Scenarios and Solutions

An Instructional Designer’s Perspective on Creating Accessible Courses

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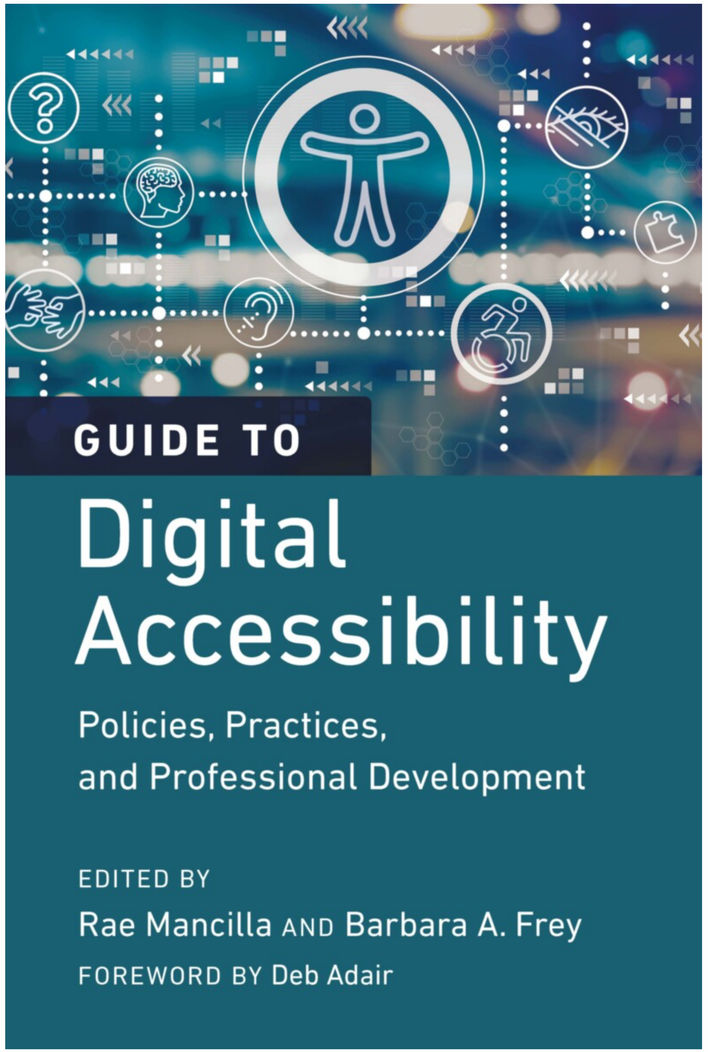
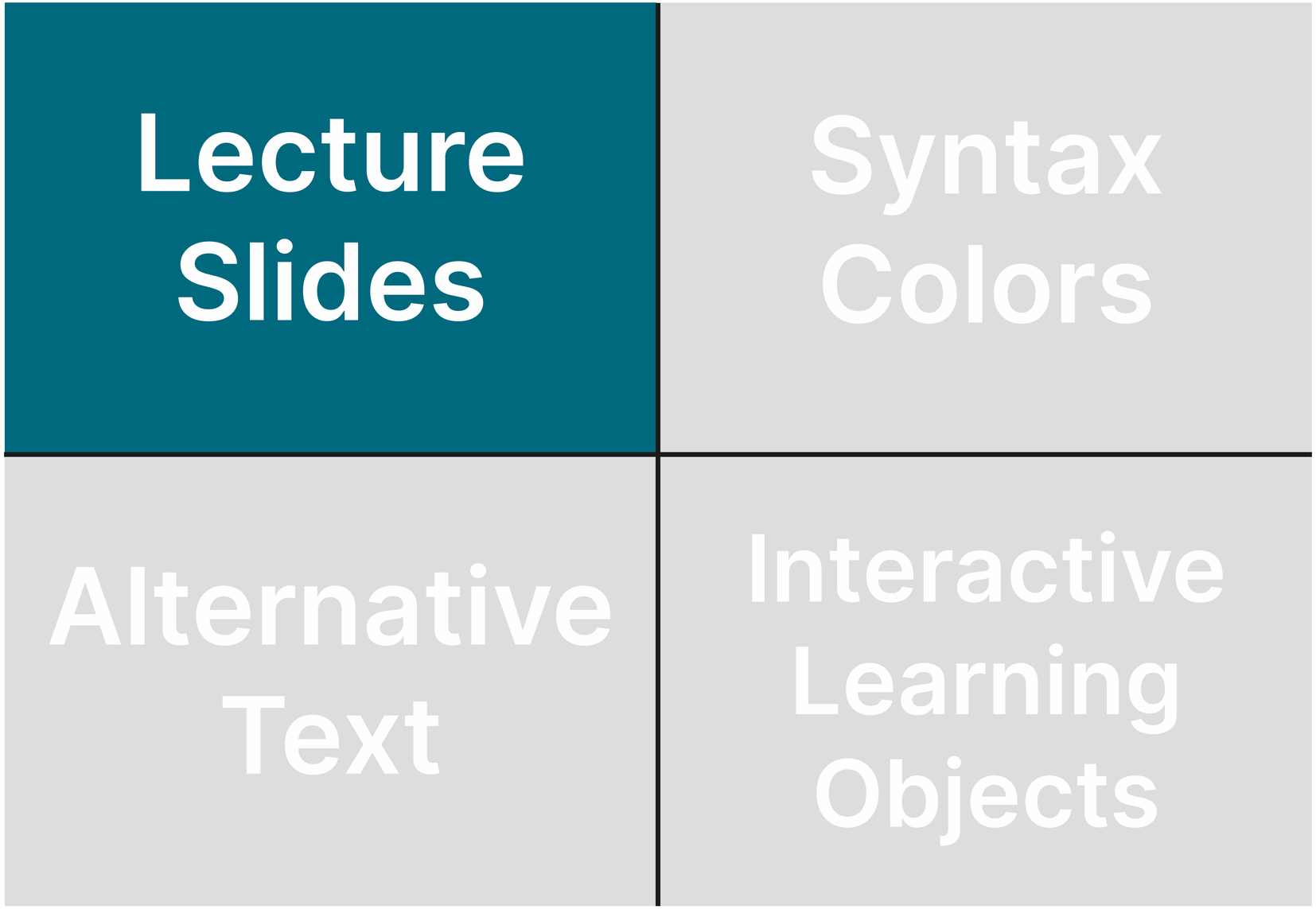
A Quality Matters Event
HE HIGHER EDUCATION Quality in Action

