Federal Website Accessibility
ETL-0204

An Interactive Qualifying Project report
submitted to

The Faculty of
WORCESTER POLYTECHNIC INSTITUTE

In partial fulfillment of the requirements for the
Degree of Bachelor of Science

By

William Chin

Approved:

Professor Eleanor T. Loiacono, Advisor

Professor Scott McCoy, Advisor

WPI

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Abstract

The purpose of this project is to assess a number of federal and federally sponsored contractors' websites to determine if the sites met federal regulations governing disabled website accessibility. Research was performed that dealt with the federal regulations involved with website accessibility using programs designed for website analysis. The primary departments that were analyzed belonged in each of the three branches of government, in addition to federally sponsored contractors.

After garnering results of the analysis, the branch of government that has the most errors overall is the Legislative Branch, most predominately the websites belonging to the Senate. Surprisingly, although webmasters of federal websites are required to produce federally compliant sites, many fall short of that goal.

Finally, as a result of interviews and assessments, a report has been constructed that detailed what needs to be done in addition to a sample website which is accessible under the laws and guidelines set forth by the US government.

Executive Summary

This project's goal is to increase awareness of website accessibility by looking at government sites which are required by law to be accessible. Anyone should be able to access them, including disabled individuals, and the websites should accommodate them in order to give everyone equal opportunity using the Internet. Using the Workforce Investment Act of 1998, Public Law 105-220, Title IV of the Act is the Rehabilitation Act Amendments of 1998. Subsection 408(b) amended section 508 of the Rehabilitation Act of 1973 (29 U.S.C. 794d). Subsection 508 requires that when federal departments and agencies develop, maintain, or use Electronic and Information Technology (EIT), they shall ensure that the EIT allows federal employees with disabilities to have access to and use of information and data that is comparable to the access to and use of information and data by other federal employees. This means that each person should get a equal opportunity to use and access information, from the Internet or from other electronic sources. Section 508 also requires that individuals with disabilities, who are members of the public seeking information or services from a Federal department or agency, have access to and use of information and data that is comparable to that provided to the public without disabilities.

Websites should also adhere to the President's "New Freedom Initiative," in which the Department of Labor has awarded five new grants totaling $10.3 million to help provide employment and training services to persons with disabilities. The proposal entails greater opportunities for accessing assistive and universal technologies, in addition to expanding educational opportunities and the incorporation of disabled individuals into daily community life.

This project has examined the websites in the three branches of government, in addition to the federally sponsored websites with "Bobby," a web accessibility software tool designed to help expose and repair barriers to accessibility and encourage compliance with existing accessibility guidelines. Using Bobby, analysis has been performed on the webpages to see if they meet the Section 508 and the Web Content Accessibility Guidelines (WAI). Using the results from Bobby, a report has been drafted detailing the errors and how they could be fixed, in order to create an easily accesible environment for disabled individuals who want to access federal information.

In regards to the final results, the branch of government that has the most errors overall is the Legislative Branch, most predominately the websites belonging to the senators, with an overall average of 30 percent of the total errors in all of the branches. The federal contractors were not far behind with 28 percent of the overall errors. The Representatives were next, with 19 percent of the errors, followed by the Judicial Branch and the Executive Branch, with 17 percent and 5 percent, respectively.

The last addition to the project is a webpage that has been setup showcases sites that will provide more information on these and other learning assistive technology programs and accessibility interest groups, such as the Association for Computing Machinery - Special Interest Group on Computers and the Physically Handicapped (ACM – SIGCAPH).

1 Introduction

Today, there are more than 54 million Americans living with a disability, representing a full 20 percent of the U.S. population (The Initiative, 2002). Unfortunately, many of these Americans have a difficult time trying to access the global information resource known as the Internet. There are various reasons that many websites are not compliant. Many developers do not have enough time to produce compliant websites; they are not being educated in disability compliance or worst of all, they do not care enough to produce compliant websites, falsely believing that disabled individuals account for a minority of the total number of people using the Internet, which is untrue, as evidenced earlier. This project has the ultimate goal of informing federal and federally sponsored websites on their ability to conform to the guidelines. The project, therefore, assesses the websites of three branches of the government, in addition to federally sponsored websites to see if they adhere to accessibility guidelines: Section 508 of the U.S. Code and WAI.

The number of people who will benefit from this project will be numerous. For instance, the compliant website that was designed in conjunction with this project will serve as an example of correct implementation of federal website compliance for webmasters of federal websites who wish to pursue total federal compliance. In addition, the information on the website will be a "stepping stone" to assist other people who wish to further study and expound on this subject.

Furthermore, the end users that are the focus of this project, i.e. disabled individuals and older individuals, will indirectly benefit from this project as well, through federal website compliance by the government websites.

The Background chapter (Chapter 2) of this document presents information on different regulations that govern website disability compliance, and the different types of software that are used to determine website accessibility. The Methodology chapter (Chapter 3) outlines the procedures to determine federal compliance in the websites. The Results chapter (Chapter 4) of the project outlines the data collected through the checks, as well as interviews and observations conducted, in addition to a detailed assessment of the data collected within the project. The Recommendations chapter outlines some advice on how to make websites become federally compliant, including a sample web page displaying procedures to becoming federally compliant. Finally, the Conclusion (Chapter 5) summarizes the project as a whole, and proposes future studies incorporating this project as a starting point through the website and the recommendations made in this report.

2 Literature Review

This chapter is a compilation of research and knowledge in the area of website compliance as they apply to the specific websites examined. The following sections present an overview of material that must be considered in order for this project to be successful. These include the organizations involved, and the laws, regulations, and agencies that pertain to all aspects of website compliance.

Information about the organizations involved provided a general basis on which to build the rest of the project. In addition, the laws, regulations, and agencies that relate to federal website compliance are considered since the laws form the foundation for a compliant website.

2.1 Section 508

The American with Disabilities Act (ADA) sets the guidelines for businesses and the government in how they should accommodate disabled individuals. However, this law does not cover website accessibility in detail. This is done by the Workforce Investment Act of 1998, Public Law 105-220. Title IV of the Act is the Rehabilitation Act Amendments of 1998. Subsection 408(b) amended section 508 of the Rehabilitation Act of 1973 (29 U.S.C. 794d).

> Section 508 requires that when Federal departments and agencies develop, maintain, or use Electronic and Information Technology (EIT), they shall ensure that the EIT allows Federal employees with disabilities to have access to and use of information and data that is comparable to the access to and use of information and data by other Federal employees. Each person should get an equal opportunity to use and access information, from the Internet, or any other electronic forms of receiving information (Section508.gov, 2002).

However, there are exceptions to this law. These standards exempt systems used for military command, weaponry, intelligence, and crypto logic activities but not routine business and administrative systems used for other defense-related purposes or by defense agencies or personnel. The standards also exempt "back office" equipment used only by service personnel for maintenance, repair, or similar purposes.

These standards cover technology procured by federal agencies under contract with a private entity, but apply only to those products directly relevant to the contract and its deliverables. An exception clarifies that the standards do not apply to technology that is incidental to a federal contract. Thus, those products that are not specified as part of a contract with a federal agency would not have to comply with the standards. For example, a firm that produces a report for a federal agency under a contract would not have to procure accessible computers and word processing software even if they were used exclusively for the contract; however, compliance would be required if such products were to become the property of the Federal agency as contract deliverables or if the federal agency purchased the products to be used by the contractor as part of the project. If a federal agency contracts with a firm to develop its website, the standards would apply to the new website for the agency but not to the firm's own website.

Section 508 not only covers personal computers, but other electronic information devices as well, such as:

- software applications and operating systems;
- web-based information or applications;
- telecommunication products;
- video and multimedia products; and
- self contained, closed products (e.g., information kiosks, calculators, fax machines, desktop and portable computers) (Section508.gov, 2002).

As for the feasibility of Section 508, many major federal departments are nearly Section 508 compliant, such as http://www.whitehouse.gov (which incidentally has one major error that needs to be fixed in order to be federally compliant). However, there are numerous smaller departments that still have some major problems in terms of accessibility, in terms of how many critical errors the website have.

However, there are many advocacy groups and websites, such as the Accessibility forums (http://accessibilityforum.org/) which advocates the standardization of Section 508 and other law compliance. Another noteworthy item to mention pertaining to Section 508 is the Department of Justice's report on the current state of Federal web accessibility, which is very similar to the research performed in this project, which uses Section 508 laws to perform its own analysis.[1]

2.2 New Freedom Initiative

Another very important federal initiative started by President George W. Bush is the "New Freedom Initiative," announced on February 1, 2001. The main goals of this plan which are targeted towards disabled individuals are to increase access to assistive and universally designed technologies, expand educational opportunities, promote homeownership, integrate Americans with disabilities into the workforce, expand transportation options, and promote full access to community life. The main components that make up this plan are listed in Appendix A.

