CS213 - Software Systems Laboratory End-Semester 2023 Total Marks: 30 Duration: 180 min

Instructions:

- Read through the questions carefully and approach any of the co-instructors if anything is ambiguous.
- In Section I, there are 5 questions, each carrying 2 marks
- In Section II, there will be 5 questions, each carrying 5 marks [only 4 need to be answered, one optional question will be there in this section.]
- One-page handout will be allowed during the exam, which can contain major tags or details.
- **Please be seated according to the seating arrangement and failing to do so will result in disqualification from the exam**.
- *If we find anyone copying, directly an FR will be graded as per the exam policies. Hence please keep things in mind and avoid any such things*.

Section I: Answer all the questions [1-5]

1. Create a bash script that takes *two strings* as input from the console and displays a message indicating whether the provided *strings* are equal or not.

   [2 Marks]

2. Write a bash script that continuously prompts the user for two integers, adds them together, and presents the result. The script should keep asking for numbers until the user types/enters ***exit*** in any of the requested integers.

   [2 Marks]

3. Create a counter with JavaScript *as shown in Figure 1* and implement conditions that dynamically change the color based on whether the displayed number is positive or negative.

   [2 Marks]

   [Note#1: Methods that could be useful to do this task: *document.querySelectorAll(); forEach(); addEventListener(); currentTarget property; classList; and textContent*.]

   [Note#2: For *positive integers use the **green color***, whereas *negative number use the **red color***.]

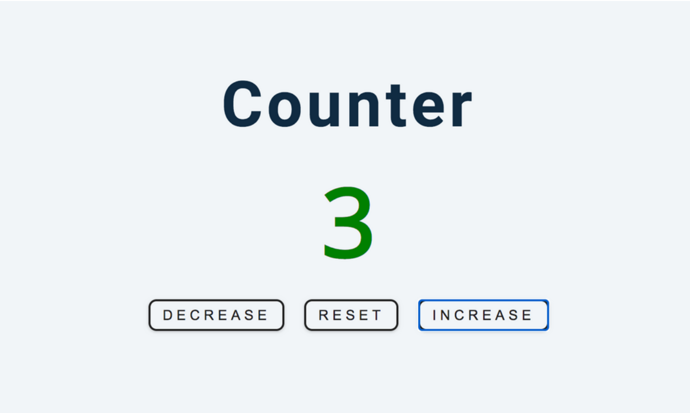
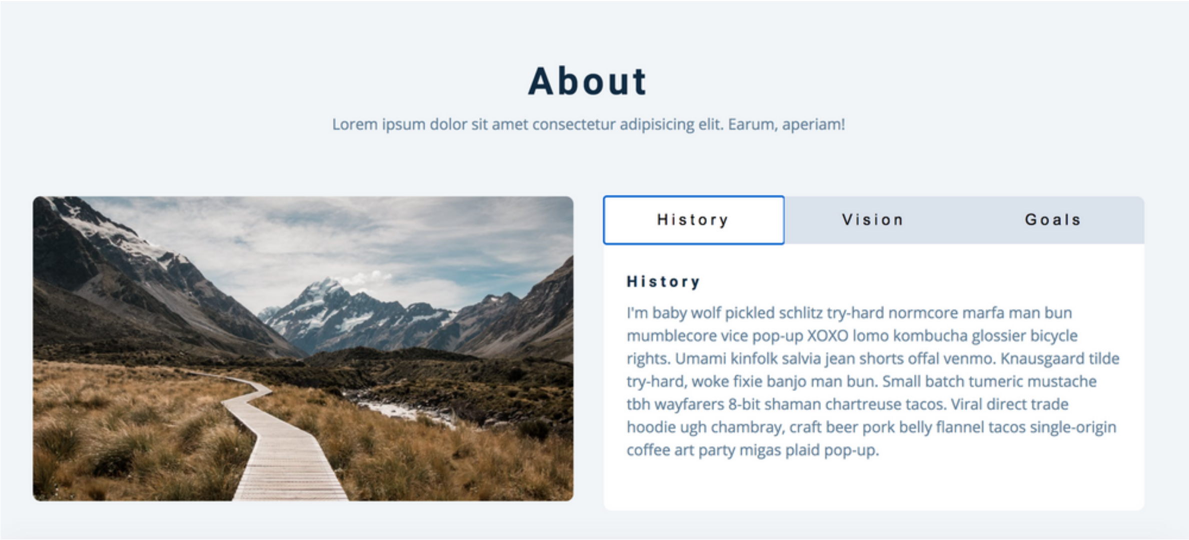


Figure 1: An example of Counter implementation using JavaScript

4. Develop a JavaScript code to create tabs for displaying different content as shown in Figure 2, especially beneficial for single-page applications. Ensure that the tabs seamlessly switch between content sections without requiring a full page reload.

