Title: Arithmetic Mean Calculator

Key Concepts: arrays, loops, iteration

Overview

In this lab, you will program a simple dataset calculator that allows users to input numerical data, remove entries, and compute the arithmetic mean (average). This exercise will reinforce the use of arrays in JavaScript and the use of for loops to process data.

Part 1: Data Entry

Create a new webpage for the arithmetic mean calculator. On the webpage, add a single text input field and two buttons.

Text input field. Field for the user to enter a number.

Button: *Add Value*. Adds the entered number to a dataset.

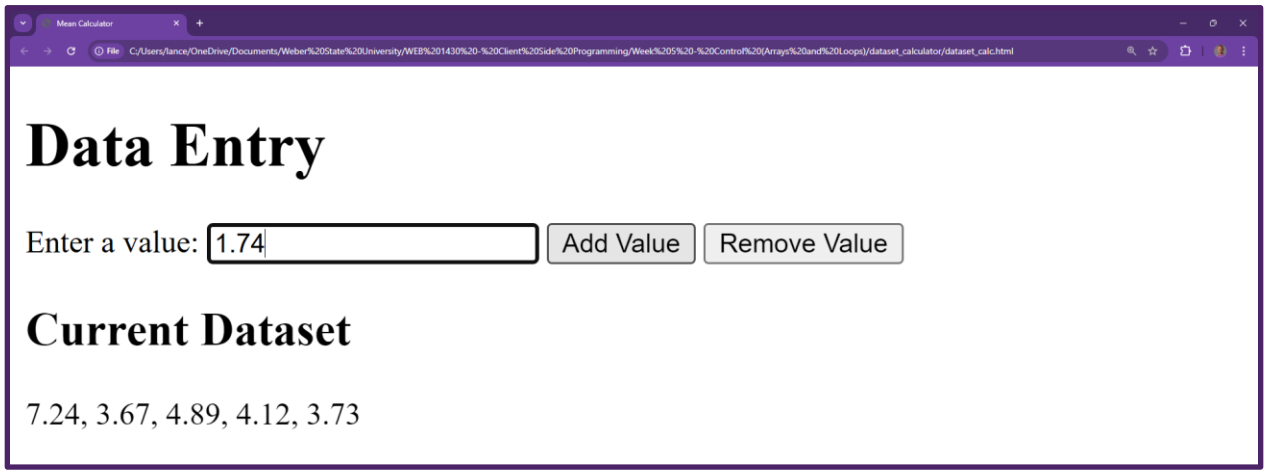
- Convert the user input to a number and validate to ensure it is numerical.
- If the value is a number, add it to a JavaScript array. (You will want the array to have global scope, as it will be accessed by multiple functions in this lab.)
- If the value is not a number—`isNaN()`—display an error message to the user. You may use an alert dialog box for this message.
- Display the updated dataset on the webpage.

Button: *Remove Value*. Removes the entered number from the dataset.

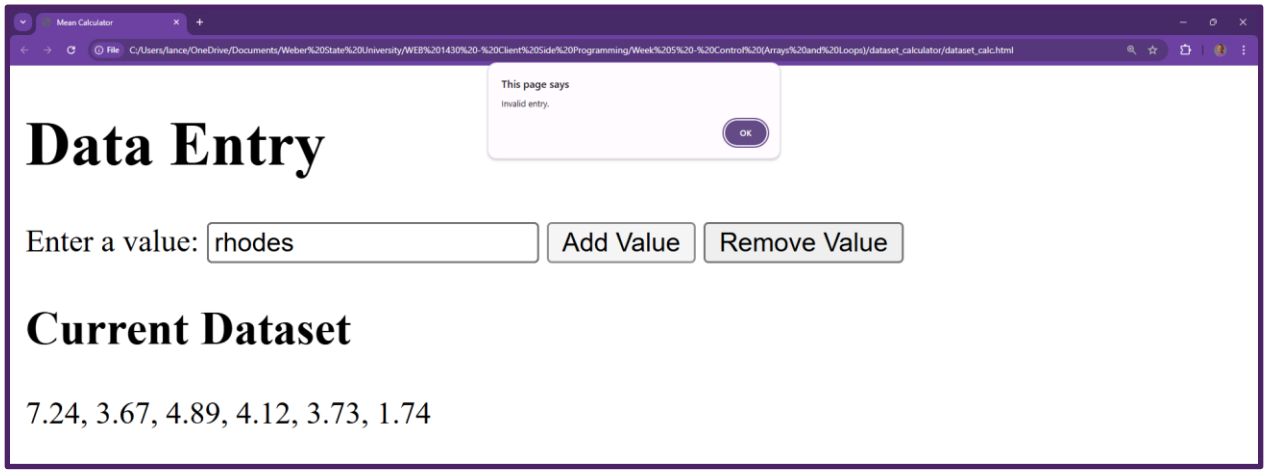
- Convert the user input to a number and validate to ensure it is numerical.
- If the value is not a number—`isNaN()`—display an error message to the user. You may use an alert dialog box for this message.
- If the value is a number, check to see if it exists in the JavaScript array.
    - If the value does not exist in the array, display an appropriate error message to the user. You may use an alert dialog box for this message.
    - If the value exists, remove it from the array.
- Display the updated dataset on the webpage.

