Ho Chi Minh City University of Technology

WEB PROGRAMMING

LAB 1.3 Exercises with JavaScript

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I. Requirements

Giving a **sequence of numbers**, such as a[i] = 5, 25, 13, 8, 45, 6, 11.

Show the above sequence of numbers on the screen. Then create the buttons (or links), “Show Max”, “Show Min”, “Sort Min to Max”, “Sort Max to Min” to show the results on the screen.

1. With **Show Max** and **Show Min**: write code in JavaScript to find ***maximum*** and ***minimum*** number of the given numbers, display on screen those numbers.

2. With **Sort Min to Max**, **Sort Max to Min**, write code to sort given numbers from smallest to largest number; largest to smallest number, and display them on the screen.

Notes: Don’t use Javascript standard functions to solve the problem. Instead, you should read all elements, compare them, use loop(s) to find the required results!!!

II. Implementation

a. index.html

```
<!DOCTYPE html>
<html>
  <head>
    <title>Number Operations</title>
    <link rel="stylesheet" type="text/css" href="styles.css" />
  </head>
  <body>
    <h1>Number Operations</h1>
    <div class="buttons">
      <button onclick="getUserInput()">Add Number</button>
    </div>
    <div id="numbers" class="numbers">
      <!-- The sequence of numbers -->
    </div>
    <div class="buttons">
      <button onclick="showMax()">Show Max</button>
      <button onclick="showMin()">Show Min</button>
      <button onclick="sortMinToMax()">Sort Min to Max</button>
      <button onclick="sortMaxToMin()">Sort Max to Min</button>
    </div>
    <div id="result" class="result">
      <!-- The result of the operation -->
    </div>
    <script src="minmax.js"></script>
  </body>
</html>
```

The HTML contains 4 main components:

- Button for the user to input their desired list of numbers.
- Place to show the input numbers.
- Buttons for showing max/ min number and sort max to min or min to max action.
- Place to show the result.

b. minmax.js

```
let numbers = [];

function getUserInput() {
  // Prompt the user to enter a comma-separated list of numbers
  const userInput = prompt("Enter a comma-separated list of numbers:");
```

```
  // Split the user input into an array of strings and convert them to
numbers
  numbers = userInput.split(',').map(Number);
  // Check if the input is valid
  if (numbers.some(isNaN)) {
    alert("Invalid input. Please enter valid numbers separated by commas.");
    numbers = []; // Reset the array if input is invalid
  } else {
    displayNumbers(numbers,'numbers');
  }
}

function displayNumbers(numbers,id) {
  const numbersDiv = document.getElementById(id);
  numbersDiv.textContent = numbers.join(', ');
}

function showMax() {
  let max = numbers[0];
  for (let i = 1; i < numbers.length; i++) {
    if (numbers[i] > max) {
      max = numbers[i];
    }
  }
  displayNumbers([max], 'result');
}

function showMin() {
    let min = numbers[0];
    for (let i = 1; i < numbers.length; i++) {
      if (numbers[i] < min) {
        min = numbers[i];
      }
    }

    displayNumbers([min], 'result');
  }

  //QUICKSORT
function quickSort(arr, low, high) {
    if (low < high) {
      const pivotIndex = partition(arr, low, high);
      quickSort(arr, low, pivotIndex - 1);
      quickSort(arr, pivotIndex + 1, high);
    }
  }
```

```
function partition(arr, low, high) {
    const pivot = arr[high];
    let i = low - 1;

    for (let j = low; j < high; j++) {
      if (arr[j] < pivot) {
        i++;
        const temp = arr[i];
        arr[i] = arr[j];
        arr[j] = temp;
      }
    }

    const temp = arr[i + 1];
    arr[i + 1] = arr[high];
    arr[high] = temp;

    return i + 1;
  }

function sortMinToMax() {
    let minNumbers = numbers
    quickSort(minNumbers, 0, numbers.length - 1);
    displayNumbers(minNumbers, 'result');
  }

function sortMaxToMin() {
    let maxNumbers = numbers
    quickSort(maxNumbers, 0, numbers.length - 1);
    maxNumbers = maxNumbers.map((_, index, arr) => arr[arr.length - 1 -
index]);;
    displayNumbers(maxNumbers, 'result');
  }
```

The JavaScript file contains functions for various purposes such as:

- Get the user input list of numbers and check its validity
- Showing the numbers list
- Find max, and min number in the list
- Sort MaxToMin, MinToMax (Using Quick Sort)

c. styles.css

```
.result{
    margin: 30px;
    padding: 10px;
```

```
    border: 1px solid #ccc;
    border-radius: 20px;
    font-family: 'Courier New', Courier, monospace;
    font-size: large;
    font-weight: bold;
    text-align: center;
}

.buttons {
    margin: 30px;
    padding: 20px;
    font-weight: bold;
    text-align: center;
}

.numbers {
    margin: 30px;
    padding: 20px;
    font-size: large;
    font-weight: bold;
    text-align: center;
}
```

The CSS file contains some simple adjustment for the HTML to look more presentable.