Chapter 12

Scenarios and Solutions

An Instructional Designer's Perspective on Creating Accessible Courses




Lecture Slides
Syntax Colors
Alternative Text
Interactive Learning Objects

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Lecture Slides

To PDF or to not PDF?

Scenario

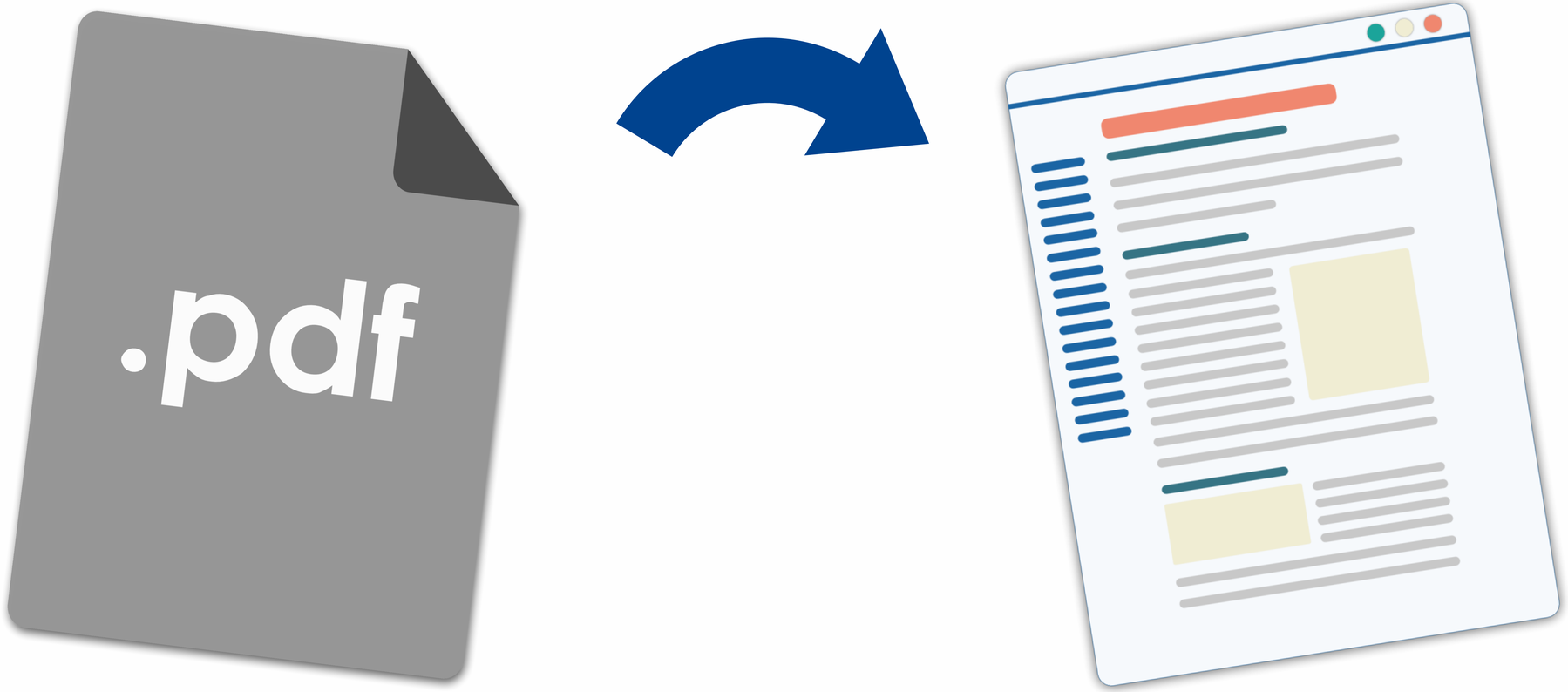
You are working with a faculty member on a course with multiple lecture videos that the faculty member has created using a popular presentation tool.

