California Open Online Library for Education & Accessibility

COOL4Ed (the California Open Online Library for Education) was created so that faculty can easily find, adopt, utilize, review and/or modify free and open etextbooks for little or no cost. The COOL4Ed accessibility open textbook evaluations can inform faculty, staff, and students how the free and open etextbooks meet 15 accessibility "checkpoints" that could impact the learning of learners with a range of disabilities.

SUMMARY OF ACCESSIBILITY EVALUATION:

Textbook:　　　　　**Programming Languages: Application and Interpretation**
Format of Textbook:　**HTML**

Assistive Technology (AT) Evaluation Score: Overall	6.6 (Maximum score = 10)
Assistive Technologies (AT) Evaluations applies specialized tools and software in the accessibility evaluation process. These specialized assistive technologies, see list below, are typically not used or available by the general public into the accessibility evaluation process. • Accessibility features of desktop operating systems (e.g. high-contrast display themes, settings from the Keyboard and Mouse control panels) • Accessibility-related software included with desktop operating systems (e.g. VoiceOver, Microsoft Narrator) • Third-party accessibility software and hardware: • Screen readers (e.g. JAWS, Window Eyes) • Magnification software (e.g. ZoomText Magnifier/Reader, MAGIC Pro with Speech) • Reading software for users with learning disabilities (e.g. Read and Write Gold, Kurzweil 3000) • Refreshable Braille displays	
Non- Assistive Technology (NAT) Evaluation Score: Overall	5.9 (Maximum score =10)
Non-Assistive Technologies (NAT) Evaluations applies only native or basic tools and software such as the keyboard and Narrator in the accessibility evaluation process. These non-assistive technologies are readily available and used by the general public.	

COOL4Ed Accessibility Evaluation Methods:

The California State University Accessible Technology Initiative and MERLOT (Multimedia Educational Resources for Learning and Online Teaching) developed the rubric or "checkpoints" for the accessibility evaluation. CAST, a nationally recognized organization with expertise in accessibility and UDL, reviewed and affirmed the appropriateness and value of the accessibility evaluation rubric and contributed the references and support resources to help people learn how best to design, evaluate, and remediate the learning materials to maximize the accessibility of the learning resources for all. The "checkpoints" have been built upon the Section 508 technical standards and has been organized and tailored to the typical characteristics of digital resources used in higher education courses.

The accessibility evaluations were performed by the Center for Usability in Design and Accessibility at California State University, Long Beach; faculty and graduate students with expertise in human factors, usability, and accessibility performed the evaluations of over 150 free and open etextbooks. COOL4ed.org has published the accessibility evaluation rubric and provides a detailed description of the methodology used to evaluate the accessibility of the etextbooks in COOL4ed.

LOOKING FOR DETAILED ACCESSIBILITY REPORTS?

See Detailed Accessibility Evaluation Report using Assistive Technologies

See Detailed Accessibility Evaluation Report using Non-Assistive Technologies

DETAILED ACCESSIBILITY EVALUATION REPORT using
Assistive Technologies

Assistive Technologies (AT) Evaluations applies specialized tools and software in the accessibility evaluation process.   These specialized assistive technologies, such as Kurzweil and NVDA, are typically not used or available by the general public into the accessibility evaluation process.

1. Accessibility Documentation

A. The organization providing the online materials has a formal accessibility policy.	**Fail**
Additional Information:	**Google Chrome. URL not found.**
B. The organization providing the online materials has an accessibility statement.	**Fail**
Additional Information:	**Google Chrome. URL not found.**
C. An Accessibility Evaluation Report is available from an external organization.	**Fail**
Additional Information:	**Google Chrome. URL not found.**

2. Text Access

A. The text of the digital resource is available to assistive technology that allows the user to enable text-to-speech (TTS) functionality.	**Pass**
Additional Information:	**17/17 pages pass. Google Chrome and NVDA. Checked all 17 chapters.**

3. Text Adjustment

A. Text is compatible with assistive technology.	**Pass**
Additional Information:	**10/10 pages pass. Google Chrome. Checked chapters 1-10. All pages' text were resizable.**
B. The resource allows the user to adjust the font size and font/background color (or is rendered by an application such as a browser,	**Pass**

media player, or reader) that offers this functionality).	
Additional Information:	**10/10 pages pass. Google Chrome and Care your Eyes add-on for Google Chrome. Checked chapters 1-10. All text was responsive to color-changing "night mode".**

