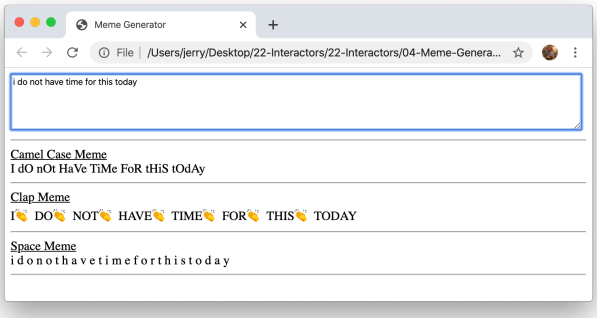
Jerry Cain
CS 106AX

Handout #21
November 15th, 2023

Section Handout #7

Problem 1: Meme Generator



Implement a simple web application that allows the user to type free form into a text editor, on-the-fly constructs three text memes, and displays them in each of three **`div`** elements. The screenshot on the right should be enough to illustrate how the meme generator might work.

- The first text meme is equivalent to the original text, save that all alphabetic characters alternate between uppercase and lowercase.
- The second meme capitalizes all letters, and places a clap emoji after each word.
- The third gets rid of all punctuation, makes everything else lowercase, and separates each character by a space.

The details of how the meme strings are synthesized isn't all that important. What **is** important is your ability to construct the JavaScript controller that knows how to extract the value from the relevant textarea with each input change and update each of the three **`div`**s to present the corresponding memes.

You should implement the program to code to operate with this HTML file:

```
<head>
   <meta charset="UTF-8">
   <title>Meme Generator</title>
   <script src="meme.js" type="text/javascript"></script>
 </head>
 <body>
    <div>
       <textarea id="source" rows="5" cols="140"></textarea>
       <hr/><u>Camel Case Meme</u>
       <div id="camel-case-meme"></div>
       <hr/><u>Clap Meme</u>
       <div id="clap-meme"></div>
       <hr/><u>Space Meme</u>
       <div id="space-meme"></div>
       <hr/>
    </div>
 </body>
```

In the starter code, you'll want to modify **`BootstrapMemeGenerator`** to get the DOM nodes for the **`textarea`** and meme **`div`**s, saving them in variables **`textarea`**, **`camelMemeDiv`**, **`clapMemeDiv`**, and **`spaceMemeDiv`** that you can reference later. Then, modify **`onTextareaInput`** to call **`constructCamelCaseMeme`**, **`constructClapMeme`**, and **`constructSpaceMeme`**, and call **`embedUpdatedMeme`** to display the returned strings on the

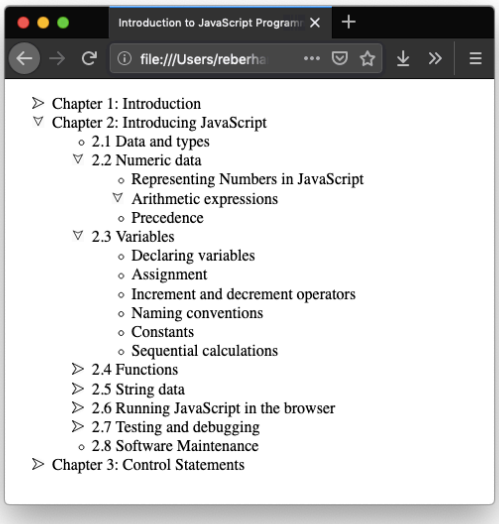
page. You'll need to implement **`constructClapMeme`**; **`embedUpdatedMeme`**, **`constructCamelCaseMeme`** and **`constructSpaceMeme`** are already implemented for you.

Problem 2: Collapsible Lists using CSS

In this problem, you will leverage CSS in order to create an interactive, collapsible list, where clicking a list item will collapse (or expand) any child list items. The example we provide is a textbook table of contents. By using some simple CSS to solve this problem, the amount of Javascript we need to write will be minimized. Note that in this class, you don't need to know how to write CSS to accomplish arbitrary goals, but you should be familiar with how it works. We will guide you through the CSS for this problem.