Course evaluations from previous students suggest that they would favor an option to see the lecture slides and review at their own pace.

The faculty member is aware of some basic digital accessibility principles, and sends you a collection of slide decks to review for accessibility compliance and to embed in the course.

In the past, they have exported other documents to PDF.

Do we have to use PDFs?



'PDF' image by Anna from Pixabay
"Course site page" image by Philip Chambers

Do we have to use PDFs?

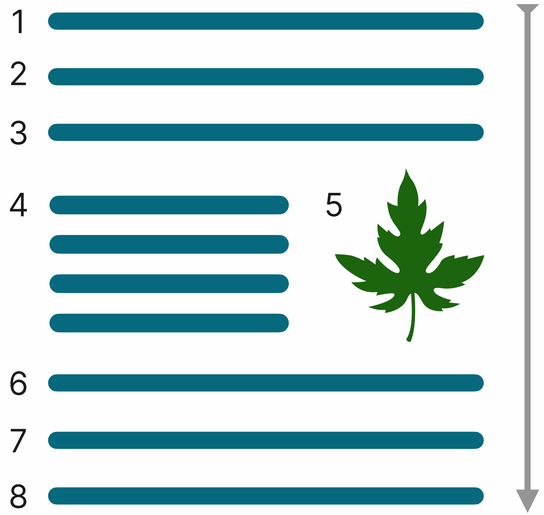
1. It is preferable to keep learners on the learning platform, if we can.
2. PDFs are much more difficult to make accessible compared to a webpage.
3. It's much easier to add alternative text to a web version of a resource than a PDF.

"Do not use PDFs to present digital content that could and should otherwise be a web page." - *Nielsen Norman Group, "PDF: Still Unfit for Human Consumption, 20 Years Later"*

When PDFs are necessary:

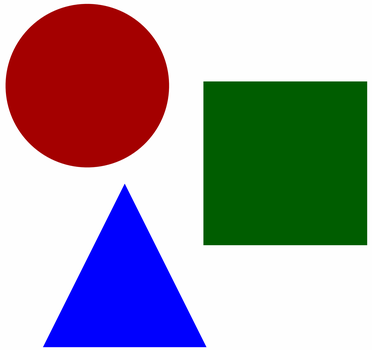
H1 Heading 1
H2 Heading 2
H3 Heading 3
H3 Heading 3
H2 Heading 2
H3 Heading 3
H3 Heading 3

Correct heading hierarchy



Logical Reading Order

Alternative Text for Images



High Contrast Colors

Color Contrast

Syntax Highlighting

Scenario

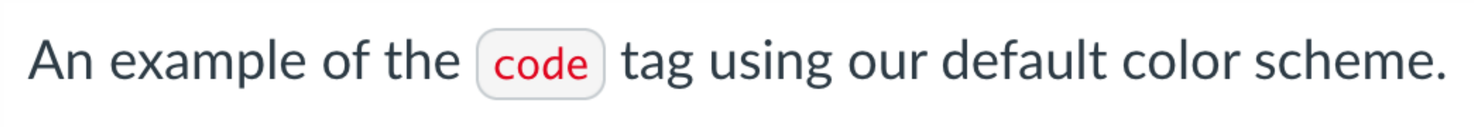
You are working with a computer science faculty member on a code-heavy course. The code is written by the faculty member in their text editor, which has color-coded the syntax to make it easier to read.

The faculty member sends you an exported version of this code with colors. Using an accessibility checker in the learning management system (LMS), you notice that the tool has identified errors on the course pages—all of them related to color contrast. Certain colors are too light for the background, making it potentially difficult to read for some learners.

On a single block of code, this might not be an issue, but the faculty member has hundreds of code blocks throughout the course with thousands of lines of code, all containing inaccessible colors.