4. Reading Layout

A. Text of the digital resource is compatible with assistive technology that allows the user to reflow the text by specifying the margins and line spacing (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	**Fail**
Additional Information:	**0/18 pages pass. Google Chrome. No reflow seen in any page of the website.**
B. If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material.	**N/A**
Additional Information:	**No printed material.**

5. Reading Order

A. The reading order for digital resource content logically corresponds to the visual layout of the page when rendered by assistive technology.	**Pass**
Additional Information:	**5/5 pages pass. Google Chrome and NVDA. Checked chapters 1-5.**

6. Structural Markup/Navigation

A. The text of the digital resource includes markup (e.g. tags or styles) that allows for navigation by key structural elements (chapters, headings, pages) using assistive technology (or is rendered by an application	**Pass**

	such as a browser, media player, or reader that offers this functionality).	
Additional Information:		**5/5 pages pass. Google Chrome and NVDA. Checked chapters 1-5. All headers navigatable.**
B.	The text of the digital resource includes markup for bullets and numbered lists that is compatible with assistive technology (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	**Pass**
Additional Information:		**17/17 lists pass. Google Chrome and NVDA. 2/2 bulleted lists in Chapter 3 recognized. 1/1 numbered list in Chapter 4 recognized. 1/1 bulleted list in Chapter 5 recognized. 1/1 numbered list in Chapter 6 recognized. 1/1 numbered list in Chapter 7 recognize**
C.	If the text of the digital resource is delivered within an ebook reader application, a method is provided that allows users to bypass the reader interface and move directly to the text content that is compatible with assistive technology.	**N/A**
Additional Information:		**eReader application not used.**

7. Tables

A.	Data tables include markup (e.g. tags or styles) that identifies row and column headers in a manner that is compatible with assistive technology (or are rendered by an application such as a browser, media player, or reader that offers this functionality).	**N/A**
Additional Information:		**Google Chrome and NVDA. No tables found in the material, but there were some issues worth noting: first block of code in Section 10.1.5 ("State") is treated incorrectly as a table. Section 14.1 is considered the first row of a 41-row table. A block of cod**

8. Hyperlinks

A. In-book links take you to a location within the textbook. For example, the table of contents would be considered in-book links and embedded links take you to the correct location in the book.	
Additional Information:	
B. Live hyperlinks take you to any website or webpages external to the book.	**Pass**
Additional Information:	**Averaged score.**
C. Live links take you to the correct webpage that is functioning properly.	**Pass**
Additional Information:	**56/56 links pass. Google Chrome. 17/17 navigation links on the left hand toolbar work. 39/39 links in the navigation list in Chapter 15 work.**
D. Live links are descriptive enough for the users to know where it should take them.	**Pass**
Additional Information:	**56/56 links pass. Google Chrome and NVDA. 17/17 navigation links on the left hand toolbar and 39/39 links in the navigation list in Chapter 15 are read as "Link: [number and name of chapter/section]".**

9. Color and Contrast

A. All information within the material that is conveyed using color is also available in a manner that is compatible with those that do not perceive color, and information conveyed by color is also conveyed in other ways.	**Fail**
Additional Information:	**56/56 links fail. Google Chrome. All links (including navigation links) save for a few (like the "prev", "up", and "next" navigation buttons at the top and bottom of each page) are not underlined and are only colored blue.**
B. Information is conveyed from the sub-categories for contrast.	**Pass**

Additional Information:	**Averaged score.**
C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	**Pass**
Additional Information:	**Google Chrome and Colour Contrast Analyser. Checked Chapters 1-17. All headers are black on white and pass.**
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	**Pass**
Additional Information:	**Google Chrome and Colour Contrast Analyser. Checked Chapters 1-17. Code within quotations are green on white (<1% of all text) and fail the contrast test. All other coding text is black, blue, or dark blue and pass. The rest of the text (non-code) is blac**
E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).	**N/A**
Additional Information:	**Google Chrome and Colour Contrast Analyser. Only one image found (in Chapter 9) and it passes. Not significant enough to warrant a score.**

10. Language

A. The text of the digital resource includes markup that declares the language of the content in a manner that is compatible with assistive technology.	**Fail**
Additional Information:	**Google Chrome. Checked home page and Chapters 1-6. No language set in HTML code.**
B. If the digital resource includes passages in a foreign language, these passages include markup that declares the language in a manner that is compatible with assistive technology.	**N/A**
Additional Information:	**No foreign languages (not including coding language).**