Sample sessions are provided on the next page.

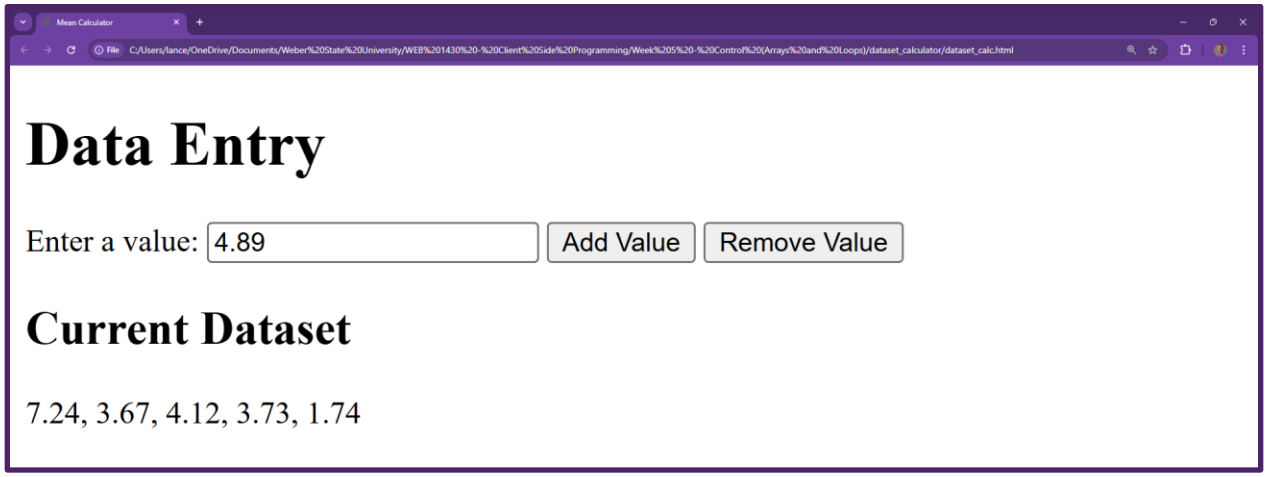
Sample data entry:



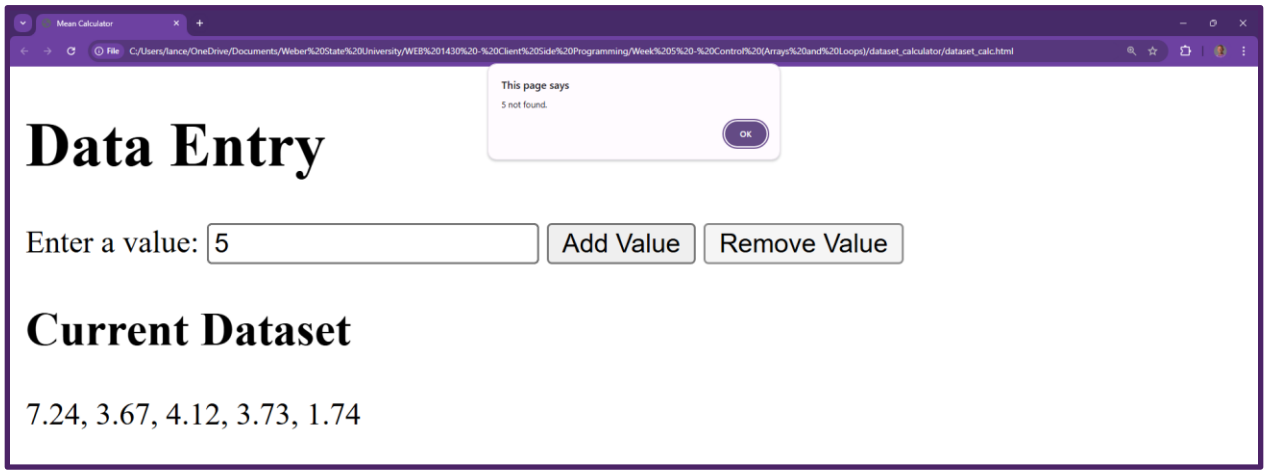
Sample invalid input (entry):



Sample data removal:



Sample item not found (removal):



Part 2: Mean Calculator

Create a new JavaScript function to compute the arithmetic mean from the existing data set.