Sometimes small changes are needed

Not Accessible



Accessible

Sometimes larger changes are identified

```
some_number = 42
print(some_number)
# Prints 42
some_number = "Hello World"
print(some_number)
# Prints Hello World
```

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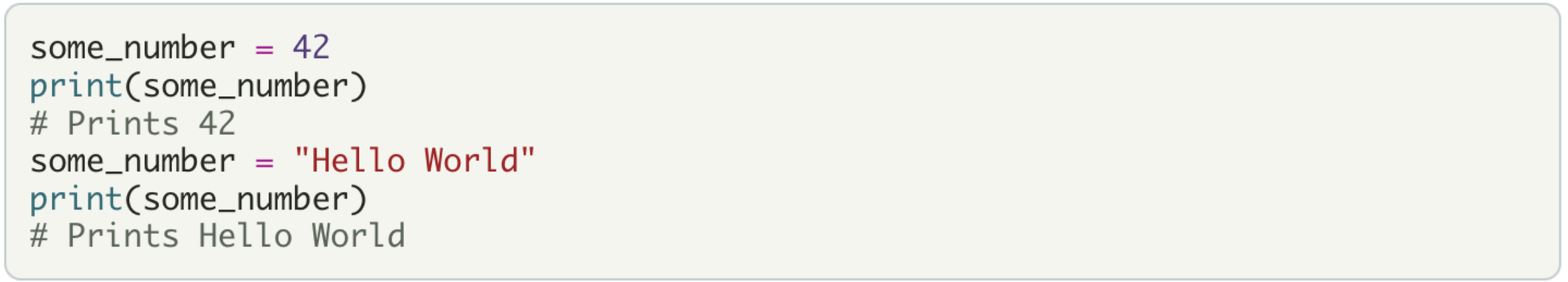

Sometimes larger changes are identified

```
<pre style="color: #000000; background-color: #f5f5f5;"><code
class="language-python" data-lang="python">some_number <span
style="color: #942899;">=</span> <span style="color:
#542299;">42</span>
<span style="color: #224699;">print</span>(some_number)
<span style="color: #0f034a;"># Prints 42</span>
some_number <span style="color: #942899;">=</span> <span
style="color: #046b99;">"Hello World"</span>
<span style="color: #224699;">print</span>(some_number)
<span style="color: #0f034a;"># Prints Hello World</span></
code></pre>
```

```python
some_number = 42
print(some_number)
# Prints 42
some_number = "Hello World"
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# Prints Hello World
```

'HTML' and 'CSS' images by Mateusz Zdrzałek from Pixabay

Only Necessary on Canvas without stylesheet access!

```
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```

'HTML' and 'CSS' images by Mateusz Zdrzałek from Pixabay

Color Contrast | Syntax Highlighting

Meets WCAG 2.0 AAA Standard

Background Color: White

Color	Hex	Color Name
	#FFFFFF	White
	#050709	Black Pearl
	#3B0053	Indigo
	#00008B	Dark Blue
	#002A15	Dark Green
	#550000	Maroon
	#66380F	Raw Umbra
	#554800	Olive
	#4B5555	Dark Slate

Background Color: Pure Dark Mode

Color	Hex	Color Name
	#000000	Black
	#FFFFFF	White
	#98FB98	Pale Green
	#DCC6E0	Blue Chalk
	#34DBDB	Turquoise
	#FFD700	Gold
	#F9BF3B	Saffron
	#FF6347	Tomato
	#D2D7D3	Mystic

Background Color: Ghost White

Color	Hex	Color Name
	#EEEEFF	Ghost White
	#000000	Black
	#002627	Dark Green
	#000036	Prussian Blue
	#2A002A	Tyrian Purple
	#382903	Raw Umbra (Brown)
	#551700	Maroon (Brown)
	#600000	Maroon (Red)
	#2e343b	Gunmetal

Meets WCAG 2.0 AA Standard

Background Color: Acadia

Color	Hex	Color Name
	#272822	Acadia
	#F8F8F2	Alabaster
	#FF521C	International Orange
	#AE81FF	Light Slate Blue
	#66D9EF	Turquoise Blue
	#FFEF38	Gorse
	#A6E22E	Las Palmas
	#7ABA07	Citrus
	#8D9987	Pewter

Background Color: White Smoke

Color	Hex	Color Name
	#F5F5F5	White Smoke
	#000000	Black
	#942899	Vivid Violet
	#542299	Purple Heart
	#224699	Endeavour
	#0F034A	Sapphire
	#046B99	Cerulean
	#851414	Falu Red
	#D0450E	Harley Davidson Orange

Background Color: Alabaster

Color	Hex	Color Name
	#F8F8F2	Alabaster
	#272822	Acadia
	#336C77	Bluemine
	#9D2323	Mandarin Orange
	#A72594	Medium Red Violet
	#543F7C	Gigas
	#4E6A16	Fiji Green
	#1C640E	Crusoe
	#5D6559	Cactus

Color Contrast | Syntax Highlighting