This initiative encompasses not only the technology aspects, i.e. the Internet and other forms of electronic devices, but also the daily aspects of life, such as the workforce,

[1] http://www.usdoj.gov/crt/508/report/webatbl.htm

schools and other aspects of community life. President Bush hopes to fully integrate disabled individuals into daily life, and to give them opportunities that a non-disabled person would have. Although the methods to apply these initiatives are different from Section 508, they do have the same goals in mind: to integrate and to give disabled individuals the same opportunities as non-disabled individuals. It may seem like a large undertaking, but it was already put into effect when President Bush started the initiative. Through the President's Initiative, the Supreme Court passed the *Olmstead v. L.C. Decision*, which interpreted Title II of the Americans with Disabilities Act (ADA) and its implementing regulation, requiring States to administer their services, programs, and activities "in the most integrated setting appropriate to the needs of qualified individuals with disabilities" (The Initiative, 1999).

2.3 SIGCAPH / Special Interest Groups

Other initiatives were started by prominent and influential groups, such as the Association for Computing Machinery (ACM), which has a subgroup called the Special Interest Group on Computers and the Physically Handicapped (SIGCAPH), which promotes the professional interests of computing professionals interested in the research and development of computing and information technology to help people. The SIGCAPH membership focuses on the application of technology to all kinds of disabilities, including but not limited to: sensory (hearing and vision); motor (orthopedic); cognitive (learning, speech, mental); emotional personnel with physical disabilities, and the application of computing and information technology in solving relevant disability problems. The SIGCAPH also strives to educate the public to support careers for the disabled (ACM SIGCAPH). Every two years, they hold an Annual ACM

Conference on Assistive Technologies, called ASSETS, which focuses on developing ideas and products that might help disabled individuals in terms of computing and information technologies, most notably for Internet usage.

2.4 Website Accessibility Software

In order to perform the analysis necessary for this report, an assessment software must be used to analyze and format the results for implementation into the report and the website.

There are many types of assessment software in the industry today, such as Crunchy Technology's PageScreamer, the University of Toronto Adaptive Technology Resource Centre's A-Prompt, and HiSoftware's AccVerify, as well as a few "home-grown" programs and Java applets that perform almost the same functions as the commercial products in assessing Section 508 compliance, such as the Coast Guard's Section 508 compliance software, written by John Brown, a member of the Coast Guard. Although they each do an admirable job of analyzing and reporting errors, the software that this project will use exclusively is called BOBBY.

2.5 BOBBY

BOBBY is a comprehensive web accessibility software tool designed to help expose and repair barriers to accessibility and encourage compliance with existing accessibility guidelines. BOBBY was created by CAST, a not-for-profit research and development organization, whose main goal is to design solutions to expand the possibilities for disabled individuals through computer technology[1].

[1]Recently, BOBBY has been purchased by Firefly Software, a for-profit company.

First released in September 1996, BOBBY was originally based on guidelines developed by the Trace Research and Development Center. BOBBY is designed for developers to test web pages and generate summary reports highlighting the most critical issues affecting site accessibility before posting to the Web or to Intranets (BOBBY website).

As for support for different languages, BOBBY does assess some websites in different languages, such as Chinese, since BOBBY checks for errors within the underlying code of the web page, not the language set itself. When running a preliminary check on http://chinese.yahoo.com, there was no mention of a language problem, just assessiblility problems.

3 Methodology

The ultimate goal of this project is to analyze and assess the current state of federal websites. In addition, a website was developed to illustrate the proper usage of federal website assessiblity standards.

The primary objectives of this project are:

- Analyze and evaluate websites that belong in the federal government in addition to federally sponsored contractors.
- Identify the number of errors and the type of error in each website.
- Propose measures to fix the errors.
- Design a website showcasing proper federal website assessibility complaince.

The rest of this chapter is divided into sections that illustrate the methods and procedures used to complete these objectives. *Domain of Inquiry* specifies the precise boundaries of the issues addressed in the project. *Spatial Coverage* depicts the spatial extent of the study and displays the websites that were investigated. *Explanation of Priorities* explains each priority in BOBBY in detail. *Professional Resources* lists the people who have been spoken to or interviewed in regards to this project. Finally, *Development of a Plan for Website Accessibility* illustrates the steps that will be taken to assess each website and design a website that is federally compliant.

3.2 Domain of Inquiry

The concentration of this project is to assess each federal website and to propose solutions to remedy the problems. This includes the recommendations of proper website

design through the use of a sample website that is federally compliant, i.e. containing no 508 and WAI errors whatsoever.

3.3 Spatial Coverage

This project focuses primarily on the websites of the three branches of government (Executive, Legislative, and Judicial) and the federally sponsored contractor's websites. The full list of departments that were be assessed is located in Appendix B.

3.4 Explanation of Priorities

The priorities are split into four sections: Priority 1, 2, 3 and Section 508 compliance. Priority 1 Accessibility problems seriously inhibit a site's usability by individuals with disabilities. A Bobby Approved rating can only be granted to a site in which all pages are free of accessibility errors. The User Checks are listed and should be taken into account if any of the checks apply to the website in question. Bobby Approved status is equivalent to Conformance Level A for the Web Content Guidelines.

Priority 2 Accessibility errors are those which a webmaster should attempt to fix. Although not as important as Priority 1 access errors, the items in this section are important for access. If the website can pass this section in addition to Priority 1, including relevant User Checks, the site meets Conformance Level AA for the Web Content Guidelines. This is the preferred minimum level for an accessible site.

Priority 3 Accessibility problems are, although not as critical as Priority 1 and 2, should be addressed as well. If the website passes all of the Priorities, including relevant User Checks, the site meets Level AAA for the Web Content Guidelines.

Section 508 Accessibility problems are part of the U.S. Section 508 Final Rule. Most of these items are related to WAI Web Content Accessibility Guidelines, though guidelines with different levels of priority receive equal priority here.

Table 1 shows the possible errors listed in each category that are most commonly found in the websites that were tested. Desciptions of each error are listed in Appendix C.

Table 1: Priority Errors

Priority 1
Provide alternative text for all image-type buttons in forms.
Provide alternative text for all images.
Give each frame a title.
Provide alternative text for all image map hot-spots (AREAs).
Provide alternative text for each APPLET.
Priority 2
Use relative sizing and positioning (% values) rather than absolute (pixels).
Use a public text identifier in a DOCTYPE statement.
Make sure event handlers do not require use of a mouse.
Explicitly associate form controls and their labels with the LABEL element.
Do not use the same link phrase more than once when the links point to different URLs.
Do not cause a page to refresh automatically.
Provide a NOFRAMES section when using FRAMEs.
Include a document TITLE.
Nest headings properly.
Create link phrases that make sense when read out of context.
Avoid scrolling text created with the MARQUEE element.
Priority 3
Provide a summary for tables.
Identify the language of the text.
Include default, place-holding characters in edit boxes and text areas.
Separate adjacent links with more than whitespace.
Include a document TITLE.
Use a public text identifier in a DOCTYPE statement.
Client-side image map contains a link not presented elsewhere on this page.
508
Provide alternative text for all image-type button in forms.
Provide alternative text for all images.
Explicitly associate form controls and their labels with the LABEL element.
Include default, place-holding characters in edit boxes and text areas.
Identify the language of the text.
Give each frame a title.
Provide alternative text for all image map hot-spots (AREAs).
Provide alternative text for each APPLET.

3.5 Professional Resources

Conducting interviews with accessibility and disability specialists along with Web experts provided information on common procedures used to assist people with

disabilities. Speaking to the specialists clarified details of various accessibility plans and how various institutions apply them. Interviewing people mainly within WPI determined additional factors to consider in assessing the websites and constructing the sample website.

3.5.1 Project Advisors

3.5.1.1 Professor Eleanor T. Loiacono

Professor Loiacono is a professor in the Department of Management at WPI, and one of two advisors for this project. Her advice propelled this project along in times when the writing stood at a standstill. Through the papers she has written and her thorough knowledge on the subject of website accessibility, she has provided aid in the background research on this project.