[2 Marks]

[Note#1: Methods that could be useful to do the task: *classList.add(); classList.remove(); forEach(); and addEventListener()*]
[Note#2: The below **About** text to be placed: Welcome to CS213 End semester examination]
[Note#3: All the descriptions required to keep under the tabs and also the image are placed in the folder Sec1_Q4]



About

Lorem ipsum dolor sit amet consectetur adipisicing elit. Earum, aperiam!

History

I'm baby wolf pickled schlitz try-hard normcore marfa man bun mumblecore vice pop-up XOXO lomo kombucha glossier bicycle rights. Umami kinfolk salvia jean shorts offal venmo. Knausgaard tilde try-hard, woke fixie banjo man bun. Small batch tumeric mustache tbh wayfarers 8-bit shaman chartreuse tacos. Viral direct trade hoodie ugh chambray, craft beer pork belly flannel tacos single-origin coffee art party migas plaid pop-up.

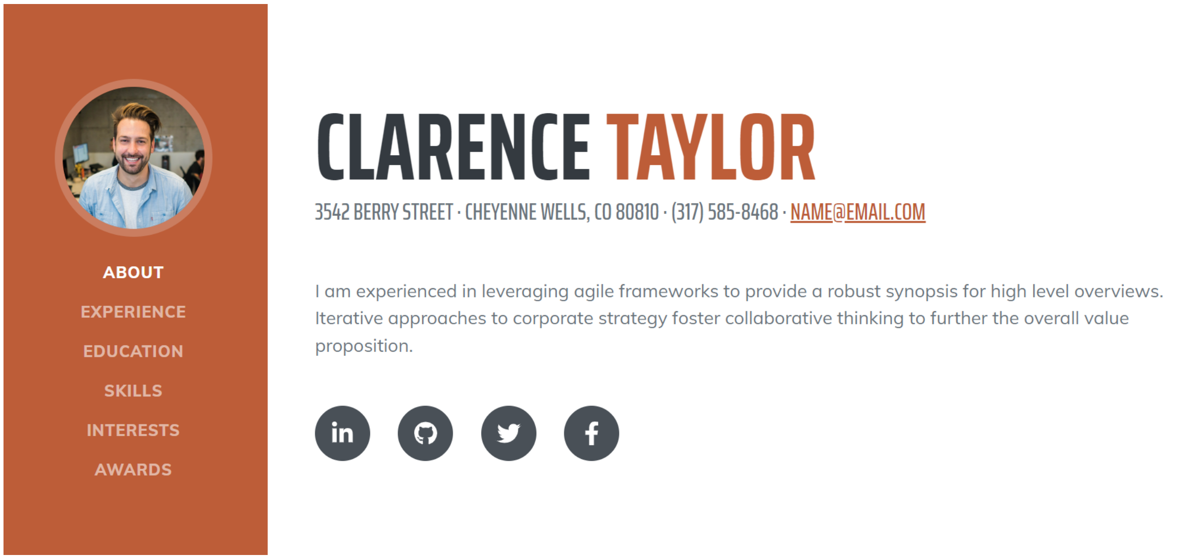
Figure 2: An example of JavaScript to create tabs for displaying different contents

5. Design a blog using HTML and CSS as shown in Figure 3.

[2 Marks]

[Note#1: Include the following in head tag:
<link rel="icon" type="image/x-icon" href="assets/img/favicon.ico" />
<script src="Supplement/fontawesome.js"
    crossorigin="anonymous"></script>
    [check fontawesome.js in the folder "Supplement"]
<style type="text/css">
    @font-face {
      font-family: 'Montserrat';
      src: local(''), url('Supplement/GoogleFont3.woff2') format('woff2');
    }
</style> [Font style check Help.txt and GoogleFonts in the folder "Supplement"]
<script src="Supplement/Bootstrap.js"> </script>
    [check Bootstrap.js in the folder "Supplement"]
]

[Note#2: Use the following for icons:
    LinkedIn — <i class="fab fa-linkedin-in"></i>
    GitHub — <i class="fab fa-github"></i>
    Twitter — <i class="fab fa-twitter"></i>, and,
    Facebook — <i class="fab fa-twitter"></i>]



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I am experienced in leveraging agile frameworks to provide a robust synopsis for high level overviews. Iterative approaches to corporate strategy foster collaborative thinking to further the overall value proposition.