11.Images

A. Non-decorative images have alternative text that is compatible with assistive technology (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	**N/A**
Additional Information:	**No images.**
B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	**N/A**
Additional Information:	**No images.**
C. Complex images, charts, and graphs have longer text descriptions that are compatible with assistive technology (or are rendered by an application such as a browser, media player, or reader) that offers this functionality).	**N/A**
Additional Information:	**No images.**

12.Multimedia

A. A synchronized text track (e.g. open or closed captions) is provided with all video content.	**N/A**
Additional Information:	**No multimedia.**
B. A transcript is provided with all audio content.	**N/A**
Additional Information:	**No multimedia.**
C. Audio/video content is delivered via a media player that is compatible with assistive technology. This includes support for all criteria listed in Section 15 below.	**N/A**
Additional Information:	**No multimedia.**

13.Flickering

A. The digital resource content does not contain anything that flashes more than three times in any one-second period.	**Pass**
Additional Information:	**Google Chrome. Checked home page and Chapters 1-17. No flickering.**

14.Science, Technology, Engineering, and Math (STEM)

A. STEM figures have appropriate markup that indicates that the image is a figure.	**N/A**
Additional Information:	**No figures.**
B. STEM graphs have appropriate markup that indicates that the image is a graph.	**N/A**
Additional Information:	**No graphs.**
C. STEM equations have appropriate markup that indicates that the image is an equation.	**Fail**
Additional Information:	**Google Chrome. Checked Chapters 3-17. No coding that signifies an equation; there are only styles that make the text look like code.**
D. STEM tables have appropriate markup that indicates the image is a table.	**N/A**
Additional Information:	**No tables.**
E. STEM figures have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**N/A**
Additional Information:	**No figures.**
F. STEM graphs have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**N/A**
Additional Information:	**No graphs.**
G. STEM equations have appropriate notation markup that conveys both the notation	**Fail**

(presentation) and meaning (semantics) of the STEM content.	
Additional Information:	**Google Chrome and NVDA. Checked Chapters 3-17. Punctuation in coding is not read and is vital to the syntax of the language.**
H. Assistive technology used can access the content from the STEM tables.	**N/A**
Additional Information:	**No tables.**

15. Interactive Elements

A. Each interactive element (e.g. menu, hyperlink, button) and function (e.g. annotations) allows keyboard-only operation both with and without assistive technology.	**N/A**
Additional Information:	**No interactive elements.**
B. Each interactive element conveys information to assistive technology regarding the element's name, type, and status (e.g. "Play, button, selected").	**N/A**
Additional Information:	**No interactive elements.**
C. All instructions, prompts, and error messages necessary to complete forms are conveyed as text to assistive technology (or are rendered by an application such as a browser, media player, or reader that offers this functionality).	**N/A**
Additional Information:	**No interactive elements.**

DETAILED ACCESSIBILITY EVALUATION REPORT using
Non-Assistive Technologies

Non-Assistive Technologies (NAT) Evaluations applies only native or basic tools and software such as the keyboard and Narrator in the accessibility evaluation process. These non-assistive technologies are readily available and used by the general public.

1. Accessibility Documentation

A. The organization providing the online materials has a formal accessibility policy.	**Fail**
Additional Information:	**Not Included**
B. The organization providing the online materials has an accessibility statement.	**Fail**
Additional Information:	**Not Included**
C. An Accessibility Evaluation Report is available from an external organization.	**Fail**
Additional Information:	**Not Included**

2. Text Access

A. The text of the digital resource is available to assistive technology that allows the user to enable text-to-speech (TTS) functionality.	**Pass**
Additional Information:	**Text was converted to speech without a problem.**

3. Text Adjustment

A. Text is compatible with assistive technology.	**Pass**
Additional Information:	**It is possible to increase font size by percentages.**
B. The resource allows the user to adjust the font size and font/background color (or is rendered by an application such as a browser, media player, or reader) that offers this functionality).	**Pass**
Additional Information:	**Colors can be changed but font styles are restricted.**

4. Reading Layout

A. Text of the digital resource is compatible with assistive technology that allows the user to reflow the text by specifying the margins and line spacing (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	**Fail**
Additional Information:	**Page does not reflow text when font size is changed.**
B. If the digital resource is an electronic alternative to printed materials, the page numbers correspond to the printed material.	**N/A**
Additional Information:	

5. Reading Order

A. The reading order for digital resource content logically corresponds to the visual layout of the page when rendered by assistive technology.	**Pass**
Additional Information:	**Text is read in a logical order.**