3.5.1.2 Professor Scott McCoy

Professor McCoy is a professor in the Department of Management at WPI, and the second advisor for this project. His expertise on website development and management was helpful when designing the project website, and often gave tips on how to improve the look, feel, and ease of navigation on the website.

3.5.3 Joanne Van Dyke

Joanne Van Dyke is the Head of Disabled Services at WPI. Ms. Van Dyke's primary responsibilities are to make sure that disabled individuals within WPI have equal access to educational resources that non-disabled individuals have, and provides aid to disabled individuals in class. Ms. Van Dyke has offered her expert opinion on disablility

issues in WPI, and has recommended various sources of information pertaining to the research at hand. Ms. Van Dyke has graciously provided an interview illustrating various procedures and practices dealing with disability access within the WPI campus. A transcript of the interview is provided in Appendix C.

3.5.4 Amy Marr

Amy Marr is the Manager of Web Development at WPI. Mr. Marr's primary responsibilities are to oversee website maintenance and development at WPI, including website accessibility. Her help on advising whether the website is WPI and federally compliant is invaluable, and her insights to website accessibility were helpful during the background research.

3.5.5 Webmasters

Webmasters from various federal websites were gracious enough to provide responses to the e-mail sent to them. The questions asked were concentrated on steps taken to develop an accessible website, and the programs involved in the analysis of website accessibility.

3.6 Development of a Plan for Website Accessibility

The overall objective of this project is to assess federal websites (listed in Appendix A) and determine what needs to be remedied, as well as designing a website to illustrate correct implementation of the federal guidelines. Before the start of the assessment, research was conducted to determine what regulations were needed to be followed, and what software to use to perform the assessment. This section presents the methods used for assessment and the layout of the sample website.

3.6.1 Methods of Assessment

The websites that were assessed were broken down as follows. First, there will be an assessment of federal websites, which will further be broken down into the three different branches of government. The reason behind choosing the websites of the three branches of government as the representatives of the federal websites was that the core of the federal government falls in these three branches. The method that these sites were chosen was through a random number generator at http://www.random.org.

After the federal websites were assessed, the federally sponsored contractors' websites were assessed. In examining and assessing each website, BOBBY was used to assess the websites. When a website is run through BOBBY (see Figure 1), a summarized listing of errors is displayed. To garner more detail on the errors, a link to an error page is brought up on the browser and displays each error in detail (see Figure 2). Each of the errors was recorded and displayed in a spreadsheet.

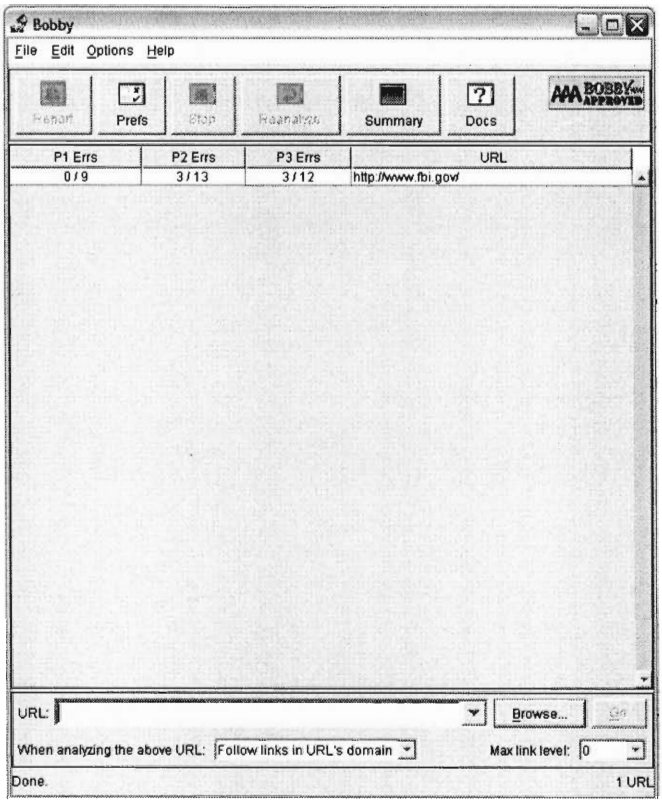

Figure 1: BOBBY Software

BOBBY WorldWide

ResearchWare® by CAST Copyright © 1996-2001 CAST, Inc.

URL tested: http://www.fbi.gov/, April 15, 2003 5:17:41 PM EDT
Bobby Core v4.0, WAI Content Accessibility Guidelines 1999/05/05, Support Level: AAA

About this report

Repair Needed This page does not yet meet the requirements for Bobby AAA Approved status. To be Bobby AAA Approved, a page must pass all of the Priority 1,2 and 3 accessibility checkpoints established in W3C Web Content Accessibility Guidelines 1.0. For more information on the report, please read "How to Read the Bobby Report".

Priority 1 Accessibility

Priority 1 User Checks

User checks are triggered by something specific on the page; however, you need to determine whether they apply. Bobby AAA Approval requires that none of them apply to your page. Please review these **6** item(s):

1. Provide alternative content for each SCRIPT that conveys important information or functionality.
2. If style sheets are ignored or unsupported, are pages still readable and usable?
3. If you use color to convey information, make sure the information is also represented another way. *(47 instances)*
   Lines 48, 49, 50, 51, 53, 54, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 74, 94, 95, 142, 143, 144, 145, 146, 151, 155
4. If this is a data table (not used for layout only), identify headers for the table rows and columns. *(5 instances)*
   Lines 52, 59, 95, 93, 141
5. If an image conveys important information beyond what is in its alternative text, provide an extended description. *(21 instances)*
   Lines 49, 50, 51, 53, 60, 61, 62, 63, 65, 66, 67, 68, 69, 70, 74, 94, 143, 144, 145, 151, 155
6. If a table has two or more rows or columns that serve as headers, use structural markup to identify their hierarchy and relationship. *(11 instances)*

Figure 2: Detailed Listing of BOBBY Report

3.6.2 Web Site Layout

The website was set up to give others who are interested in this subject more information and other sources to conduct their own research. The web site will be set up as follows.

The website will have all its sections on one single page, since it was deduced that it would be easier to read and easier to print out if the user wishes to do so. In the menu, it will first have a link to the abstract describing the project in basic terms. It will then have a link to the executive summary describing the project in more detail. Additionally, it will have the actual link to the IQP project report, in which the user will have to send a request via e-mail in order to access the report. The final link will be to the listing of links that will aid the user to find more information for further research.

3.6.3 IQP Timeline

A very important step in completing the IQP was establishing a timeline of work that was to be performed during the three terms. During Term B, all of the background research was performed, determining which websites will be analyzed and what programs will be used to assess the sites. During Term C, the websites chosen to be assessed were analyzed with the BOBBY software. During Term D, a website was created to give others who are interested in this subject more information and other sources. Follow up interviews were conducted, as well, and finally, the written IQP report was completed. The Gantt Chart listing the tasks is provided in Appendix D.

4 Results

This chapter outlines the data the team obtained during the accessibility study. The Executive Branch Assessment Section details the results of the Executive Branch of the government. The Legislative Branch Assessment Section will detail the results for the Legislative Branch of the government. The Judicial Branch Assessment Section will detail the results for the Judicial Branch of the government. The Federal Contractors Assessment Section will detail the results for the federally sponsored contractors' website analysis. The number of sites analyzed for each section are as follows:

Table 2: Number of Sites Analyzed

Department	Number of Sites	
Executive Branch	20	
Legislative Branch		
Representatives	100	
Senators	100	
Judicial Branch	100	(selected from random sample of 237 total sites)
Federal Contractors	100	(selected from a list of the top 100 contractors)

Tables 3 and 4 are sample spreadsheets used to calculate the results presented in this chapter. Table 3 records the number of Priority 1, 2, and 3 errors within each website, in addition to the number of recommended items to check. Table 4 displays the numbers of instances a certain type of error has occurred within a certain website.