Figure 3: An example of HTML and CSS for blog content

Section II: Answer any four of the following questions [6-10]

6. Write a bash script to accomplish the following tasks

[5 Marks]

   a. Receive the positional arguments “Hi there, ALL the best for your CS213 EndSem” from the command line

      [Note#1: For example, consider ./myscript.sh arg1 arg2 arg3; Here, arg1 arg2 arg3 are the positional arguments in the same order]

   b. Print the list of arguments provided while running the script

   c. The total number of arguments

   d. PID of the currently running script

   e. Name of the executing script

7. Develop a JavaScript code for an interactive Magic 8-Ball. Allow users to input a question and receive an enigmatic response. Ensure that the answers are randomized for a more engaging experience.

[5 Marks]

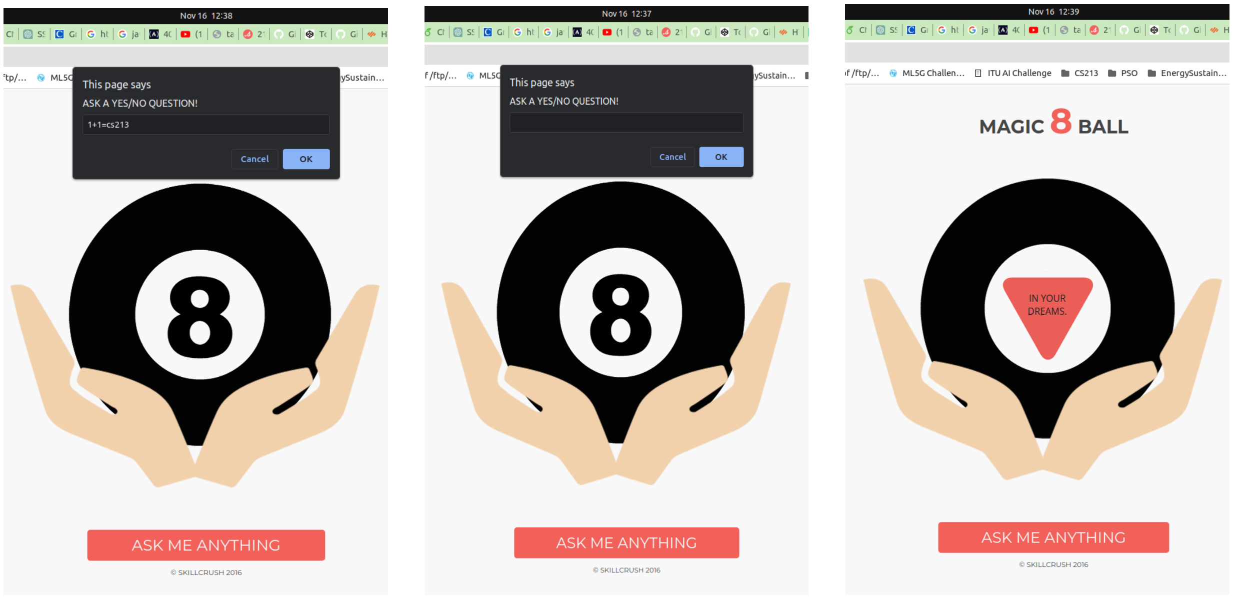
[Note#1: The responses of the Magic 8-ball should include any of the following:
"No", "Yes", "I don't think so...", "Of course!", "Indubitably", "In your dreams."
]
[Note#3: For font style use —

```
<style type="text/css">
@font-face {
 font-family: 'Montserrat';
 font-style: normal;
 font-weight: 400;
 src: local(''), url('Supplement/GoogleFont3.woff2') format('woff2');
 unicode-range: U+0000-00FF, U+0131, U+0152-0153, U+02BB-02BC, U+02C6, U+02DA,
 U+02DC, U+0304, U+0308, U+0329, U+2000-206F, U+2074, U+20AC, U+2122, U+2191,
 U+2193, U+2212, U+2215, U+FEFF, U+FFFD;
}
</style> [Font style check Help.txt and GoogleFonts in the folder “Supplement”]
```

]
[Note#3: Include the following links in the head tag:

<script src = “Spplement/jquery.min.js”>
</script> [Refer *jquery.min.js* in the folder “Supplement”]
<script src = “Supplement/jquery-ui.min.js”>
</script> [Refer *jquery-ui.min.js* in the folder “Supplement”]
]
[Note#4: Reference images are attached in Figure 4(a), 4(b), and 4(c) respectively.]

