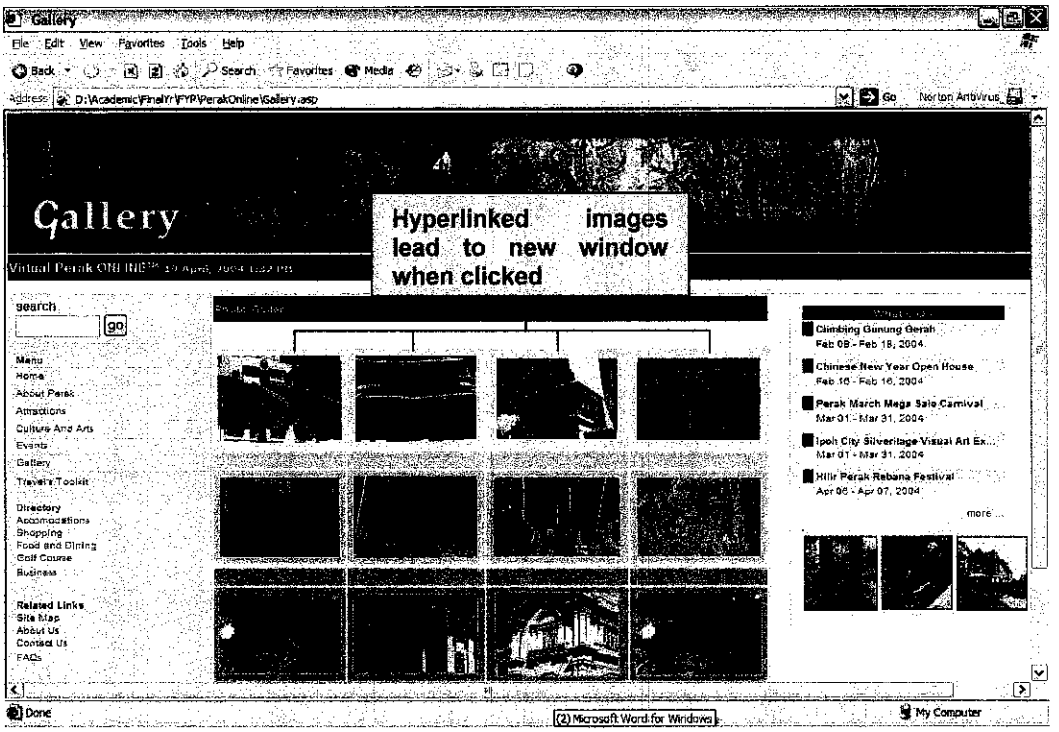
About Perak's main page



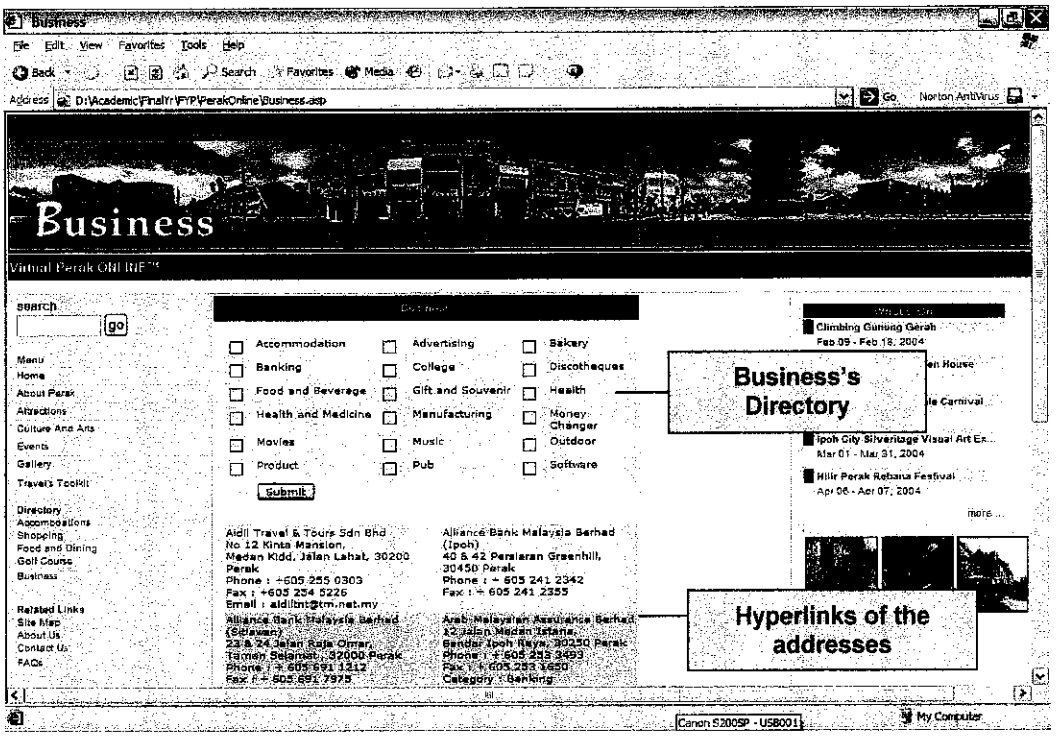
Culture and Art's main page

