Able to articulate what web accessibility is and why it is important.

Prepared to describe key principles for developing accessible web sites.

Equipped to evaluate a web site and make it accessible.
Introductions and Expectations
Quiz
Why is web accessibility important?
Why is it important?

- Inaccessible web sites deny services and information to people with disabilities
- In the U.S., 49.7 million people (19% of the population) have a disability, according to a U.S. Census 2000 Brief
- JHU has a policy of non-discrimination and must comply with Federal laws
- Benefits for people without disabilities, too

Think about audience for site: Students, employees, general public?

What services and information are available to them on JHU web sites?

Of the approximately 16,538,000 undergraduate students enrolled during the 1999-2000 academic year, 1,508,000 were students with disabilities (about 9.118 percent). Among graduate students, 161,000 of 2,658,000 have disabilities (about 6.057 percent).

JHU’s nondiscrimination statement is on the web accessibility web site. Section 504 of the Rehabilitation Act prohibits colleges and universities from excluding an “otherwise qualified individual with a disability” from “any program or activity that receives Federal financial assistance.”

Other benefits of accessible web sites: Graceful adaptation to older browsers, small screen-devices. Separation of content and format make it easier to update either one.
What disabilities might affect how someone uses the web?

visual: not just blindness but also low vision and color blindness

auditory:

cognitive:

motor:
How do people with disabilities access the Web?
Assistive Technology

- Screen readers
- Screen magnifiers
- Refreshable Braille displays
- Alternate keyboards
- Alternate pointing devices
One example of a screen magnifier: A screenshot of the JHU home page with a portion of the screen magnified. A square can be moved around the screen to magnify different areas.
Another example of screen magnification: Again, this is a screenshot of the JHU homepage. In this case, the entire screen is magnified, but only a small portion of the page can be viewed without scrolling.
This image shows a refreshable Braille display, a device that someone who reads Braille can use to read the content of a Web page.

See [http://www.deafblind.com/display.html](http://www.deafblind.com/display.html) for more information about refreshable Braille displays.
The images on the left show two alternative keyboards. The top one allows people to type with one hand, using different combinations of keys. The bottom one allows for different keyboard layouts, including several with much larger keys than a standard keyboard.

The top center image shows a large trackball. This allows people with motor difficulties finer control of a cursor than a mouse would give them. Below that is a “pneumatic switch,” a “sip and puff” device.

The image in the top right corner shows a man operating a joystick designed to be controlled by the mouth or chin. Below that is an image of several switches. These are devices that one clicks as one would click a mouse button, but these switches are large enough that they can be activated with other body parts besides a finger, such as a foot, elbow, or head.

See http://www.infogrip.com for more information about these products.
Section 508 is the guideline that most developers immediately recognize. It refers to federal agencies and those enterprises that do business with the federal government.

Section 504 is the portion of the law that deals specifically with colleges and universities in this regard.

The WCAG are a set of 14 guidelines published by consensus of the W3C, that describe how to make content accessible. Each recommendation has checkpoints, or subparts. There is a version 2 that has not been fully approved that writes the same guidelines in a more generalized manner.

On the W3C site and in your handouts is a link to their techniques page which explains how to implement the checkpoints and is located at http://www.w3c.org/TR/WAI_WEBCONTENT-TECHS/

The IBM website has a section on web accessibility that takes guidelines and provides a rationale for each, techniques and examples to make the explanation clear to the reader. Worth taking a look at.
Text Equivalents

- Alt text:
  - `<img src="jhu_logo.gif" width="120" height="30" alt="Johns Hopkins University">`
  - Also in buttons `<input>` and image maps `<area>`
  - `alt=""` for spacer or “decorative” images
- Transcripts of audio files
- Synchronized captions for videos

Any non-text element on a Web site should have a text equivalent, such as alt text, a transcript, or a caption.
Writing Alt Text

- Alt text should match text in the image
- Blank alt text should be used for spacers or “decorative” images
- When alt text isn’t sufficient to describe an image, use longdesc or a D-link
  - Graphs
  - Complex images

longdesc = long description
Let’s look at the homepage of Amazon.com.