```
newString = input("Enter a word or phrase here!\n")
strLength = len(newString)

print("Your input has " + str(strLength) + " characters.")
```

Check String Character Length Code by Philip Chambers
"Night Owl" syntax color palette by Sarah Drasner

Color Contrast | Syntax Highlighting

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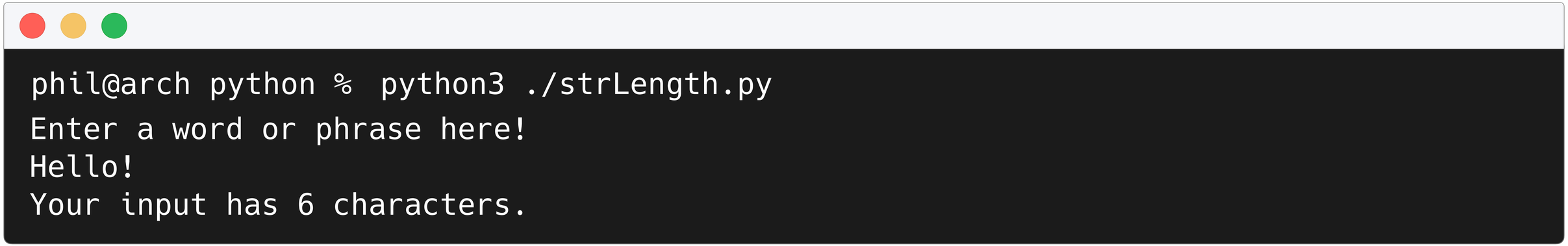

Color Contrast | Syntax Highlighting

```
original_text = input("Enter a word or sentence to see if it is a palindrome:\n")

filtered_text = "".join([char for char in original_text if char.isalnum()]).lower()

palindrome_check = filtered_text[::-1]

if palindrome_check == filtered_text:
    print("Yep, that's a palindrome!")
else:
    print("That's not a palindrome, sorry!")
```

Demo Palindrome Checker Code by Philip Chambers
"Night Owl" syntax color palette by Sarah Drasner

Color Contrast | Syntax Highlighting

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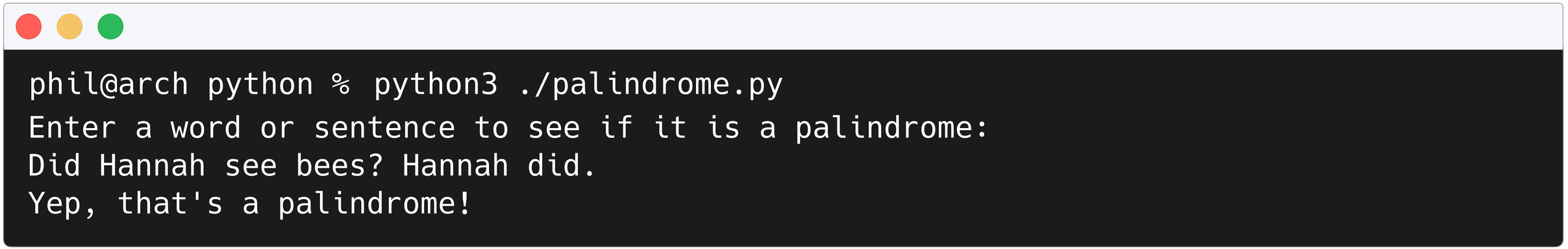

Color Contrast | Syntax Highlighting

```
original_text = input("Enter a word or sentence to see if it is a palindrome:\n")

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palindrome_check = filtered_text[::-1]

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     print("Yep, that's a palindrome!")
else:
     print("That's not a palindrome, sorry!")
```

Demo Palindrome Checker Code by Philip Chambers
"Night Owl" syntax color palette by Sarah Drasner