[Note#5: Source images are attached in “Sec2_Q2”.]



This page says
ASK A YES/NO QUESTION!
1+1=cs213

This page says
ASK A YES/NO QUESTION!

IN YOUR DREAMS.

(a) (b) (c)

Figure 4: An illustration of the interactive Magic 8-Ball Task

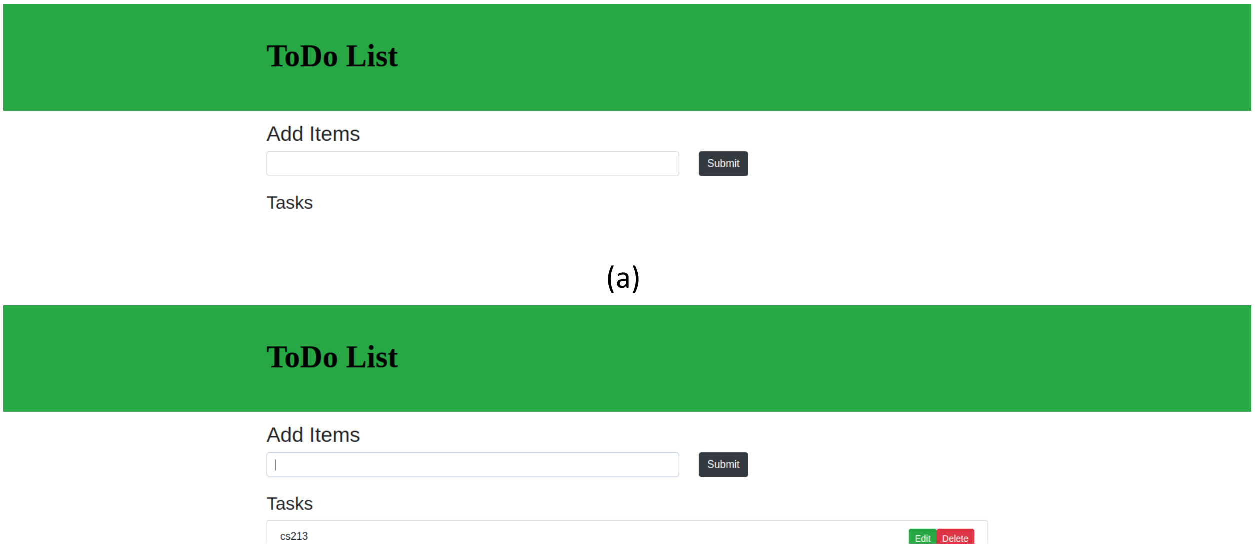
8. **To-Do List:** Implement the JavaScript code so that you can add new items and use the buttons to toggle completed items, edit items, or delete items.

[5 Marks]

[Note#1: *DOM Manipulation, Event listeners and others* could be helpful to implement this task.]

[Note#2: Include the following scripts in the head tag:
<link rel = "stylesheet" href = "Supplement/Bootstrap.css" crossorigin = "anonymous" >
[Refer *Bootstrap.css* in the folder “Supplement”]
]

[Note#3: Reference images are attached in Figure 5(a) and 5(b).]



ToDo List

Add Items

Tasks

(a)

ToDo List

Add Items

Tasks

cs213

(b)

Figure 5: An illustration of the To-Do List Task

9. Create a basic calculator using HTML and CSS as shown in Figure 6.

[5 Marks]

[Note#1: Basic mathematical operations like Addition, Subtraction, Multiplication, and Division.]