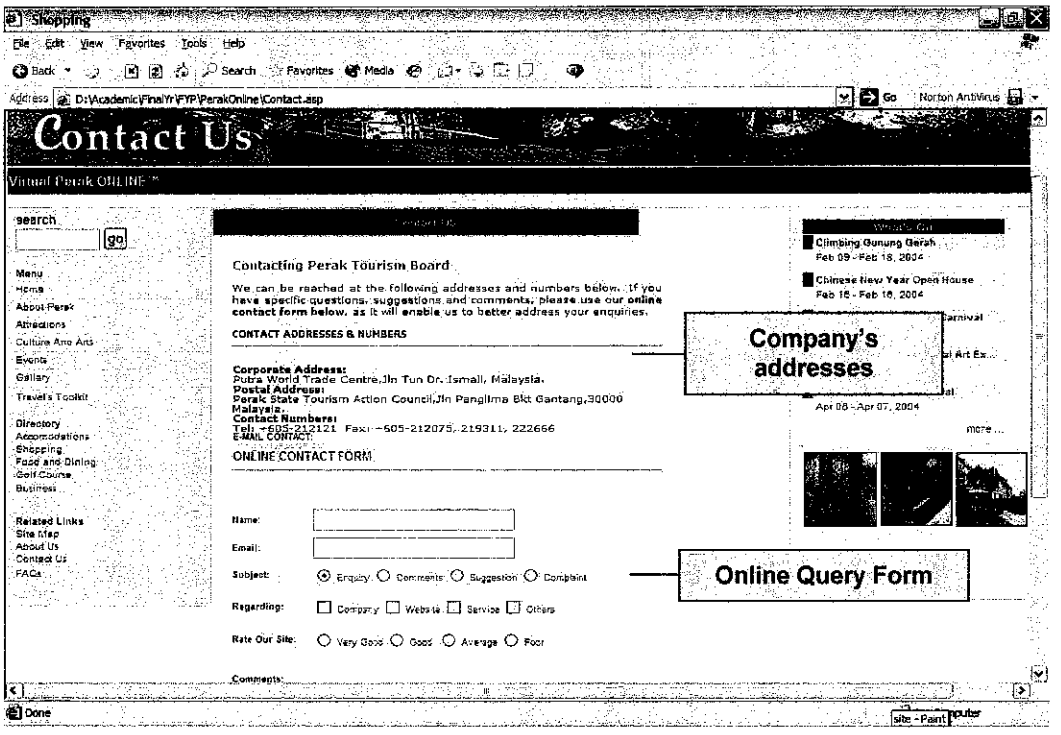


Event's main page

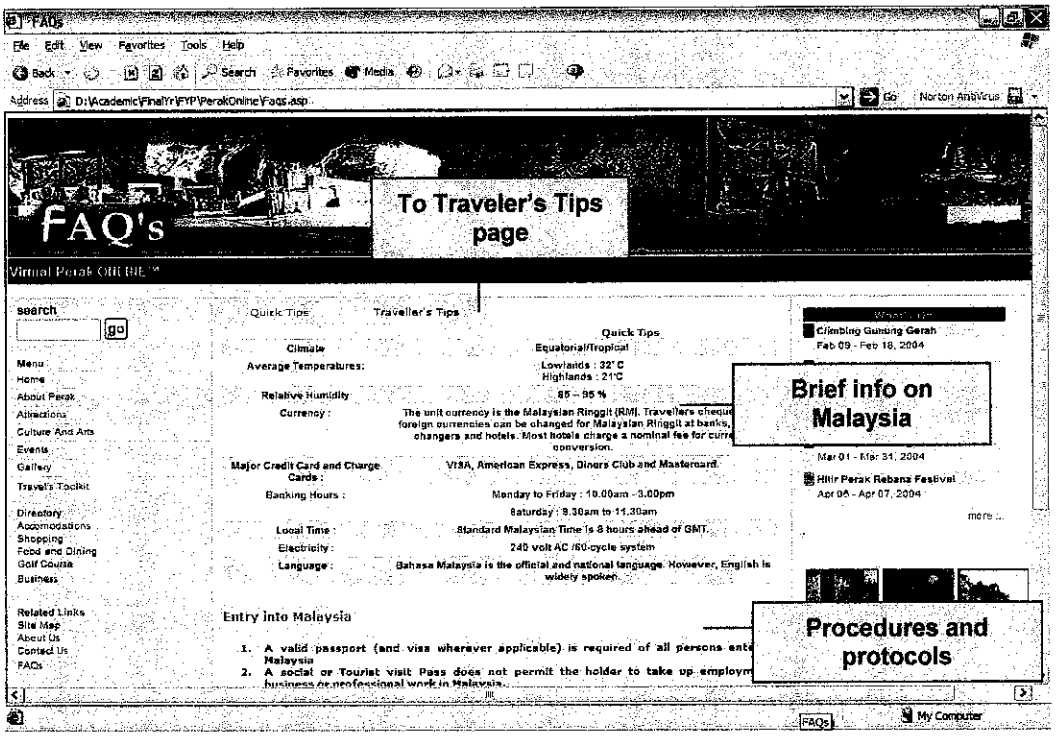