```
phil@arch python % python3 ./palindrome.py
Enter a word or sentence to see if it is a palindrome:
Did Hannah see bees? Hannah did.
Yep, that's a palindrome!
```

Alternative Text

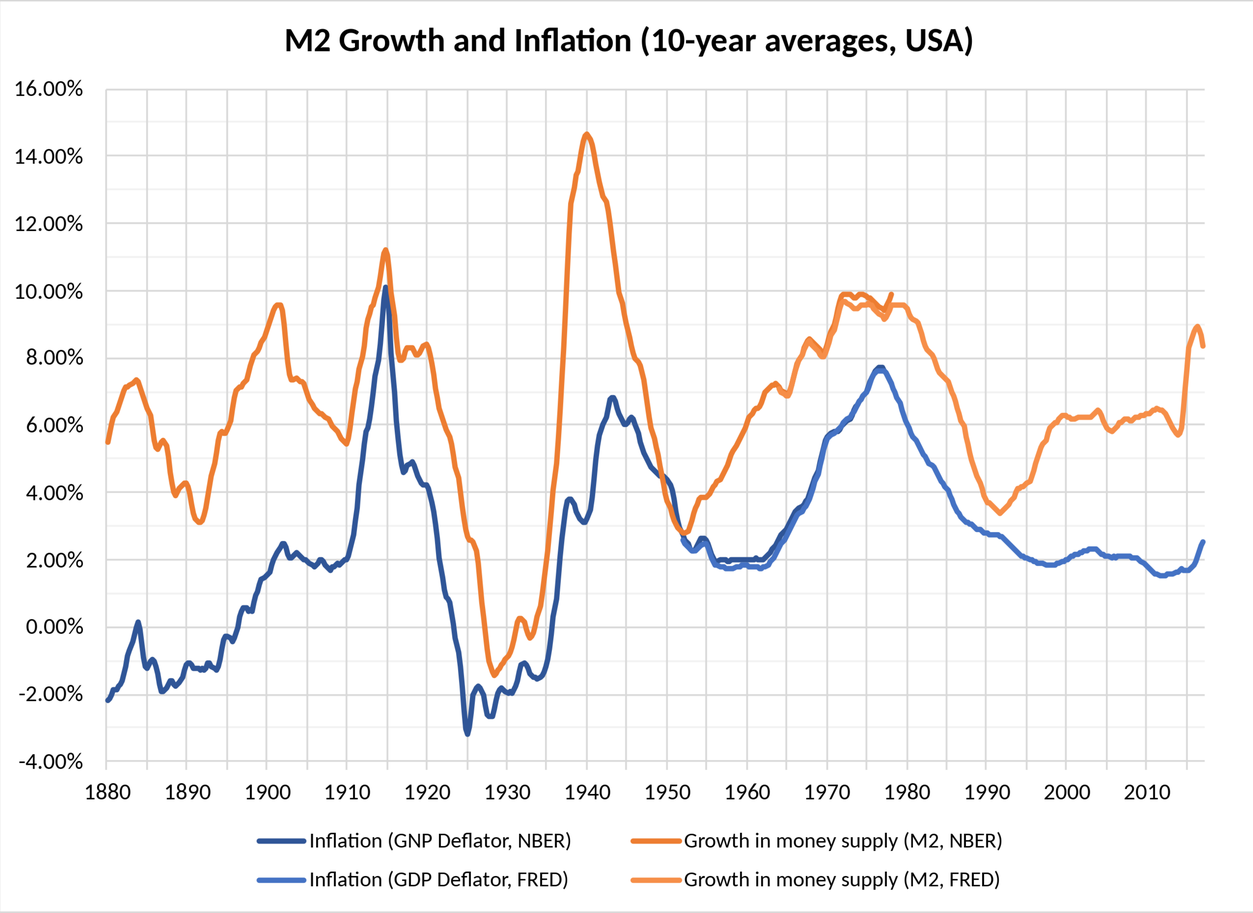
Writing Descriptions

Scenario

You have been assigned to work with an economics professor on a particularly challenging course for third-year university students.

The professor has taught this course a few times and would like to add more visuals to the learning materials. As it is an economics course, the images consist of complex graphs and charts.

Integrating the images into the existing webpages is simple, but after running your accessibility checker tool, it reports that all the new images are inaccessible for screen readers because they lack suitable descriptions.



Text Description

"Changes in the ten-year moving averages of price level and growth in money supply (using the measure of M2, the supply of hard currency and money held in most types of bank accounts) in the US from 1880 to 2016. Over the long run, the two series show a close relationship. The graph can be reproduced by producing a 10-year moving average for each series, and comparing (by division) resulting values that are one year apart."

(352 - 427 characters)

"M2 and Inflation USA", AlphaMikeOmega, CC0, via Wikimedia Commons

```
<img src="m2_and_inflation_usa.png" alt="Changes in the ten-year moving averages of price level and growth in money supply (using the measure of M2, the supply of hard currency and money held in most types of bank accounts) in the US from 1880 to 2016. Over the long run, the two series show a close relationship. The graph can be reproduced by producing a 10-year moving average for each series, and comparing (by division) resulting values that are one year apart."
width="500" height="600">
```

Alternative Text | Writing Descriptions