Table 3: Summary of Errors (Example)

Choice	Website	WAI Errors					
		Priority 1		Priority 2		Priority 3	
		Access	Check	Access	Check	Access	Check
1	Lockheed Martin Corp.	0	3	2	8	1	8
2	United Space Alliance LLC	1	8	2	13	3	12
3	Computer Science Corp.	0	9	4	17	4	13
4	Boeing Co.	0	4	0	11	1	9

Table 4: Detailed List of Errors (Example)

BRANCH OF GOVERNMENT **NOTE:** The Numbers stand for the number of instances the given error has occurred.	**1**	**2**	**3**
Priority 1			
Provide alternative text for all image-type buttons in forms.			
Provide alternative text for all images.		1	
Give each frame a title.			
Provide alternative text for all image map hot-spots (AREAs).			
Provide alternative text for each APPLET.			
Priority 2			
Use relative sizing and positioning (% values) rather than absolute (pixels).		6	8
Use a public text identifier in a DOCTYPE statement.	1	1	
Make sure event handlers do not require use of a mouse.			9
Explicitly associate form controls and their labels with the LABEL element.			1
Do not use the same link phrase more than once when the links point to different URLs.			5
Do not cause a page to refresh automatically.			
Provide a NOFRAMES section when using FRAMEs.			
Include a document TITLE.	1		
Nest headings properly.			
Create link phrases that make sense when read out of context.			
Avoid scrolling text created with the MARQUEE element.			
Priority 3			
Provide a summary for tables.		7	12
Identify the language of the text.	1	1	1
Include default, place-holding characters in edit boxes and text areas.			1
Separate adjacent links with more than whitespace.		1	
Include a document TITLE.			
Use a public text identifier in a DOCTYPE statement.			
Client-side image map contains a link not presented elsewhere on this page.			
508			
Provide alternative text for all image-type button in forms.			
Provide alternative text for all images.			
Explicitly associate form controls and their labels with the LABEL element.			
Include default, place-holding characters in edit boxes and text areas.			
Identify the language of the text.			
Give each frame a title.			
Provide alternative text for all image map hot-spots (AREAs).			
Provide alternative text for each APPLET.			

4.1 Final Tally Percentages

The sites that have the greatest percentage of the total number of instances would be the senators websites, with 30 percent. In addition, the senators websites have the greatest number of websites that have the errors, with 27 percent of the total (see Table 5).

Table 5: Final Tally of Priority Errors

Department	Number of instances	Percentage (Instances)	Number of single errors	Percentage (Single errors)
Executive Branch	1623	5%	113	4%
Representatives	5616	19%	590	23%
Senators	8544	30%	697	27%
Judicial Branch	4785	17%	527	20%
Federal Contractors	8176	28%	641	25%
Total	**28744**	**100%**	**2568**	**100%**

Tables 6 and 7 displays the particular branches which having the greatest number of total instances and websites with the greatest number of errors within each Priority.

Table 6: Department with Greatest Number of Error Instances

Priority	Department	Number of errors
Priority 1	Federal Contractors	2066
Priority 2	Legislative Branch (Senators)	5063
Priority 3	Legislative Branch (Senators)	1639

Table 7: Department with Greatest Number of Priority Errors

Priority	Department	Number of errors
Priority 1	Legislative Branch (Senators)	111
Priority 2	Legislative Branch (Senators)	311
Priority 3	Legislative Branch (Senators)	375

It is apparent that the largest number of errors are in the Legislative Branch, with 27% of the Senate and 23% of the Representatives websites having errors. This compared to 4% of the Executive Branch, and 20% of the Judicial Branch having errors. Finally, federal contractors had 25% of the priority errors.

4.2 Executive Branch Assessment

All websites examined can be found in Appendix B. The most predominant Priority 1 error in the Executive Branch websites was the "Provide alternate text for all images," with a total number of instances equalling 59 errors, or 5 sites. The most predominant Priority 2 error by far was the "Use relative sizing and positioning (% values) rather than absolute (pixels)" which equaled to 938 instances, or 18 sites. The most predominant Priority 3 error was "Provide a summary for tables," which equaled 212 instances, or 18 sites. Coming close is "Separate adjacent links with more than whitespace," with 210 errors, or 14 sites.

Table 8: Executive Branch Errors

	Number of instances	Percentage (Instances)	Number of single errors	Percentage (Single errors)
Priority 1	61	4%	6	5%
Priority 2	1117	68%	53	47%
Priority 3	445	27%	54	47%
Total	**1623**	**100%**	**113**	**100%**

4.3 Legislative Branch Assessment

In this section, the results for the representatives and the senators are outlined. For the representatives, the predominant Priority 1 error for the Legislative Branch (see Appendix B) was "Provide alternative text for all images," with a total of 753 errors, or 60 sites that have this error. The predominant Priority 2 error was "Use relative sizing and positiioning (% values) rather than absolute (pixels)," with a total of 2897 errors, or 83 sites that have this error. In addition, although "Use a public text identifier in a DOCTYPE statement" has a total of 85 errors, a total of 80 sites have this error. The predominant Priority 3 error was "Provide a summary for tables," with a total of 639 errors, or 84 sites that have this error. However, "Identify the language of the text," although it has only 99 instances of this error appearing, it has a total of 85 sites that have this error, which means one more site has this error than the one above.

The senators errors are listed as follows. The predominate Priority 1 error was the "Provide alternative text for all images," with a total of 1692 errors, or 77 sites that have this error. The predominant Priority 2 error was "Use relative sizing and positiioning (% values) rather than absolute (pixels)," with a total of 4080 errors, or 92 sites that have this error. The predominant Priority 3 error was "Provide a summary for tables," with a total of 782 errors, or 92 sites that have this error. However, "Identify the language of the text," although it has only 97 instances of this error appearing, it has a total of 94 sites that have this error, which means two more sites has this error than the one above.

Through the analysis, it has shown the sites of the representatives have less total errors and less total instances of each error than the sites belonging to the senators.

Table 9: Legislative Branch (Representatives) Errors

	Number of instances	Percentage (Instances)	Number of single errors	Percentage (Single errors)
Priority 1	892	16%	83	14%
Priority 2	3459	62%	266	45%
Priority 3	1265	23%	241	41%
Total	**5616**	**100%**	**590**	**100%**

Table 10: Legislative Branch (Senators) Errors

	Number of instances	Percentage (Instances)	Number of single errors	Percentage (Single errors)
Priority 1	1842	22%	111	16%
Priority 2	5063	59%	311	45%
Priority 3	1639	19%	275	39%
Total	**8544**	**100%**	**697**	**100%**

4.4 Judicial Branch Assessment

The most predominant Priority 1 error in the Judicial Branch websites (see Appendix B) was the "Provide alternate text for all images," with a total number of instances equalling 451 errors, or 55 sites. The most predominant Priority 2 error by far was the "Use relative sizing and positioning (% values) rather than absolute (pixels)" which equaled to 2642 instances, or 72 sites, compared to 362 instances, or 30 sites, to the next highest tally, which is "Make sure event handlers do not require use of a mouse." The most predominant Priority 3 error was "Separate adjacent links with more than whitespace," which equaled 518 instances, or 72 sites. However, the error with the greater amount of sites having the error was "Identify the language of the text," which had 94 sites with the error, even though it has 94 total instances.

Table 11: Judicial Branch Errors

	Number of instances	Percentage (Instances)	Number of single errors	Percentage (Single errors)
Priority 1	570	12%	88	17%
Priority 2	3175	66%	215	41%
Priority 3	1040	22%	224	43%
Total	**4785**	**100%**	**527**	**100%**

4.5 Federal Contractor Assessment

The most predominant Priority 1 error in the Federal Contractors websites (see Appendix B) was the "Provide alternate text for all images," with a total number of instances equalling 1943 errors, or 62 sites. The most predominant Priority 2 error by far was the "Use relative sizing and positioning (% values) rather than absolute (pixels)" which equaled to 3260 instances, or 84 sites, compared to 832 instances, or 50 sites, to the next highest tally, which is "Make sure event handlers do not require use of a mouse." However, the second highest amount of sites to have a certain error was not the one listed above. It was "Use a public text identifier in a DOCTYPE statement," with 69 sites having that error. The most predominant Priority 3 error was "Provide a summary for tables," which equaled 911 instances, or 81 sites. However, the error with the greater amount of sites having the error was "Identify the language of the text," which had 87 sites with the error.

Table 12: Federal Contractor Errors

	Number of instances	Percentage (Instances)	Number of single errors	Percentage (Single errors)
Priority 1	2066	25%	90	14%
Priority 2	4585	56%	294	46%
Priority 3	1525	19%	257	40%
Total	**8176**	**100%**	**641**	**100%**

5 Conclusion

During this project various resources were used to assess and evaluate the current status of federal websites. Laws and regulations regarding website accessibility were studied to better understand accessibility concerns. In addition, the different types of web accessibility software were reviewed. The most versatile one, B.O.B.B.Y., was chosen to perform the website analysis of all sites.