Where are the images?

What would be appropriate alt text for the images?
If we look at the homepage without the images loaded, we can tell what was an image.

What would we be missing, if we visited this page and only had access to text and not images?
(Special promotions, Amazon logo, view cart/wishlist/your account/help, navigation tabs, “dear customers” letter, short film competition, cover of Harry Potter book)

What alt text is here? (Search Web, Announcing Amazon Prime)

What alt text should be here? (amazon.com, navigation tabs should have same words [welcome, your store, books, apparel & accessories, electronics, toys & games, music software, see more stores], d-link for text of “dear customers” letter, etc.)

Some of these images are links. Let’s look at the page in a text browser that shows us the filename for each image.
Because these images don’t have alt text, a screen reader will probably choose to read the filenames. Thus, “Welcome” becomes “welcome-on-whole.gif”. “Your store” becomes “yourstore-unrec-off-sliced.gif”. Etc.

Even better is the cover of the Harry Potter book, which becomes “0439784549.01.THUMBZZZ.jpg”

A spacer image that should have blank alt text may be read as pixel-white.gif
This is a menu of two animations.
The animations have more detail than can be summed up in alt text.
Animations of the trimeric G protein cycle, homologous desensitization, and receptor endocytosis. A textual description is available.

To see these animations, you need the Macromedia Shockwave Player.

These animations were created in the Digital Knowledge Center.

If the browser does not support the animation, a short description appears, along with a link to a more detailed textual description.
Textual description of G protein animations

The two cell biology animations described here are:

- The Trimeric G Protein Cycle
- Homologous Desensitization and Receptor Endocytosis.

In both of these animations, a horizontal bar, which represents the cell membrane, stretches across the screen. The area above the bar represents space outside the cell, and the area below the bar represents the area inside the cell. The receptors, proteins, enzymes, and other things outside the cell, inside the cell, or inside the cell membrane, are all represented by different geometric shapes, some of which are labeled with letters to distinguish them from similar parts. Activated parts are represented by shades of green, and inactive parts are represented by shades of red.

These are the steps shown in the animation of the trimeric G protein cycle:

- When the ligand binds the receptor, the receptor is activated.
- When the alpha subunit exchanges GDP for GTP, the G protein becomes active.
- The alpha subunit interacts with the target effector.
- The activated target effector increases the amount of a second messenger.
- The second messenger interacts with a protein kinase.
- The protein kinase becomes activated.
- The activated protein kinase phosphorylates downstream target proteins. Some target proteins are activated, some are inactivated, and some are degraded.
- When the ligand dissociates from the receptor, the receptor becomes inactive.

The textual description gives a step-by-step list of the different things that happen in the animation.
Some users have trouble distinguishing colors for medical reasons (glaucoma, diabetes, aneurysms, etc.)

It is not fair to colorblind users to use statements on your webpage that direct the user to “Click the red button” or say “the required fields are in green” for example.

If you use color as redundant information, such as to identify the location on a navigation bar, this would be acceptable.

The use of contrast, dark text/light background is the best way to avoid problems with color.
This image is a screenshot of a form where each field is identified with red or green text. The instructions read: fields in red are required; fields in green are optional. This is inaccessible, as we can see on the next slide...
When we look at the same screenshot in grayscale instead of full color, the required “red” fields are indistinguishable from the optional “green” fields.
Some older screen readers will read across the page, reading sentences on the same row from different columns as one sentence, and are unable to present side-by-side text in tables, so the page content will not make sense.

Simple: identify row and column headers using `<th>` instead of `<td>` or by using scope attribute
Complex: associate relevant headers with cell using headers attribute

Use the `summary` attribute

Other markup attributes that tell a screen reader what the table looks like is the `colgroup` and `span` element; these help the machine to calculate the table
Users interact with forms through elements called **controls**. Controls may be **buttons**, **radio checkboxes**, **textareas**, **menu items**, etc.

Each control has a label tag and the id attribute **for**

To ensure accessibility, forms are marked up using the LABEL element that 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.

