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: **How to Think Like a Computer Scientist**
Format of Textbook: **HTML**

Assistive Technology (AT) Evaluation Score: Overall	**6.2 (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	**7.0 (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:	**No content found.**
B. The organization providing the online materials has an accessibility statement.	**Fail**
Additional Information:	**No content found.**
C. An Accessibility Evaluation Report is available from an external organization.	**Fail**
Additional Information:	**No content 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.	**Fail**
Additional Information:	**Checked Home Page, Copyright Notice, Forward, Preface, Contributor List: NVDA reads text.**

3. Text Adjustment

A. Text is compatible with assistive technology.	**Pass**
Additional Information:	**Checked Home Page, Copyright Notice, Forward, Preface, Contributor List: zooming up to 150% OK, but after that the text moves off the screen causing the user to vertical scroll.**
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:	**Checked Home Page, Copyright Notice, Forward, Preface, Contributor List: all text changes colors.**

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:	**Checked entire book: text does not reflow.**
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 PDF version.**

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.	**Fail**
Additional Information:	**Checked Home Page, Copyright Notice, Forward, Preface, Contributor List: page content is read in 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	**Pass**

such as a browser, media player, or reader that offers this functionality).	
Additional Information:	**Checked Home Page, ch. 1-4: NVDA navigates through headings and heading levels.**
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:	**Checked Home Page, ch. 1-4: NVDA navigates through lists and list items, but doesn't speak the appropriate number for the lists.**
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:	**Not using reader application.**

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).	**Pass**
Additional Information:	**Only 1 table found (ch. 2) - reads well for the most part but doesn't always state the row before the column so the reader would have to remember where he/she was based on the last time the reader stated which row they were on.**

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:	**All HTML links are live.**
B. Live hyperlinks take you to any website or webpages external to the book.	**Pass**
Additional Information:	**Most links work and most have sufficient descriptive text.**
C. Live links take you to the correct webpage that is functioning properly.	**Pass**
Additional Information:	**46/50 links work, home page: 35/35, preface: 3/4, contributor list: 0/2, ch. 1: 2/3, ch. 2: 1/1, ch. 3: 1/1, ch. 4: checked first 4, 4/4.**
D. Live links are descriptive enough for the users to know where it should take them.	**Pass**
Additional Information:	**43/50 links have sufficient descriptive text, home page: 35/35, preface: 1/4, contributor list: 0/2, ch. 1: 3/3, ch. 2: 0/1, ch. 3: 1/1, ch. 4: 3/4.**

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:	**Checked home page, ch. 5-10: everything has color redundancy, but "how to think like a computer scientist", "index", and "next" are questionable. Their location might indicate that they are links.**
B. Information is conveyed from the sub-categories for contrast.	**Fail**
Additional Information:	**Checked home page, ch. 11-14.**

C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	**Pass**
Additional Information:	**Checked home page, ch. 11-14, all headers pass.**
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	**Fail**
Additional Information:	**Checked home page, ch. 11-14: orange (links and in python code), light blue (in python code), red (in python code), gray copyright text at the bottom of each page all fail.**
E. Contrast for simple images (for example, images of atoms) passed WCAG AA standards (contrast ratio of 4.5:1).	**Fail**
Additional Information:	**Checked home page, ch. 11-14: all gray boxes of python code fail against white bg, ch. 12: 2/2 fail, ch. 13: 1/1 fail.**

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 lang tag.**
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.**

11.Images

A. Non-decorative images have alternative text that is compatible with assistive technology (or is rendered by an application such as a	**Pass**

browser, media player, or reader that offers this functionality).	
Additional Information:	**7/7 ND images pass, ch. 1: 2/2, ch. 2: 1/1, ch. 3: 1/1, ch. 12: 2/2, ch. 13: 1/1.**
B. Decorative images are marked with null alternate text or contain markup that allows them to be ignored by assistive technology.	**Pass**
Additional Information:	**1 decorative image on the home page passes.**
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 complex 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:	**No flickering content.**

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 STEM content.**
B. STEM graphs have appropriate markup that indicates that the image is a graph.	**N/A**
Additional Information:	**No STEM content.**
C. STEM equations have appropriate markup that indicates that the image is an equation.	**Fail**
Additional Information:	**0/10 equations are marked up, ch. 4-6.**
D. STEM tables have appropriate markup that indicates the image is a table.	**Pass**
Additional Information:	**1/1 tables have markup, ch. 2.**
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 STEM content.**
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 STEM content.**
G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Fail**
Additional Information:	**0/10 equations are read properly, ch. 4-6.**
H. Assistive technology used can access the content from the STEM tables.	**Pass**

Additional Information:	**1/1 tables only states current row for the item in the first column for every row, otherwise read properly, ch. 2.**

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:	**No content found.**
B. The organization providing the online materials has an accessibility statement.	**Fail**
Additional Information:	**No content found.**
C. An Accessibility Evaluation Report is available from an external organization.	**Fail**
Additional Information:	**No content 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:	

3. Text Adjustment

A. Text is compatible with assistive technology.	**Pass**
Additional Information:	**Used Google Chrome.**
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:	**Used Care For Eyes for Google Chrome.**

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).	**N/A**
Additional Information:	**No PDF or other type of documentation to reference.**

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.	**N/A**
Additional Information:	

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, media player, or reader that offers this functionality).	**N/A**
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).	**Fail**
Additional Information:	**Table output is done with python language class indicators and does not have column or row classes/indicators.**

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.	**Pass**
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.	**N/A**
Additional Information:	
D. Live links are descriptive enough for the users to know where it should take them.	**N/A**
Additional Information:	

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	**Pass**

not perceive color, and information conveyed by color is also conveyed in other ways.	
Additional Information:	**Python language operators and error messages are of different colors. This is inherent within the language and whether it is something in need of explanatory text is debatable.**
B. Information is conveyed from the sub-categories for contrast.	**Pass**
Additional Information:	**Some operators/symbols used in the coding language are of unsatisfactory colors.**
C. Contrast for headers passed WCAG AA standards for large texts (contrast ratio 3:1).	**Pass**
Additional Information:	
D. Contrast for text passed WCAG AA standards for normal texts (contrast ratio of 4.5:1).	**Pass**
Additional Information:	
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 markup.**
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.	**Fail**
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).	**Fail**
Additional Information:	**Inadequate alt text.**
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:	**None**
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:	**None**

12.Multimedia

A. A synchronized text track (e.g. open or closed captions) is provided with all video content.	**N/A**
Additional Information:	**None**
B. A transcript is provided with all audio content.	**N/A**
Additional Information:	**None**
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:	**None**

13.Flickering

A. The digital resource content does not contain anything that flashes more than three times in any one-second period.	**N/A**
Additional Information:	**None**

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:	**None**
B. STEM graphs have appropriate markup that indicates that the image is a graph.	**N/A**
Additional Information:	**None**
C. STEM equations have appropriate markup that indicates that the image is an equation.	**Fail**
Additional Information:	**Script blocks contain no alternate text/explanations.**
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.	**NA**
Additional Information:	**None**
F. STEM graphs have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**N/A**
Additional Information:	**None**
G. STEM equations have appropriate notation markup that conveys both the notation (presentation) and meaning (semantics) of the STEM content.	**Fail**

Additional Information:	**Scripting language is properly tagged but not detailed enough.**
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:	**Able to tab through links.**
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:	**None**
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:	**None**