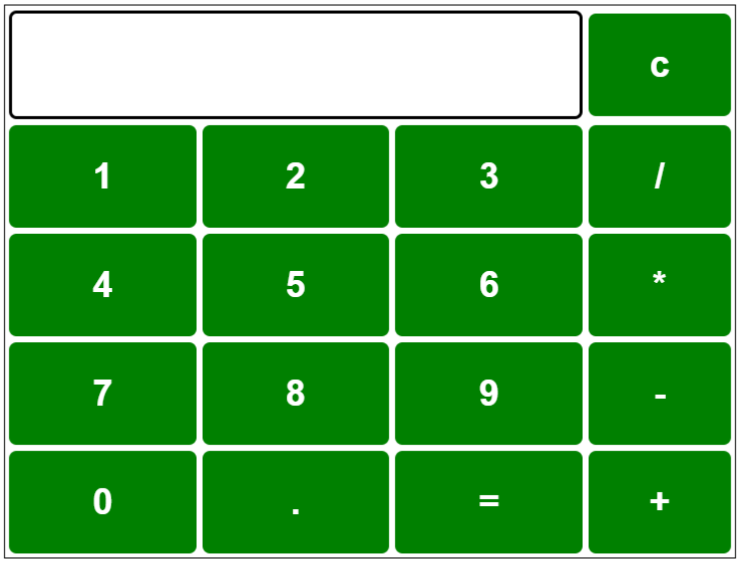


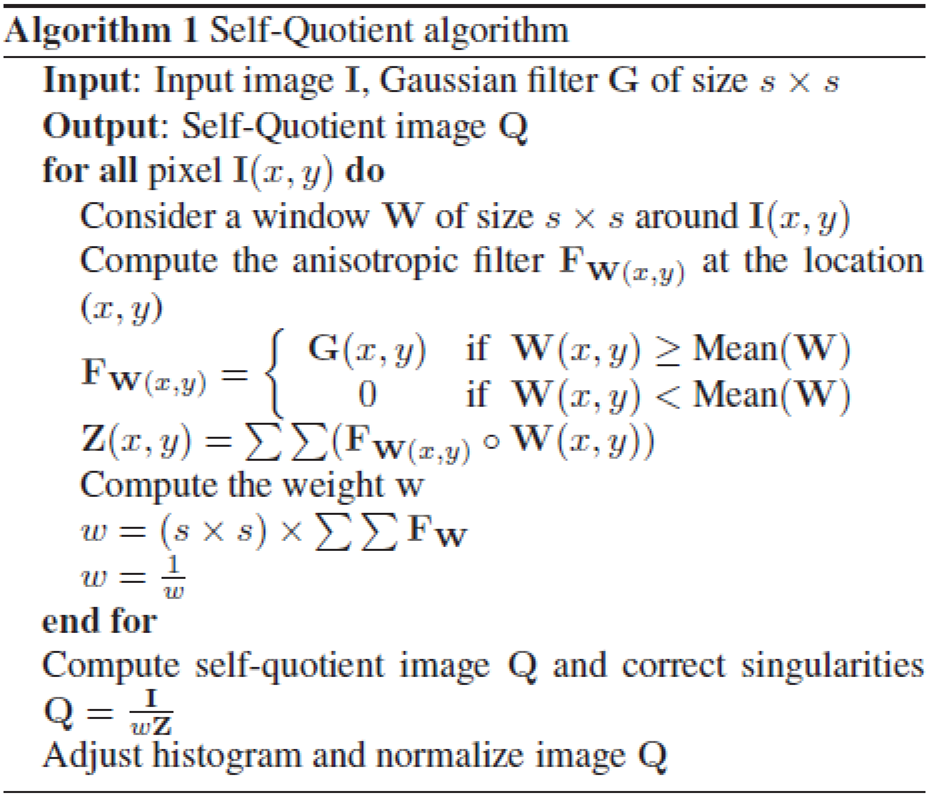
Figure 6: Illustration of the Basic Calculator

10. Write a latex code (i.e., .tex file) to generate the algorithm as shown in the following Figure

[5 Marks]

[Note#1: Use packages *algorithm, amsmath, and algpseudocode*]

[Note#2: Refer *q5-template* in the folder Sec2_Q5.]



```
**Algorithm 1** Self-Quotient algorithm
**Input**: Input image $\mathbf{I}$, Gaussian filter $\mathbf{G}$ of size $s \times s$
**Output**: Self-Quotient image $\mathbf{Q}$
**for all** pixel $\mathbf{I}(x, y)$ **do**
    Consider a window $\mathbf{W}$ of size $s \times s$ around $\mathbf{I}(x, y)$
    Compute the anisotropic filter $\mathbf{F}_{\mathbf{W}(x,y)}$ at the location $(x, y)$
    $\mathbf{F}_{\mathbf{W}(x,y)} = \begin{cases} \mathrm{G}(x,y) & \text{if } \mathrm{W}(x,y) \geq \mathrm{Mean}(\mathrm{W}) \\ 0 & \text{if } \mathrm{W}(x,y) < \mathrm{Mean}(\mathrm{W}) \end{cases}$
    $\mathbf{Z}(x, y) = \sum\sum(\mathbf{F}_{\mathbf{W}(x,y)} \circ \mathrm{W}(x, y))$
    Compute the weight w
    $w = (s \times s) \times \sum\sum \mathbf{F}_{\mathbf{W}}$
    $w = \frac{1}{w}$
**end for**
Compute self-quotient image Q and correct singularities
$\mathrm{Q} = \frac{\mathbf{I}}{w\mathbf{Z}}$
Adjust histogram and normalize image Q
```