```
<img src="m2_and_inflation_usa.png" alt="Changes in the ten-year moving averages of price level and growth in money supply (using the measure of M2, the supply of hard currency and money held in most types of bank accounts) in the US from 1880 to 2016. Over the long run, the two series show a close relationship. The graph can be reproduced by producing a 10-year moving average for each series, and comparing (by division) resulting values that are one year apart."
width="500" height="600">
```

✗ Beyond usual recommendation of 150-200 characters for alt text.

✗ Breaks the flow of information for users of screen reader software

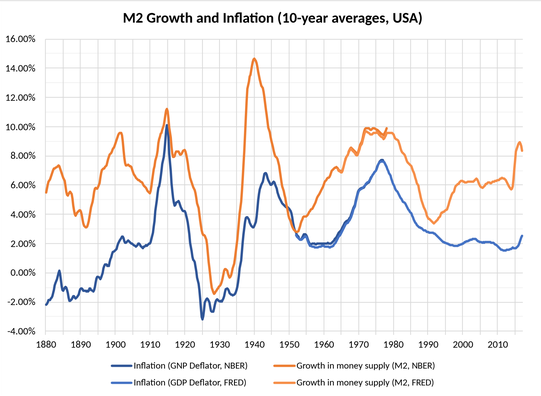
I don't know what any of those images are...

Create and share a document with subject matter experts specifically for alternative text and descriptions!

Image and Location	Alt Text	Long Description
Lecture 1, Slide 5, Lower Right	Short, descriptive text	Longer description giving more context
"Start Here - Technical Help" Page	Short, descriptive text	Longer description giving more context

Figure and Figcaption

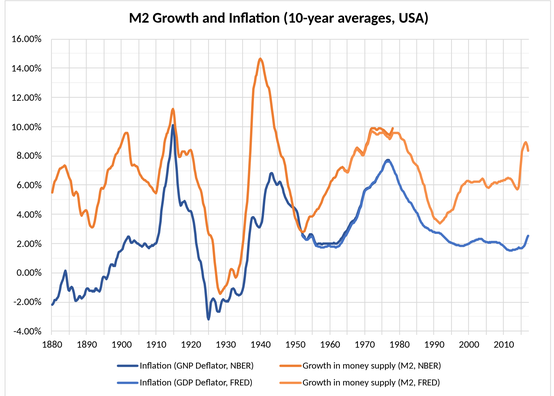
```
<figure>
  <img src="m2_and_inflation_usa.png" alt="M2
Growth and Inflation (10-year averages, USA)">
  <figcaption>Changes in the ten-year moving
averages of price level and growth in money
supply (using the measure of M2, the supply of
hard currency and money held in most types of
bank accounts) in the US from 1880 to 2016. Over
the long run, the two series show a close
relationship. The graph can be reproduced by
producing a 10-year moving average for each
series, and comparing (by division) resulting
values that are one year apart.</figcaption>
</figure>
```



Changes in the ten-year moving averages of price level and growth in money supply (using the measure of M2, the supply of hard currency and money held in most types of bank accounts) in the US from 1880 to 2016. Over the long run, the two series show a close relationship. The graph can be reproduced by producing a 10-year moving average for each series, and comparing (by division) resulting values that are one year apart.

Place-Linked

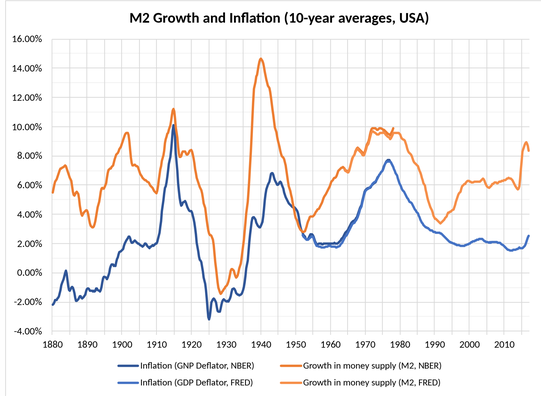
```
<p><img src="m2_and_inflation_usa.png" alt="M2
Growth and Inflation (10-year averages, USA)">
<br>
Changes in the ten-year moving averages of price
level and growth in money supply (using the
measure of M2, the supply of hard currency and
money held in most types of bank accounts) in
the US from 1880 to 2016. Over the long run, the
two series show a close relationship. The graph
can be reproduced by producing a 10-year moving
average for each series, and comparing (by
division) resulting values that are one year
apart.
</p>
```



Changes in the ten-year moving averages of price level and growth in money supply (using the measure of M2, the supply of hard currency and money held in most types of bank accounts) in the US from 1880 to 2016. Over the long run, the two series show a close relationship. The graph can be reproduced by producing a 10-year moving average for each series, and comparing (by division) resulting values that are one year apart.

ARIA Attribute