Gallery's main page

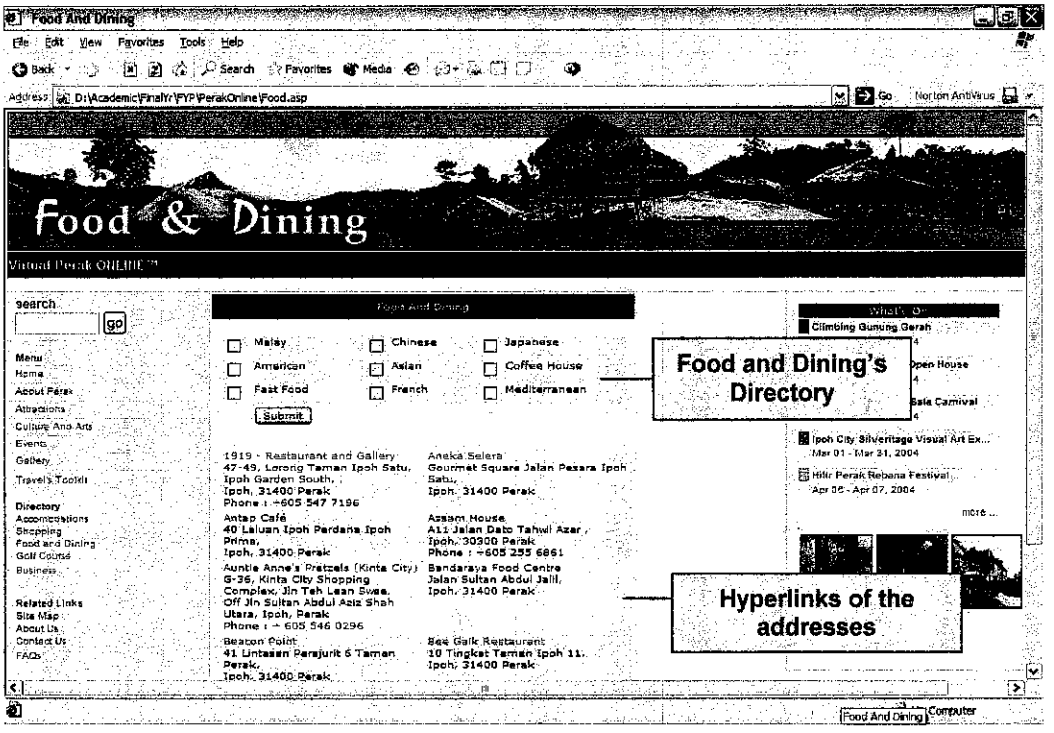




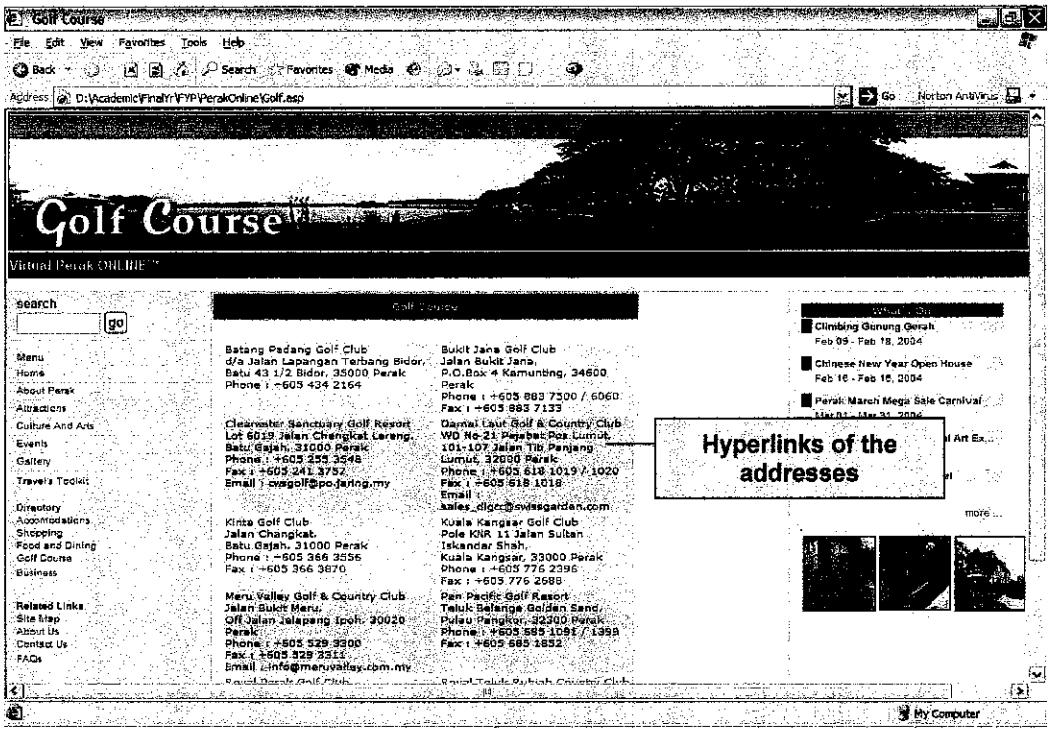
Contact Us's main page