Federal or federally sponsored contractors' websites must be compliant to the Website Accessibility Initiative (WAI) as well. There are three tiers to compliance. Priority 1 is what the websites should be most concerned about, since those are the most critical errors that need repair. It was surprising to observe the myriad of Priority 1 errors in the websites, predominantly in the Legislative Branch of the government (with 14160 errors, or 49 percent of the total errors). The branch with the least errors was the Executive Branch (with 1623 errors, or 5 percent of the total errors), undercutting the Legislative Branch by very large margin.

The errors in each of the websites are easily remedied. The most prevalent Priority 1 error, "Provide alternate text for all images," can easily be fixed by adding an <alt> tag after the graphic to produce mouseover text when the cursor goes over the picture. The <alt> tag is very important because individuals with a visual impairment use a text to speech translator to read the websites aloud. These <alt> tags are used to describe the graphic. If a certain graphic does not have an <alt> tag, the translator will not register the graphic and the user will not be aware that a graphic exists. The most prevalent Priority 2 error, "Use relative sizing and positioning (% values) rather than absolute (pixels)" can be fixed by using percentage scales on the graphic instead of using

an absolute size, such as pixel or inch measurements. The rationale behind this is for two reasons: web content should be able to flow into differently sized viewing areas, and users may need to change the size of the text on a page. Various viewing sizes and devices are used, from large monitors to tiny screens on handheld devices, and the content should appear appropriately. When absolute position and length units are used, this will not happen. Across the range of viewing areas, users need to be able to change the size of the text in order to compensate for the resolution or size of their device, or because of a visual impairment. This is not possible if a fixed font is used. The most prevalent Prevalent 3 errors are "Provide a summary for tables" and "Identify the language of the text." To add a "summary" to each table, the webmaster would use the following sample code:

```
  <TABLE border="border" summary="This table charts the number of cups
of coffee
      consumed by each senator, the type of coffee (decaf or regular),
and whether
      taken with sugar.">
    <CAPTION> Cups of coffee consumed by each senator </CAPTION>
    <!--table cells here-->
  </TABLE>
```

The code for determining the language of the page is handled by adding in the following code:

```
<HTML lang="en">
<HEAD> <TITLE>An English Document.</TITLE> </HEAD>
```

The "summary" attribute is important because it describes the table's structure and purpose when the table itself cannot be read, but the tag is not normally displayed to visual users. The rationale behind the language tag is it helps the computer present

information in a way that is appropriate to the language that is displayed on the web page, and it also helps automatic translation software that translates text from one language into another.

Additionally, a website was designed to highlight this IQP and provide links to other resources for website accessibility (see Figure 3).

Federal Website Accessibility

William Chin

Advisor: Professor Eleanor T. Loiacono
Advisor: Professor Scott McCoy

Interactive Qualifying Project IQP-ETL-0204

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Abstract

The purpose of this project is to assess a number of federal and federally sponsored contractors' websites to determine if the sites met federal regulations governing disabled website accessibility. Research was performed that dealt with the federal regulations involved with website accessibility using programs designed for website analysis. The primary departments that were analyzed belonged in each of the three branches of government, in addition to federally sponsored contractors. As a result of interviews and assessments, a report has been constructed that detailed what needs to be done in addition to a sample website detailing the improvements.

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Figure 3: IQP Website

Hopefully, the webmasters of the various federal websites would heed the information within this project, and design websites that are truly accessible to any and all individuals wishing to seek the information on their websites. In addition, this report in conjunction with the resources in the website should hopefully be helpful to the persons who decide to perform additional research on this subject.

The implications on disabled users and society in general if websites are more accessible are very significant. One aspect would be online sales and e-commerce. If more e-tailers were accessible, then they would have a whole other base of customers to sell to, garnering more profits. Another aspect would be e-government. For example, filing online tax returns. Even if the forms are online, if the site is not accessible to disabled users, then it would be useless for them since they cannot utilize this convenience. Another example would be renewing driver's licenses and automobile registrations. Even though it is possible to perform those actions online, if the site were more accessible, then those individuals would have another option if they have difficulty leaving their homes. A more general application would be accessing Frequently Asked Questions (FAQs), or even basic contact information. If the user needs to contact the webmaster, it would be difficult if the only contact was through telephone, considering if the user was hearing impaired. Designing the website to be accessible would save the user time and aggravation if they wish to find this information.

Having a website that is accessible has very important implications which not only affect the users, but society in general. The Internet and everything connected to it will be changed drastically for the better if all sites heeded the federal regulations for website accessibility.

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Appendix A

Shown below is the President's Initiative given by President George W. Bush in regards to website accessibility for the disabled. (Note that this is taken in verbatim.)

Increasing Access to Assistive and Universally Designed Technologies:

- Federal Investment in Assistive Technology Research and Development. The Administration will provide a major increase in the Rehabilitative Engineering Research Centers' budget for assistive technologies, create a new fund to help bring assistive technologies to market, and better coordinate the Federal effort in prioritizing immediate assistive and universally designed technology needs in the disability community.

- Access to Assistive Technology. Assistive technology is often prohibitively expensive. In order to increase access, funding for low-interest loan programs to purchase assistive technologies will increase significantly.

Expanding Educational Opportunities for Americans with Disabilities:

Increase Funding for the Individuals with Disabilities Education Act (IDEA). In return for participating in a new system of flexibility and accountability in the use of Federal education funds, states will receive an increase in IDEA funds for education at the local level and help in meeting the special needs of students with disabilities.

- Focus on Reading in Early Grades. States that establish a comprehensive reading program for students, including those with disabilities, from preschool through second grade will be eligible for grants under President Bush's Reading First and Early Reading First Initiatives.

- Integrating Americans with Disabilities into the Workforce

- Expanding Telecommuting. The Administration will provide Federal matching funds to states to guarantee low-interest loans for individuals with disabilities to purchase computers and other equipment necessary to telework from home. In addition, legislation will be proposed to make a company's contribution of computer and Internet access for home use by employees with disabilities a tax-free benefit.

- Swift Implementation of "Ticket to Work." President Bush has committed to sign an order that directs the federal agency to swiftly implement the law giving Americans with disabilities the ability to choose their own support services and maintain their health benefits when they return to work.

- Full Enforcement of the Americans with Disabilities Act (ADA). Technical assistance will be provided to promote ADA compliance and to help small businesses hire more people with disabilities. The Administration will also promote the Disabled Access Credit, an incentive program created in 1990 to assist small businesses comply with the Act.

- Innovative Transportation Solutions. Accessible transportation can be a particularly difficult barrier for Americans with disabilities entering the workforce. Funding will be provided for 10 pilot programs that use innovative approaches to developing transportation plans that serve people with disabilities. The Administration will also establish a competitive matching grant program to promote access to alternative methods of transportation through community-based and other providers.

Promoting Full Access to Community Life:

- Promote Homeownership for People with Disabilities. Congress recently passed the "American Homeownership and Economic Opportunity Act of 2000," which will permit recipients with disabilities to use up to a year's worth of vouchers to finance the down payment on a home. The Administration will work to swiftly implement the recently enacted law.

- Swift Implementation of the Olmstead Decision. President Bush has committed to sign an order supporting the most integrated community-based settings for individuals with disabilities, in accordance with the Olmstead decision.

- National Commission on Mental Health. President Bush has committed to create a National Commission on Mental Health, which will study and make recommendations for improving America's mental health service delivery system, including making recommendations on the availability and delivery of new treatments and technologies for individuals with severe mental illness.

- Improving Access. Federal matching funds will be provided annually to increase the accessibility of organizations that are currently exempt from Title III of the ADA, such as churches, mosques, synagogues, and civic organizations. The Administration also supports improving access to polling places and ballot secrecy for people with disabilities. (www.whitehouse.gov)

Appendix B

Shown below are the sites that were analyzed using Bobby.