**Position form control labels appropriately:**

- To left of or above text fields, select menus
- To right of checkboxes and radio buttons

**OR**, use `<label>` to explicitly associate form controls and their labels

For complex forms, use `<fieldset>` to group different parts of a form

Fieldset adds structure to a form, allows for grouping control elements, making it easier for users to understand their purpose while navigating through the form with visual user agents and speech navigation for speech-oriented user agents
Rather than have the screen reader read every navigation link on the page, the “skip navigation” link allow it to move to the main page content.

Image maps should contain redundant text links to tell the screen reader where the text link is pointed.

Use **server-side** image maps only if the regions cannot be defined by an available geometric (rectangle, triangle, pentagon, etc) shape. Provide a list of equivalent text links for server-side image maps. Include one text link for each hotspot that can be activated on the map.

Example would be a world map, where each country would be a link, and you are unable to define the image as a geometric shape.

Frames should have clear title and name for each frame so the user knows what kind of information each frame contains.
Other

- Timed responses: Avoid
- Style sheets: Pages should be readable without them
- Screen Flicker: <blink> and <marquee> Avoid

Ensure the user is notified when the process is going to time out and is given the ability to indicate more time is needed.

Stylesheets allow you to separate presentation from content. However, not all assistive technologies and some older browsers do not fully support style sheets, so your pages should be readable without them.
A PDF is a file that presents/prints information exactly as the author intended. A PDF may contain multimedia content. Popular because:

- Can be easily created from word processing or desktop publishing programs
- Brochures and information fact sheets.
- Large public documents that contain charts and images, such as annual reports.
- Documents that exist in hard copy but have a very short life, such as press releases.
- Fax-back order/request forms for the user to print out.
- Contracts and agreements for the user to print.
- Secure password-protected documents.

Prior to version 5 of the Acrobat Reader, PDF files were mostly inaccessible to screen readers. With version 6 and 7 of Acrobat, the accessibility features have improved. If you have Acrobat Version 4.0, convert to html using the online tool at the Adobe site to be read by a screen reader. If you have Version 5.0, use the Make-Accessible plug-in at http://access.adobe.com/downloads.html The MakeAccessible Plug-in creates a tagged Adobe PDF file from an untagged PDF file. This allows a pdf document to be read by a screen reader for greater accessibility. PDF Tags are used to define the structure of a document.
Flash content is time-based and constantly changing; older screen readers cannot render this dynamic content.

The newer JAWS and Window Eyes have the Flash Player natively embedded and can provide better/marginal access. The accessibility features improve with each successive software upgrade (Flash Player 7 is latest version).

Applets are small programs that run in browsers that are Java-enabled. The small program is embedded in a web page, and might connect to a server-side technology such as a J2EE server. However, because major browsers don’t always keep up with the latest releases of the Java 2 platform, this has led to accessibility problems.

Also, some users may elect to turn off java in their browsers.

The link to the Sun website can direct you to the latest information on the accessibility features of the Java platform.
Valid html improves accessibility.
Invalid html code turns away visitors and decreases search engine rankings, in addition to being inaccessible.
WYSIWYG editors like FrontPage, Dreamweaver and HomeSite do not automatically create valid code.
This image shows a screenshot of the homepage of the Bobby Online Free Portal, a tool for evaluating the accessibility of a Web page. In addition to some basic instructions and disclaimers, the page has radio buttons where one can select either the Web Content Accessibility Guidelines 1.0 or the U.S. Section 508 Guidelines. There is a field where one can enter the URL of the page to be evaluated. After selecting which set of guidelines to use and typing (or pasting) the URL, one need only hit the Submit button to activate the evaluation.
This image is a screenshot of the MarylandWeather.com homepage. The page has an image of clouds in the top left corner, a logo with a crab on a weathervane in the top right corner. The central content is a map of Maryland showing no rain in the area. Today’s forecast, the 5-day forecast, and the weather blog are also part of the page. If we feed this URL into the Bobby tool, with the Web Content Accessibility Guidelines 1.0 selected... (see next slide)
This image is a screenshot of the top part of the Bobby report we ran on the MarylandWeather.com home page. Following the Bobby logo and some notes are pieces of the home page, with several question marks and “hats” (icons from the Bobby logo) dispersed throughout.
This image is a screenshot of the middle of the Bobby report on the MarylandWeather.com home page. We see more pieces of the home page, as well as more question marks and hat icons.
This image is another screenshot of the Bobby report on the MarylandWeather.com home page. The report states that the page is not accessible. It lists several Priority 1 errors and cites the line numbers in the code where it found them. The MarylandWeather.com page needs to add alt text to its images.
This image is another screenshot of the Bobby report of the MarylandWeather.com home page. It shows the rest of the Priority 1 errors and several Priority 2 errors found on the home page, as well as several warnings that are not triggered by the code, but that the person reading the report must evaluate manually to ensure that the page is accessible.
This image is another screenshot of the Bobby report of the MarylandWeather.com home page. It lists the Priority 2 User Checks, more possible errors that the person who ran the report must check on manually, to determine whether or not they are actually problematic.
This image is another screenshot of the Bobby report on the MarylandWeather.com home page. It lists the remaining Priority 2 User Checks and the Priority 3 errors.
Priority 3 User Checks