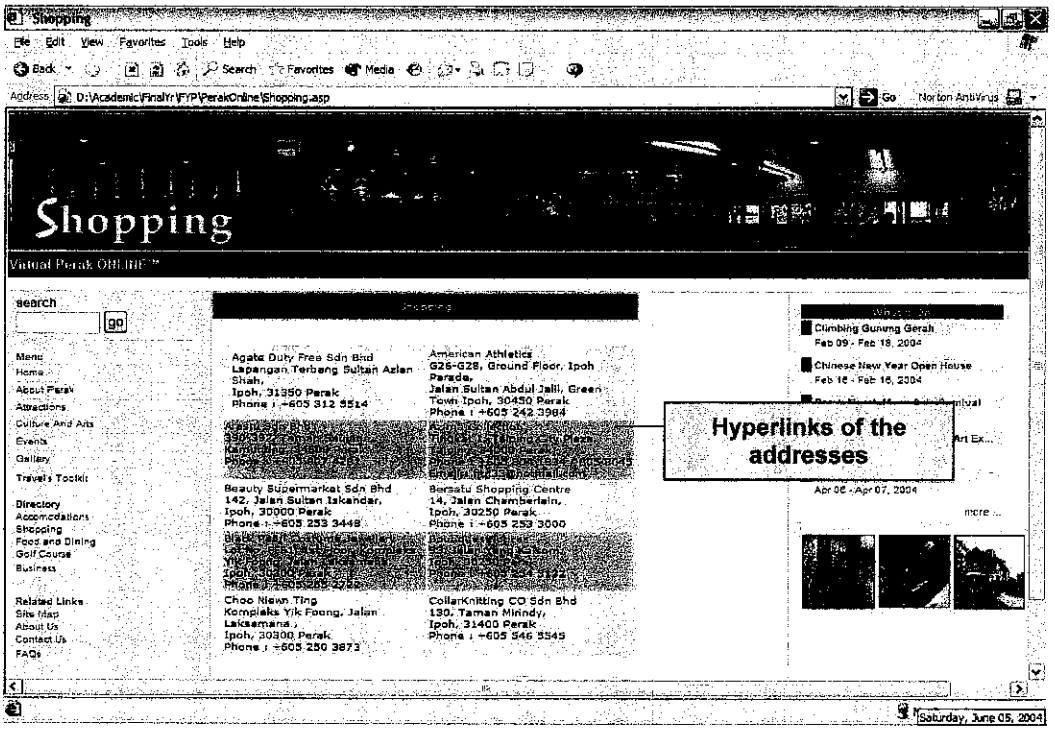
FAQ's main page



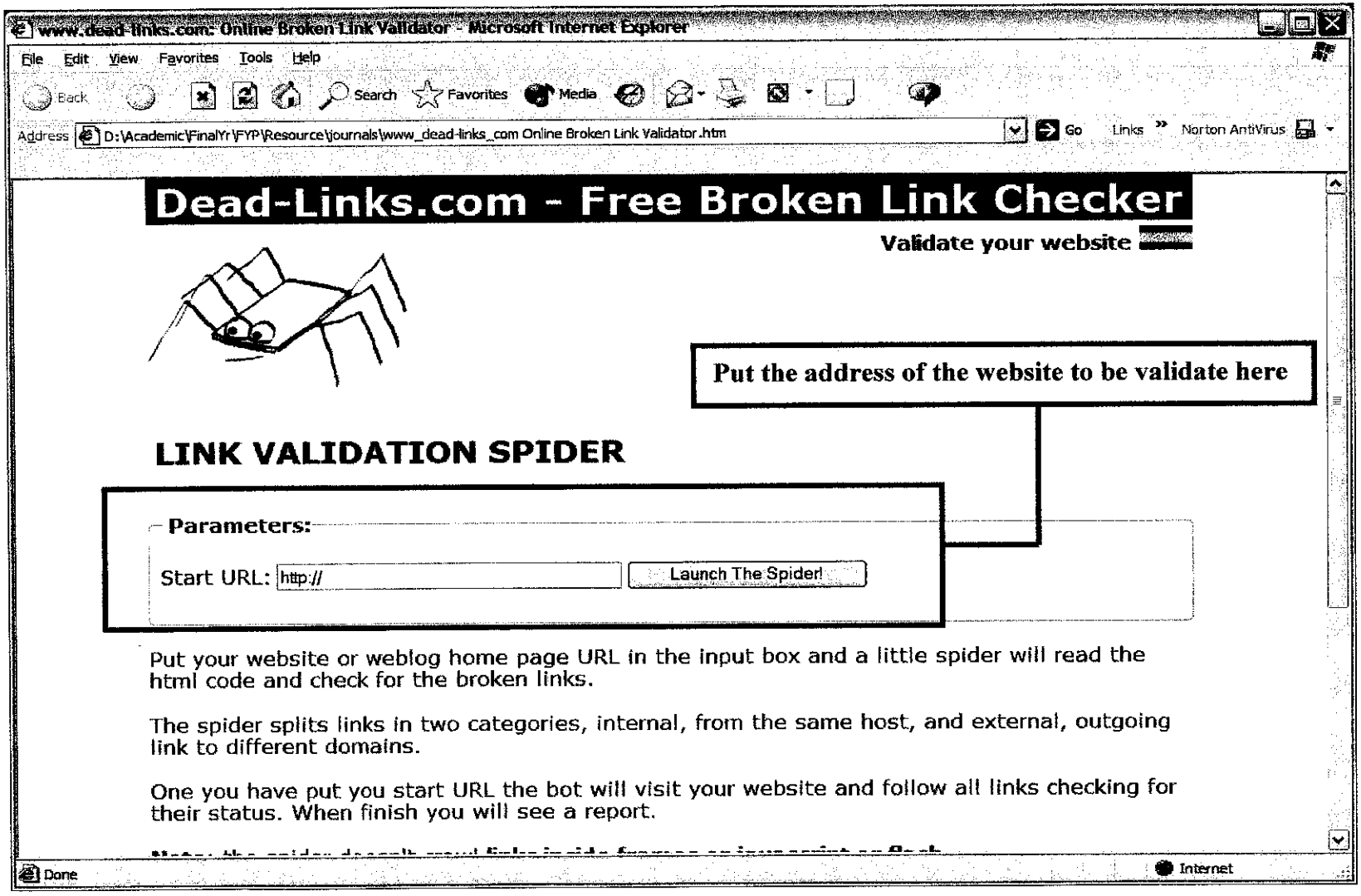
Food and Dining's main page