Judicial Sites

California Southern District Court	Oklahoma Western District Court	California Southern Pretrial Services
Kentucky Western Probation Office	Utah Bankruptcy Court	Missouri Eastern Bankruptcy Court
Michigan Eastern Bankruptcy Court	Wyoming Bankruptcy Court	Missouri Eastern District Court
Michigan Eastern District	Alabama Middle Bankruptcy Court	Illinois Southern Bankruptcy Court
Ohio Southern District Court	Alabama Southern District Court	Illinois Southern District Court
Ohio Southern Probation	Court of Appeals 11th Circuit	Federal Magistrate Judges Secretaries Association
Massachusetts District Court	Florida Middle District Court	Louisiana Western District Court
New Hampshire Bankruptcy Court	Florida Southern District Court	Louisiana Middle Bankruptcy Court
New York Western District Court	Georgia Middle Bankruptcy Court	Pennsylvania Middle District Court
Vermont Bankruptcy Court	Georgia Southern District Court	Montana Bankruptcy Court
New Jersey Pretrial Services	DC Bankruptcy Court	Northern Mariana Islands District Court
Pennsylvania Eastern Bankruptcy Court	DC District Court	Office of the Circuit Executive
Pennsylvania Eastern District Court	Federal Public Defender	Oregon District Court
North Carolina Western District Court	Association of Bankruptcy Judicial Assistants	Washington Eastern Bankruptcy Court
South Carolina Bankruptcy Court	Commission on Structural Alternatives for the Federal Courts	Washington Western District Court
Virginia Western District Court	Court of Appeals for Veterans' Claims	Bankruptcy Appellate Panel of the Tenth Circuit
West Virginia Northern Bankruptcy Court	FirstGov	Colorado District Court
Texas Western District Court	Judicial Fellows Program	Kansas District Court
Kentucky Western Bankruptcy Court	Judicial Panel on Multi-District Litigation	New Mexico Bankruptcy Court
Illinois Central Bankruptcy Court	Montana District Court	New Mexico Probation Office
Illinois Central District Court	California Eastern District Court	Oklahoma Eastern Bankruptcy Court
Indiana Southern Probation Office	California Eastern Probation Office	Mississippi Southern Bankruptcy Court
Wisconsin Eastern Bankruptcy Court	California Northern Bankruptcy Court	Mississippi Southern District Court
Wisconsin Western District Court	North Dakota District Court	West Virginia Southern District Court
Arkansas Western District Court	South Dakota Bankruptcy Court	West Virginia Southern Probation Office
Iowa Southern District Court	Court of Appeals 8th Circuit	Court of Appeals 5th Circuit
Minnesota Bankruptcy Court	Iowa Northern Bankruptcy Court	Virgin Islands District Court
Missouri Western District and Bankruptcy Courts	Indiana Southern District Court	Court of Appeals 4th Circuit
Nebraska Bankruptcy Court	Indiana Southern Probation Office	Delaware District Court
Arizona District Court	Tennessee Middle Probation & Pretrial Services Office	New Jersey Bankruptcy Court
California Central Bankruptcy Court	Library of Congress	Rhode Island District Court
Guam District Court	U.S. Court of Appeals for the Armed Forces	New Hampshire District Court
Hawaii Bankruptcy Court	U.S. Court of Federal Claims	
Idaho Bankruptcy/District Court	U.S. Court of International Trade	

Legislative (Senators) Sites

	Domenici, Pete - (R - NM)	Mikulski, Barbara - (D - MD)
Clinton, Hillary - (D - NY)	Dorgan, Byron - (D - ND)	Miller, Zell - (D - GA)
Collins, Susan - (R - ME)	Durbin, Richard - (D - IL)	Murkowski, Lisa - (R - AK)
Akaka, Daniel - (D - HI)	Edwards, John - (D - NC)	Murray, Patty - (D - WA)
Alexander, Lamar - (R - TN)	Ensign, John - (R - NV)	Nelson, Bill - (D - FL)
Allard, Wayne - (R - CO)	Enzi, Michael - (R - WY)	Nelson, Ben - (D - NE)
Allen, George - (R - VA)	Feingold, Russell - (D - WI)	Nickles, Don - (R - OK)
Baucus, Max - (D - MT)	Feinstein, Dianne - (D - CA)	Pryor, Mark - (D - AR)
Bayh, Evan - (D - IN)	Fitzgerald, Peter - (R - IL)	Reed, Jack - (D - RI)
Bennett, Robert - (R - UT)	Frist, Bill - (R - TN)	Reid, Harry - (D - NV)
Biden, Joseph - (D - DE)	Graham, Bob - (D - FL)	Roberts, Pat - (R - KS)
Bingaman, Jeff - (D - NM)	Graham, Lindsey - (R - SC)	Rockefeller, John - (D - WV)
Bond, Christopher - (R - MO)	Grassley, Chuck - (R - IA)	Santorum, Rick - (R - PA)
Boxer, Barbara - (D - CA)	Gregg, Judd - (R - NH)	Sarbanes, Paul - (D - MD)
Breaux, John - (D - LA)	Hagel, Chuck - (R - NE)	Sessions, Jeff - (R - AL)
Brownback, Sam - (R - KS)	Harkin, Tom - (D - IA)	Shelby, Richard - (R - AL)
Bunning, Jim - (R - KY)	Hatch, Orrin - (R - UT)	Smith, Gordon - (R - OR)
Burns, Conrad - (R - MT)	Hollings, Ernest - (D - SC)	Snowe, Olympia - (R - ME)
Byrd, Robert - (D - WV)	Hutchison, Kay - (R - TX)	Specter, Arlen - (R - PA)
Campbell, Ben - (R - CO)	Inhofe, James - (R - OK)	Stabenow, Debbie - (D - MI)
Cantwell, Maria - (D - WA)	Inouye, Daniel - (D - HI)	Stevens, Ted - (R - AK)
Carper, Thomas - (D - DE))	Jeffords, James - (I - VT)	Sununu, John - (R - NH)
Chambliss, Saxby - (R - GA)	Johnson, Tim - (D - SD)	Talent, James - (R - MO)
Cochran, Thad - (R - MS)	Kohl, Herb - (D - WI)	Thomas, Craig - (R - WY)
Coleman, Norm - (R - MN)	Kyl, Jon - (R - AZ)	Voinovich, George - (R - OH)
Conrad, Kent - (D - ND)	Landrieu, Mary - (D - LA)	Warner, John - (R - VA)
Cornyn, John - (R - TX)	Lautenberg, Frank - (D - NJ)	Wyden, Ron - (D - OR)
Corzine, Jon - (D - NJ)	Leahy, Patrick - (D - VT)	
Craig, Larry - (R - ID)	Levin, Carl - (D - MI)	
Crapo, Michael - (R - ID)	Lincoln, Blanche - (D - AR)	
Daschle, Thomas - (D - SD)	Lott, Trent - (R - MS)	
Dayton, Mark - (D - MN)	Lugar, Richard - (R - IN)	
DeWine, Mike - (R - OH)	McCain, John - (R - AZ)	
Dole, Elizabeth - (R - NC)	McConnell, Mitch - (R - KY)	