Start by opening **`collapsible-list.js`** and implementing **`ConfigureCollapsibleList`**. This function should loop through all **`li`** nodes on the page; for each node that contains more list items (i.e. for each node that has a child **`ul`** node), you should do two things:

- Add the **`closed`** class, so the collapsible list starts off completely collapsed
- Add a click event listener, calling **`toggleListItem`** when the **`li`** is clicked

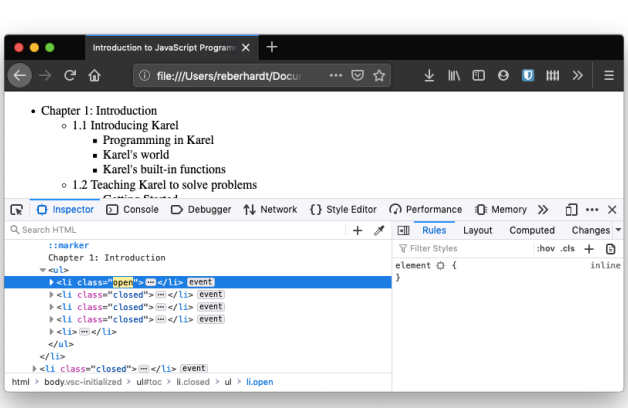


Note that given a particular **`node`**, you can get an array of children in that node that are a particular tag type (e.g. **`ul`**) by calling **`node.getElementsByTagName("tagname")`**. (This is the same as **`document.getElementsByTagName`**, except that it only returns children of **`node`**.)

You should also implement **`toggleListItem(e)`** to toggle whether a clicked list item is collapsed. If the **`closed`** class is present on the clicked node (**`e.target`**), you should remove it and add the **`open`** class. Similarly, if the **`open`** class is present, you should remove it and add the **`closed`** class. After changing the classes, you will need to stop the event from propagating upwards in the DOM. (Do you know why?)

Recall that you can add a class by calling **`node.classList.add("classname")`**, remove a class by calling **`node.classList.remove("classname")`**, and check if a class is present by calling **`node.classList.contains("classname")`**.

Once you have done this, try opening **`collapsible-list.html`**. Clicking the list items won't do anything (although you shouldn't see any errors in the console, either). However, if you right click an element and click "Inspect Element," you should see that element's class displayed in the Chrome debugger, and you



should see that class change if you click the element.

To change the presentation of the page based on what classes are present, we'll need to add some CSS. Open **`collapsible-list.css`**. To get warmed up, let's first apply a consistent style to all list items, so that each list item has the same kind of bullet point regardless of whether it is a top-level list item or a child:

```
li {
    list-style-image: none;
    list-style-type: circle;
}
```

Let's take this one step further: for **`closed`** list items, let's replace the bullet point with a right-facing arrow indicating that the list item is collapsed, and for **`open`** list items, let's replace the bullet point with a down-facing arrow. We can *override* the general li styles we just created with styles targeted at a *more specific* selector:

```
.open {
    list-style-type: none;
    list-style-image: url("down-arrow.png")
}

.closed {
    list-style-type: none;
    list-style-image: url("right-arrow.png")
}
```

Finally, we need to implement the collapsing functionality, so that **`closed`** list items hide their children. To do this, we want to avoid displaying child lists (i.e. **`ul`** nodes) that are inside **`closed`** list items. We can accomplish this like so:

```
.closed ul {
    display: none;
}
```

Note: in the styles above, we could have written **`.closed`** as **`li.closed`** and it would have had the same effect. Since it's not necessary, convention is to keep the styles more general, so that the styles would still work if you nested a **`ul`** inside of a **`closed`** element of some other type.

Voilà! With just a few lines, we've managed to implement a fully-functional collapsible list. As an additional question, consider: why is the **`.closed ul`** selector so handy? How would you implement list collapsing if you could not use these "descendant selectors"?