Golf Course's main page



Shopping's main page



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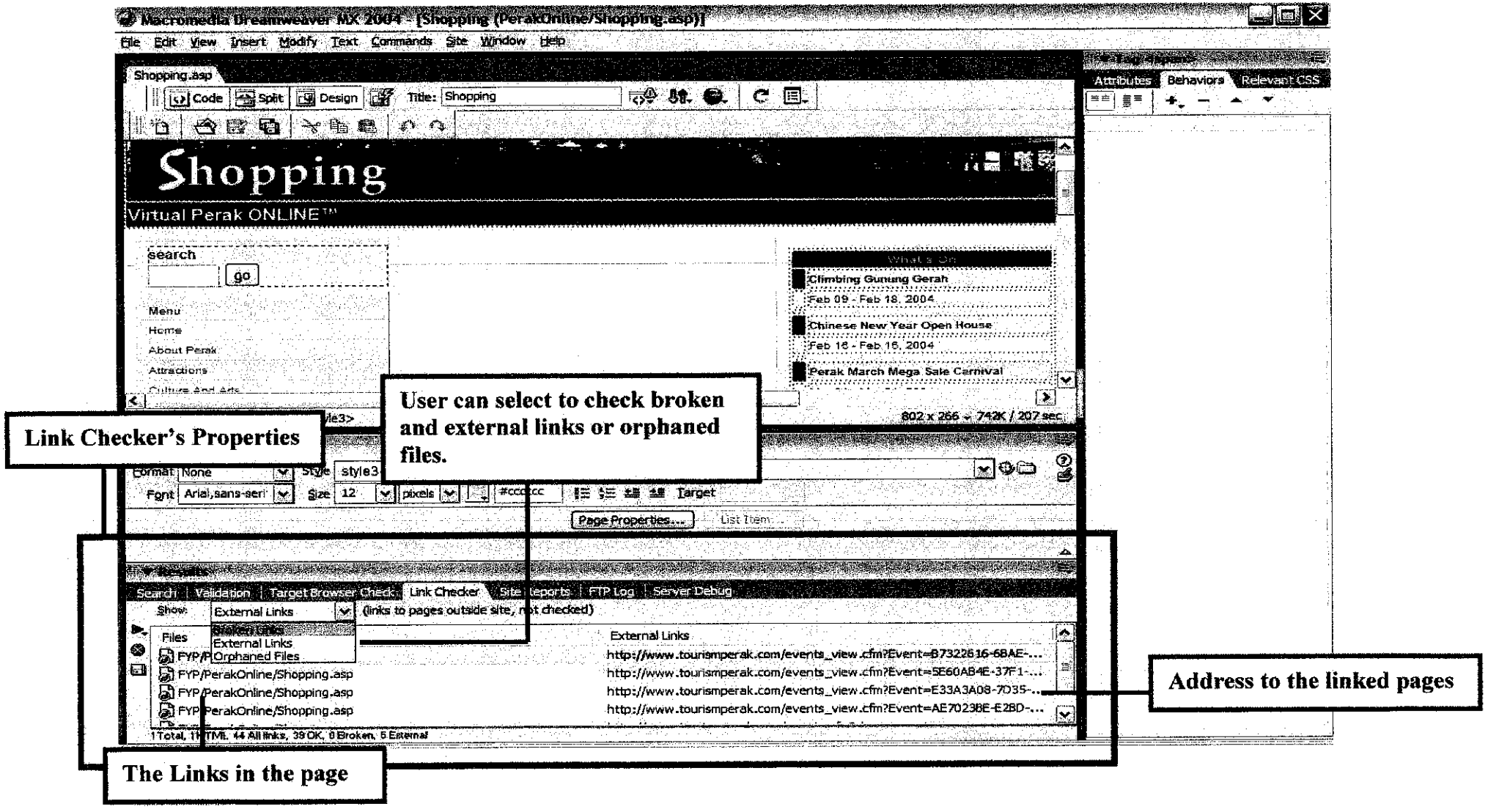

Print screen of the Macromedia Dreamweaver MX 2004 Link Checker's properties on Shopping's page