```
<p><img src="m2_and_inflation_usa.png" alt="M2
Growth and Inflation (10-year averages, USA)"
aria-describedby="chart-text">
</p>
<p id="chart-text">Changes in the ten-year
moving averages of price level and growth in
money supply (using the measure of M2, the
supply of hard currency and money held in most
types of bank accounts) in the US from 1880 to
2016. Over the long run, the two series show a
close relationship. The graph can be reproduced
by producing a 10-year moving average for each
series, and comparing (by division) resulting
values that are one year apart.
</p>
```



Changes in the ten-year moving averages of price level and growth in money supply (using the measure of M2, the supply of hard currency and money held in most types of bank accounts) in the US from 1880 to 2016. Over the long run, the two series show a close relationship. The graph can be reproduced by producing a 10-year moving average for each series, and comparing (by division) resulting values that are one year apart.

"M2 and Inflation USA", AlphaMikeOmega, CC0, via Wikimedia Commons

Interactive Objects

Accessible Design Planning

Scenario

An instructor comes to you with a request for an interactive element on their Module Overview pages. They would like an interactive checkbox task list that students can use to monitor their progress throughout the week.

Once a task is completed, students can check the box next to the task and it is crossed out for them to indicate that it has been completed.

You know that your dedicated media and web team will be able to come up with something to help with this, and so you schedule a meeting.

Task List

In order to achieve this week's learning outcomes, please make sure to complete the following:

Your Task Checklist:

- [ ] This is task 1!
- [ ] This is task 2!
- [ ] This is task 3!
- [ ] This is task 4!

Module Completion Progress

Your completed tasks are stored in your web browser's local storage and not saved to any other computer or server.
If you want to clear this from your local storage, click the button below:

Clear Local Storage

JavaScript Interactive Task Checklist by Philip Chambers

If I am not making the interactive, how can I help?

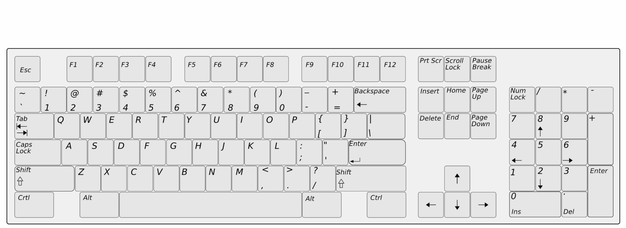
What are the things we needed to do in that previous example?

1. Identify the interactive part(s) of the element.
2. Click on checkboxes or text itself to trigger the interaction.
3. Receive feedback that checkbox was activated.
4. See the progress bar moving across the screen.

All things that required certain inputs and expectations of the learner!

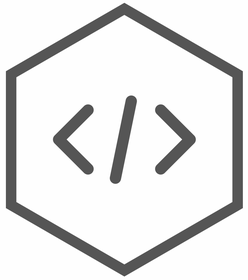
How do we ensure accessibility with interactive during design planning stages?

Establish methods of interaction



Are interactions announced to users of accessible technology?

Can users "escape" from embedded objects?



Is the interactive object designed for multiple devices?

"Information" image by Stephan from Pixabay
"Hexagon" image by Jan from Pixabay
"Laptop, Tablet and Smartphone" image by Coffee Bean from Pixabay
"Mouse" and "Keyboard" image by Clker-Free-Vector-Images from Pixabay
"Speech" image by mcmurryjulie from Pixabay

Summary

A list of things to look out for

Summary | A list of things to look out for

Accessibility Scenario	Design Solution
Course documents may not be accessible due to a lack of document styles.	Be mindful of the time required to make a slide deck or PDF file accessible. Use built-in accessibility checkers found in applications that create, read, and edit course documents. Look out for missing titles and properly ordered headings, a logical reading order through the document, alternative text for images, and inaccessible color usage.
Low-contrast colors present barriers to learning.	Check all colors used on the course site by applying WCAG standards of 7:1 or higher to ensure the highest contrast and readability. Avoid using colors falling under a 4.5:1 ratio as they will be difficult to read. Try not to use colors for emphasis (such as red for important information), as these will not be read by assistive technologies such as screen readers and any intended meaning will be lost.
Images require alt text with certain complex images requiring longer explanations than is reasonable to fit in an alt text field.	With all images, be sure to include alt text that succinctly describes the image for users who are not able to see it and for those whose web browsers cannot load the image. Try to keep the image description brief to not interrupt the flow of information in the rest of the page. Complex images requiring more detailed explanations can be further explained in text, and linked directly to the image so screen-reader users are aware of the relationship between the image and the detailed explanation.
Interactive learning objects need a special focus due to the different ways users can interact with content.	During the process of working with a web development or multimedia team to create ILOs, be mindful of the ways that learners might interact with the content. Assume that some may not be using a mouse and may require alternative forms of interaction with the object. Early intervention on behalf of the different kinds of users saves time for all stakeholders and avoids unnecessary changes later on when content is identified as inaccessible.

Discussion

Questions/Answers/Chat Time!

End

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philip.chambers@oregonstate.edu

Sources/References

Code Syntax Color Scheme: 'Night Owl' by **Sarah Drasner**, https://github.com/sdras/night-owl-vscode-theme

'HTML' and 'CSS' images by Mateusz Zdrzałek from Pixabay

'M2 and Inflation USA', AlphaMikeOmega, CC0, via Wikimedia Commons

Nielsen Norman Group, August 9, 2020, "PDF: Still Unfit for Human Consumption, 20 Years Later"

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