6. Structural Markup/Navigation

A. The text of the digital resource includes markup (e.g. tags or styles) that allows for navigation by key structural elements (chapters, headings, pages) using assistive technology (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	**N/A**
Additional Information:	
B. The text of the digital resource includes markup for bullets and numbered lists that is compatible with assistive technology (or is rendered by an application such as a browser,	**N/A**

media player, or reader that offers this functionality).	
Additional Information:	
C. If the text of the digital resource is delivered within an ebook reader application, a method is provided that allows users to bypass the reader interface and move directly to the text content that is compatible with assistive technology.	**N/A**
Additional Information:	

7. Tables

A. Data tables include markup (e.g. tags or styles) that identifies row and column headers in a manner that is compatible with assistive technology (or are rendered by an application such as a browser, media player, or reader that offers this functionality).	**N/A**
Additional Information:	

8. Hyperlinks

A. In-book links take you to a location within the textbook. For example, the table of contents would be considered in-book links and embedded links take you to the correct location in the book.	**N/A**
Additional Information:	
B. Live hyperlinks take you to any website or webpages external to the book.	**Pass**
Additional Information:	
C. Live links take you to the correct webpage that is functioning properly.	**Pass**
Additional Information:	**Navigation text and Ch 11 worked.**

D. Live links are descriptive enough for the users to know where it should take them.	**Pass**
Additional Information:	**Chapter links are descriptive, at the bottom of Ch 11 are links that are also descriptive.**

9. Color and Contrast

A. All information within the material that is conveyed using color is also available in a manner that is compatible with those that do not perceive color, and information conveyed by color is also conveyed in other ways.	**Pass**
Additional Information:	**Headers and are emphasized using boldface, italics, and capitalization, Ch 1-5 Links need to be denoted by something other than color.**
B. Information is conveyed from the sub-categories for contrast.	**Pass**
Additional Information:	
C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	**Fail**
Additional Information:	**Ratio 18.87:1, and nav is 7.47:1**
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	**Pass**
Additional Information:	**Ratio is 21.0:1, however some text is a green and does not pass ratio 3.92:1 see Ch 16.**
E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).	**N/A**
Additional Information:	

10. Language

A. The text of the digital resource includes markup that declares the language of the content in a manner that is compatible with assistive technology.	**Fail**

Additional Information:	No language declared in head.
B. If the digital resource includes passages in a foreign language, these passages include markup that declares the language in a manner that is compatible with assistive technology.	N/A
Additional Information:	

11.Images

A. Non-decorative images have alternative text that is compatible with assistive technology (or is rendered by an application such as a browser, media player, or reader that offers this functionality).	N/A
Additional Information:	
B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	N/A
Additional Information:	
C. Complex images, charts, and graphs have longer text descriptions that are compatible with assistive technology (or are rendered by an application such as a browser, media player, or reader) that offers this functionality).	N/A
Additional Information:	

12.Multimedia

A. A synchronized text track (e.g. open or closed captions) is provided with all video content.	Pass
Additional Information:	Youtube videos use closed captions.
B. A transcript is provided with all audio content.	N/A
Additional Information:	

C. Audio/video content is delivered via a media player that is compatible with assistive technology. This includes support for all criteria listed in Section 15 below.	N/A
Additional Information:	

13.Flickering

A. The digital resource content does not contain anything that flashes more than three times in any one-second period.	Pass
Additional Information:	

14.Science, Technology, Engineering, and Math (STEM)

A. STEM figures have appropriate markup that indicates that the image is a figure.	N/A
Additional Information:	
B. STEM graphs have appropriate markup that indicates that the image is a graph.	N/A
Additional Information:	
C. STEM equations have appropriate markup that indicates that the image is an equation.	N/A
Additional Information:	
D. STEM tables have appropriate markup that indicates the image is a table.	N/A
Additional Information:	
E. STEM figures have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	N/A
Additional Information:	
F. STEM graphs have appropriate notation markup that conveys both the notation	N/A

(presentation) and meaning (semantics) of the STEM content.	
Additional Information:	
G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**N/A**
Additional Information:	
H. Assistive technology used can access the content from the STEM tables.	**N/A**
Additional Information:	

15. Interactive Elements

A. Each interactive element (e.g. menu, hyperlink, button) and function (e.g. annotations) allows keyboard-only operation both with and without assistive technology.	**N/A**
Additional Information:	
B. Each interactive element conveys information to assistive technology regarding the element's name, type, and status (e.g. "Play, button, selected").	**N/A**
Additional Information:	
C. All instructions, prompts, and error messages necessary to complete forms are conveyed as text to assistive technology (or are rendered by an application such as a browser, media player, or reader that offers this functionality).	**N/A**
Additional Information:	