Legislative (Representatives) Sites

Oberstar, James L., Minnesota, 8th	Wilson, Joe, South Carolina, 2nd	Kucinich, Dennis J., Ohio, 10th
Bishop Jr., Sanford D., Georgia, 2nd	Davis, Jim, Florida, 11th	Lahood, Ray, Illinois, 18th
Bishop, Timothy, New York, 1st	Wolf, Frank, Virginia, 10th	Lampson, Nick, Texas, 9th
Blackburn, Marsha, Tennessee, 7th	Woolsey, Lynn, California, 6th	Langevin, Jim, Rhode Island, 2nd
Blumenauer, Earl, Oregon, 3rd	Wu, David, Oregon, 1st	Lantos, Tom, California, 12th
Blunt, Roy, Missouri, 7th	Wynn, Albert, Maryland, 4th	Larsen, Rick, Washington, 2nd
Boehlert, Sherwood L., New York, 24th	Young, C.W. Bill, Florida, 10th	Larson, John B., Connecticut, 1st
Boehner, John A., Ohio, 8th	Gillmor, Paul, Ohio, 5th	Latham, Tom, Iowa, 4th
Bonilla, Henry, Texas, 23rd	Gingrey, Phil, Georgia, 11th	LaTourette, Steven C., Ohio, 14th
Bonner, Jo, Alabama, 1st	Gonzalez, Charlie A., Texas, 20th	Leach, Jim, Iowa, 2nd
Bono, Mary, California, 45th	Goode Jr., Virgil H., Virginia, 5th	Lee, Barbara, California, 9th
Boozman, John, Arkansas, 3rd	Goodlatte, Bob, Virginia, 6th	Levin, Sander, Michigan, 12th
Bordallo, Madeleine, Guam Delegate	Gordon, Bart, Tennessee, 6th	Lewis, Jerry, California, 41st
Boswell, Leonard, Iowa, 3rd	Goss, Porter, Florida, 14th	Miller, Jeff, Florida, 1st
Boucher, Rick, Virginia, 9th	Granger, Kay, Texas, 12th	Mollohan, Alan B., West Virginia, 1st
Boyd, Allen, Florida, 2nd	Graves, Sam, Missouri, 6th	Moore, Dennis, Kansas, 3rd
Bradley, Jeb, New Hampshire, 1st	Green, Gene, Texas, 29th	Moran, Jerry, Kansas, 1st
Brady, Kevin, Texas, 8th	Green, Mark, Wisconsin, 8th	Moran, Jim, Virginia, 8th
Brady, Robert, Pennsylvania, 1st	Greenwood, James C., Pennsylvania, 8th	Murphy, Tim, Pennsylvania, 18th
Brown, Corrine, Florida, 3rd	Grijalva, Raul, Arizona, 7th	Murtha, John, Pennsylvania, 12th
Brown, Henry, South Carolina, 1st	Gutierrez, Luis, Illinois, 4th	Musgrave, Marilyn, Colorado, 4th
Conyers Jr., John, Michigan, 14th	Gutknecht, Gil, Minnesota, 1st	Myrick, Sue, North Carolina, 9th
Cooper, Jim, Tennessee, 5th	Hall, Ralph M., Texas, 4th	Nadler, Jerrold, New York, 8th
Costello, Jerry, Illinois, 12th	Harman, Jane, California, 36th	Napolitano, Grace, California, 38th
Cox, Christopher, California, 48th	Harris, Katherine, Florida, 13th	Neal, Richard E., Massachusetts, 2nd
Cramer, Robert E. "Bud", Alabama, 5th	Hart, Melissa, Pennsylvania, 4th	Nethercutt Jr., George R., Washington, 5th
Crane, Phil, Illinois, 8th	Hastert, Denny, Illinois, 14th	Ney, Robert W., Ohio, 18th
Crenshaw, Ander, Florida, 4th	King, Steve, Iowa, 5th	Northup, Anne, Kentucky, 3rd
Crowley, Joseph, New York, 7th	Kingston, Jack, Georgia, 1st	Norton, Eleanor Holmes, District of Columbia
Cubin, Barbara, Wyoming, At Large	Kirk, Mark, Illinois, 10th	Norwood, Charlie, Georgia, 9th
Culberson, John, Texas, 7th	Kleczka, Gerald D., Wisconsin, 4th	Nunes, Devin, California, 21st
Cummings, Elijah, Maryland, 7th	Kline, John, Minnesota, 2nd	Nussle, Jim, Iowa, 1st
Cunningham, Randy "Duke", California, 50th	Knollenberg, Joseph , Michigan, 9th	
Wilson, Heather, New Mexico, 1st	Kolbe, Jim, Arizona, 8th	

Federally Sponsored Contractors Sites

Force 3 Inc.	ManTech International Corp.	Rockwell International Corp.
Lockheed Martin Corp.	ARINC Inc.	Semcor Inc.
United Space Alliance LLC	BTG Inc.	Dynamics Research Corp.
Computer Science Corp.	Micron Electronics Inc.	Aspen Systems Corp.
Boeing Co.	Jacobs Engineering Group Inc.	NCI Information Systems
Raytheon Co.	Gateway Inc.	General Electric Co.
AT&T Corp.	OAO Corp.	Datatrac Information Services Inc.
General Dynamics Corp.	World Wide Technology Inc.	Swales Aerospace
TRW Inc.	Intellisys Technology Corp.	Newport News Shipbuilding Inc.
Science Applications International Corp.	Oracle Corp.	Research Triangle Institute
Northrop Grumman Corp.	McBride & Associates Inc.	British Telecom
Unisys Corp.	Signal Corp.	Universal Systems Inc.
IBM Corp.	MCI WorldCom	Siemens AG
Electronic Data Systems Corp.	ITT Industries	L3 Communications Corp.
Litton Industries Inc.	PricewaterhouseCoopers LLP	GTE Corp.
Booz-Allen & Hamilton Inc.	Battelle Memorial Institute	Silicon Graphics Inc.
Dell Computer Corp.	American Management Systems Inc.	Labat-Anderson Inc.
Government Technology Services Inc.	Telos Corp.	Westat Inc.
BAE Systems Plc	Cubic Corp.	Presidio Corp.
Sprint Corp.	Sun Microsystems Inc.	SETA Corp.
Bell Atlantic Corp.	Intergraph Corp.	NCR Corp.
Affiliated Computer Services Inc.	Accenture	Kajax Engineering Inc.
Federal Data Corp.	Computer Associates International Inc.	AverStar Inc.
Motorola Inc.	Milcom Systems Corp.	Orkand Corp.e
DynCorp	Comteq Federal Inc.	Resource Consultants Inc.
Getronics NV	Soza & Company Ltd.	Sabreliner Corp.
Compaq Computer Corp.	National Computer Systems Inc.	Sytex Inc.
Harris Corp.	Veridian Inc.	CALIBRE Systems Inc.
SRA International Inc.	Federal Technology Solutions	Network Equipment Technologies Inc.
Anteon Corp.	Intelligent Decisions Inc.	Southwest Research Institute
CACI International Inc.	Eagan McAllister Associates	GRC International Inc.
Lucent Technologies Inc.	Sterling Software Inc.	Tybrin Corp.
Honeywell International Inc.	Comsat	
KPMG	Government Micro Resources	

Executive Branch Sites

White House
Dept. of Health and Human Services
ATF
CIA
IRS
Dept. of Agriculture (USDA)
Dept of Commerce
Dept. of Defense
Dept. of Education
Dept. of Interior
Dept. of Treasury
FBI
CIA
Dept. of Energy
Dept. of Health and Human Services
Dept of Housing and Urban Development
Department of Justice
Dept. of Labor
Dept. of Transportation
Office of Homeland Security

Appendix C

Descriptions of each of the errors are listed in this section. (Note that this is taken in verbatim.)

PRIORITY 1

Provide alternative text for all image-type buttons in forms.

All HTML image buttons (`<INPUT TYPE="IMAGE" ...>`) in forms should contain a short alternative text description that represents the function of the graphic. Null ALT text (`alt=""`) or blank ALT text (`alt=" "`) is not a sufficient description for buttons. When creating alternative text, aim for a functional label based on the context in which it is used rather than a visual description.

Provide alternative text for all images.

All images should contain a short alternative text description that represents the function of the graphic. This includes images used as image maps, spacers, bullets in lists, graphical buttons, links, and images used to present math equations.

Give each frame a title.

Add a "title" attribute to each `FRAME` element to describe the purpose and content of the `FRAME`.

Provide alternative text for all image map hot-spots (AREAs).

All major browsers today support client-side image maps. Image maps are images in which regions of the image contain "hot-spots" where a person can click to follow a link. Client-side image maps should always be used in place of or in addition to the older server-side image maps except for a few specific cases in which the region shapes cannot be duplicated (like geographic maps). All `AREA` tags should have an `alt` attribute.

Provide alternative text for each APPLET.

All applets should contain one of two types of alternative text.

1. A short alternative text description placed in the "alt" attribute of the APPLET element.
2. An alternative HTML-based content within the Applet that, if possible, duplicates the function of the applet.

PRIORITY 2

Use relative sizing and positioning (% values) rather than absolute (pixels).

Most features that can be sized can accept relative or absolute size units. Absolute sizes are units like pixels, points, inches, etc. Sizes in these units are relative to an absolute measurement and cannot be scaled. By contrast, relative units, such as percentages, ems (a unit of width relative to a font size), etc. are automatically scaled when the base unit is scaled. This allows the text to change size and the page layout to flow without creating extra whitespace or running off the edge of the screen or paper.

Use a public text identifier in a DOCTYPE statement.

Include a document type declaration at the beginning of a document that refers to a published DTD (e.g., the strict HTML 4.0 DTD). The document type declaration should be appropriate to the markup language you are using.

If objects use event handlers, make sure they do not require use of a mouse.

If programmatic objects interact with the user, ensure that they can do so in a device-independent way. The code should not listen exclusively for mouse input, but should provide a way for keyboard input to function as well.

Explicitly associate form controls and their labels with the LABEL element.

For each `FORM` control, place its label in a `LABEL` element. A `LABEL` is attached to a specific form control through the use of the "for" attribute. The value of the "for" attribute must be the same as the value of the "id" attribute of the form control.

Do not use the same link phrase more than once when the links point to different URLs.

If more than one link on a page shares the same link text, all those links should point to the same resource. Such consistency will help page design as well as accessibility.

If two or more links refer to different targets but share the same link text, distinguish the links by specifying a different value for the "title" attribute of each `A` element.

Do not cause a page to refresh automatically.