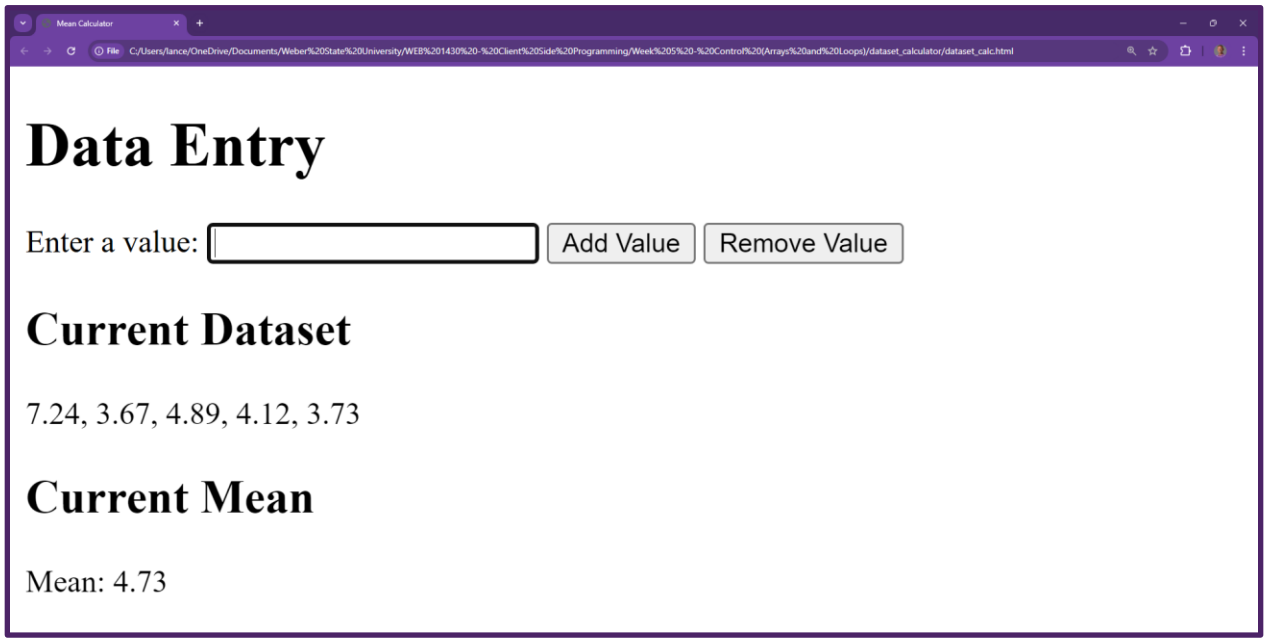
The arithmetic mean is given by the following formula:

$$\bar{x} = \frac{\sum x}{n}$$

- Use a for loop to iterate through the dataset, summing all values.
- Divide the total by the number of values in the dataset.
- Display the mean on the page. You may activate the mean function by:
  - Providing an additional button on the page (i.e. “Compute Mean”), OR
  - Computing the mean concurrently with data entry. (In other words, each time a value is added or removed, the mean is recomputed and displayed).

Note: You must use a loop to compute the arithmetic mean. Do not use existing libraries or functions. Doing so will result in a 0 for this part of the assignment.

Sample session:



Submission: Add the mean calculator page to your portfolio website. Add a link to the mean calculator from your portfolio homepage. Once complete, submit the URL to your portfolio site online for grading.

Important Note: All work included in the project must consist of your own original work. Any portion deemed to contain *unoriginal* content, including but not limited to, source material copied from the internet or other external sources, even sources such as public domain or creative commons, and even works which may be considered derivative in nature (such as altering existing content) may be issued a 0 grade for this project.

Generative AI (e.g., ChatGPT, DALL-E, OpenArt, Photoshop AI, etc.) should not be used in the formulation of any part of this or any other lab or assignment. Copying and/or modifying material from the internet or other external sources is also unacceptable. Use of AI or external resources in *any* capacity may result in a score of 0. Labs and assignments cannot be redone.

Grade Breakdown

Grade Breakdown	
A functional link to the mean calculator webpage has been added to your portfolio site; a functional link to the portfolio site has been submitted.	*N/A*
The input field and buttons are properly implemented.	15 points
Numbers can be successfully added to the dataset. The dataset updates dynamically on the page as numbers are added.	20 points
Numbers can be successfully removed from the dataset. The dataset updates dynamically on the page as numbers are removed.	20 points
There is proper handling of cases where input is invalid, or a number is not found (removal).	20 points
Use of a `for` loop to sum dataset values and division by dataset length to correctly compute the mean. No library functions were used.	20 points
Mean is displayed on the page	5 points
Total	**100 points**