User checks are triggered by something specific on the page; however, you need to determine manually whether they apply and, if applicable, whether your page meets the requirements. Bobby AAA Approval requires that all user checks pass. Even if your page does conform to these guidelines they appear in the report. Please review these 7 item(s):

1. Consider furnishing keyboard shortcuts for form elements.
2. If this is a data table (not used for layout only), provide a caption. (22 instances)
3. Consider specifying a logical tab order among form controls, links and objects.
4. Use the ABBR and ACRONYM elements to denote and expand any abbreviations and acronyms that are present.
5. If you have grouped links, is there a link at the beginning to bypass the group?
6. If there are logical groups of links, have they been identified and a link to skip the group provided?
7. Consider adding keyboard shortcuts to frequently used links.

The following 5 item(s) are not triggered by any specific feature on your page, but are still important for accessibility and are required for Bobby AAA Approved status.

8. Is there distinguishing information at the beginning of headings, paragraphs, lists, etc.?
9. If there is a search feature, are there different types of searches for different skill levels and preferences?
10. Are there navigation bars for easy access to the navigation structure?
11. Do you allow users to customize their experience of the web page?
12. Is there a consistent style of presentation between pages?

Copyright © 2002 Watchfire Corporation. All rights reserved. Use of this software is subject to the Bobby Software License Agreement.

This image shows a screenshot of the end of the Bobby report of the MarylandWeather.com home page. It lists the Priority 3 User Checks.
This image is a screenshot of a Bobby Report help file. The help files explain what the guidelines mean and why it is important to follow them.
How to evaluate pages

- Inspect the page using the Firefox browser or the Opera browser
- Validate to see if code is well-formed
- Use an evaluation/repair tool
- Listen to the page using a screen reader or IBM’s Home Page Reader
- Look at the page in a text browser, such as Lynx
- View images using Vischeck
- Compare WYSIWYG documentation against web accessibility guidelines

In addition to the automatic accessibility checkers, the most important tool to ensure that a page is accessible is human inspection and intervention.
Using the Opera Browser

- Free to download, http://www.opera.com
- Allows users to see what their pages look like
  - to someone with low vision and/or
  - without images, stylesheets or animation
- Keyboard shortcuts for mobility impairments
- Sound alerts for blind users and screen reader compatibility
Several plug-ins available for the Firefox browser make it easy to evaluate the accessibility of web pages. The Web Developer plug-in menus, for example, have options for turning off images and stylesheets, highlighting images that don't have alt text, and running the Cynthia Says accessibility evaluation tool.
Each of these tools will provide a way to check your pages for accessibility. The W3C listing is the most extensive.
This is only the beginning...

- Many accessibility resources are available on the web. We have only introduced the basic concepts and resources for learning more.

On this slide, the image of a pyramid is used to illustrate that this workshop has only covered a small amount of the available information on web accessibility, represented by the tip of the pyramid. The rest of the pyramid represents the other resources available.
Questions?