By placing an HTML tag like the following in the `HEAD` section of your web page:

```
<META HTTP-EQUIV="Refresh" CONTENT="10">
```

some web browsers can be made to reload web pages after a certain amount of time has passed. In the example above, the page would reload in 10 seconds. If the time interval is too short, people who are blind will not have enough time to make their screen readers read the page.

If you do use auto-refresh web pages, provide a single line of text at the top of the page stating that the page contains changing information and will automatically reload itself after some amount of time, and provide a link to an alternate version of the page on which this

does not happen. Also, if it is possible, provide redundant links on the page that will advance to the next screen for those browsers that don't support this.

Auto refresh should primarily be used to update tabular data or graphs that reflect changing real time information, i.e. a graph of the Dow Jones Industrial Average that updates every minute. In these cases the layout of the web page remains the same except for the graph or table on the page.

Provide a NOFRAMES section when using FRAMEs.

A frame-based page should always include an alternative layout inside a `NOFRAMES` element. Browsers that don't recognize frames will ignore them and use the content of the `NOFRAMES` element instead. The content of the `NOFRAMES` section should be equivalent content to the frame content if possible or links to the individual frames. The content must *not* be a message instructing users to use a frames-capable browser.

Include a document TITLE.

A page title should contain a brief text description of the page contents. Most authoring tools provide a way to add this even though it is not visible in the page's content, usually in a Page Properties dialog. The `TITLE` element must be placed in the `HEAD` section of the page.

Nest headings properly.

Increment heading levels correctly (e.g., `H1` followed by `H2`, rather than `H1` followed by `H3`). Consider headings as analogous to an outline. The outline should not appear as:

I. Heading 1
    1. Heading 3
B. Heading 2

Create link phrases that make sense when read out of context.

Authors should not use "click here" as link text several times on the same page; this requires a user browsing the page with a screen reader to step through each link and read the surrounding text to determine the purpose of the link. Instead, link text should carry sufficient information, as in "download this document in ASCII text," "view the full version in HTML," or "for the text version select this link."

Avoid scrolling text created with the MARQUEE element.

Do not use the `MARQUEE` tag, which is not part of the HTML specification; instead, use one of the following options:

- Emphasized text, i.e. <EM>this is important</EM>
- An animated GIF image whose alternative text corresponds to the scrolling text.
- A Java applet marquee with alternative text that corresponds to the scrolling text.

PRIORITY 3

Provide a summary for tables.

Like "alt" text for images, each TABLE element should contain a "summary" attribute that briefly describes the table structure and purpose.

Identify the language of the text.

The HTML element at the beginning of each page should use the HTML 4.0 "lang" attribute to help specify the main language of the text on the page, such as English, French, German, Japanese, etc.

Include default, place-holding characters in edit boxes and text areas.

Placeholder text appears in the form control before the user has made any changes. The user can type over that text when entering data into the form.

Separate adjacent links with more than whitespace.

Place some sort of separating character between adjacent links. Images or bulleted or numberd lists are good choices. You can also use explicit separator characters such as "|" or enclose the links in brackets []. "Whitespace characters", such as spaces, line l. breaks, carriage returns, and paragraph breaks, are not sufficient.

Include a document TITLE.

A page title should contain a brief text description of the page contents. Most authoring tools provide a way to add this even though it is not visible in the page's content, usually in a Page Properties dialog. The TITLE element must be placed in the HEAD section of the page.

Use a public text identifier in a DOCTYPE statement.

Include a document type declaration at the beginning of a document that refers to a published DTD (e.g., the strict HTML 4.0 DTD). The document type declaration should be appropriate to the markup language you are using.

Client-side image map contains a link not presented elsewhere on the page.

Some newer browsers allow the creation of alternative text for each hot-spot in the image map. Until all browsers support this, however, it remains important to have redundant text links on the page as well. The example below shows a combination of server and client-side image maps for compatibility with older browsers which don't support client-side maps, as well as redundant text links.

Appendix D

Project: Website Accessibility

Tasks	10/22 to 10/29	10/29 to 11/05	11/05 to 11/12	11/12 to 11/19	11/19 to 11/26	11/26 to 12/03	12/03 to 12/10	12/10 to 12/17	12/17 to 12/24	12/24 to 12/31	12/31 to 01/07	01/07 to 01/14	01/14 to 01/21	01/21 to 01/28	01/28 to 02/04	02/04 to 02/11	02/11 to 02/18	02/18 to 02/25	02/25 to 03/04	03/04 to 03/11	03/11 to 03/18	03/18 to 03/25	03/25 to 04/01
Current Week																							
Background Research	■	■	■	■	■	■	■																
Interview/Interview Writeups					■	■																	
Literature Review Writeup	■	■	■	■	■	■	■																
Methodology Writeup	■	■	■	■	■	■	■																
Website Evaluations														■	■	■	■	■	■				
Corrections to Background/Literature Review													■	■	■								
Evaluations on Executive Branch														■	■	■							
Evaluations on Legislative Branch																■	■						
Evaluations on Judicial Branch																	■	■					
Evaluations on Federally Sponsored Websites																		■	■				
Any Other Interviews Needed													■	■	■	■	■	■	■				
Final Revising Methodology Section																					■	■	■
Adding Results																						■	■
Adding Conclusion																						■	■
Final Revisions																							■
Webpage																				■	■	■	■

Note: Final Revisions and Webpage continues until April 16th.

Appendix E

The e-mail below was sent to various webmasters of Federal websites, which lists various questions concerning how well each website performs in accordance with Section 508 practices.

Dear Webmaster,

My name is William Chin, and I am a student currently attending Worcester Polytechnic Institute (WPI), located in Worcester, MA. I am conducting a study that assesses the current web accessibility tools and methods used by webmasters to design sites for persons with disabilities. I would like to take a moment of your time, and have you answer some questions that I have posed below. Be assured that your responses will be completely confidential, and that it will only be used for research for this study. Thank you for your time.

1. Do you consider persons with disabilities a priority when developing a webpage?
   How important is it?
2. What steps do you take to make a webpage accessible to persons with disabilities?
3. What regulations/laws do you consider when designing the webpage?
4. Do you use software programs when testing the webpage?
   If so, which ones?
5. Who makes the final checks on the webpage when completed?

If you have any questions regarding this study, you can contact me at willc@wpi.edu, or to my Advising Professors, Professor Eleanor Loiacono at eloiacon@wpi.edu, and Professor Scott McCoy at smccoy@wpi.edu.
Once again, I thank you for your time in reading this e-mail.

William Chin

Listed below are the responses to the above e-mail. The person who sent the e-mail is listed above the e-mail they sent. The e-mails have not been edited in any way.

CONFIDENTIAL

CONFIDENTIAL

CONFIDENTIAL

CONFIDENTIAL

CONFIDENTIAL

Appendix F

Below is the transcript of the interviews given during the duration of the project.

Interview Time: November 20, 2002 @ 2:30 PM
Interviewer: William Chin
Interviewee: Joanne Van Dyke

The main purpose of the Disability Services Department is to make any kind of accommodations for any type of disability that would enhance access to the same information and opportunities as to non-disabled individuals, according to Section 504 code.

As to how Disability Services offers assistance, they must need to meet with Ms. Van Dyke prior to applying to WPI to determine what type of assistance needs to be given, which is determined by a consultant which is hired by Disability Services. When the individual gets the package from the New Student Orientation, there is a Voluntary Disclosure form that they can fill out listing the types of disabilities they may have. However, they must prove this through documentation.

As for the types of assistance that Disability Services provide, the most common accommodation is to add more time for exams, usually time and a half. They also have a testing room if the student needs a quieter place to take the test.

The people who are involved in assistance are primarily note takers, who are students that are taking the same class as the disabled individual. The professors also lists the types of accommodations they provide. In the case of being visually or hearing impaired, Ms. Van Dyke speaks to the professor one-on-one as well, to determine the accommodations needed.

As for assistance in using the Internet, Ms. Van Dyke informed me that there was no individual who has a need for assistance in using the internet.

Ms. Van Dyke did recommend to contact the Lisa Isleb from the Assistive Technology Committee, Amy Marr, who is the Head of Web Development, and Dave Taranto, who is in charge of the Kurtzweil, the scanner to voice machine. She also recommended to look into Dragon Voice's ViaVoice, which uses voice recognition and ReadPlease Corporation's Readplease software, which translates typed text into voice.

Appendix G

The spreadsheets can be found on the project CD under the folder "Spreadsheets".

Appendix not included
in original submission

IQP/MQP SCANNING PROJECT