**Q6: Sorting a Music Library (Quick Sort)**: Implement **quick sort** to arrange songs in a music library by different parameters (duration, artist, genre). Optimize the algorithm for large datasets.

<!DOCTYPE html>

<html lang="en">

<head>

<meta charset="UTF-8">

<meta name="viewport" content="width=device-width, initial-scale=1.0">

<title>Music Library - Quick Sort</title>

<style>

body { font-family: Arial, sans-serif; padding: 20px; }

input, button { padding: 10px; margin: 5px; }

table { width: 100%; border-collapse: collapse; margin-top: 20px; }

th, td { padding: 10px; border: 1px solid #ddd; text-align: left; }

</style>

</head>

<body>

<h1>Sort Music Library</h1>

<label for="songs">Enter Songs (Format: Name,Artist,Duration):</label>

<input type="text" id="songs" placeholder="Song1,Artist1,3.5, Song2,Artist2,4.0" />

<button onclick="sortSongs()">Sort by Duration</button>

<h2>Sorted Songs</h2>

<table id="songsTable">

<thead>

<tr>

<th>Song</th>

<th>Artist</th>

<th>Duration (minutes)</th>

</tr>

</thead>

<tbody></tbody>

</table>

<script>

function sortSongs() {

const input = document.getElementById('songs').value.split(',');

const songs = [];

for (let i = 0; i < input.length; i += 3) {

songs.push({

name: input[i].trim(),

artist: input[i + 1].trim(),

duration: parseFloat(input[i + 2].trim())

});

}

quickSort(songs, 0, songs.length - 1);

updateTable(songs);

}

function quickSort(arr, left, right) {

if (left < right) {

const pivotIndex = partition(arr, left, right);

quickSort(arr, left, pivotIndex - 1);

quickSort(arr, pivotIndex + 1, right);

}

}

function partition(arr, left, right) {

const pivot = arr[right].duration;

let i = left - 1;

for (let j = left; j < right; j++) {

if (arr[j].duration <= pivot) {

i++;

[arr[i], arr[j]] = [arr[j], arr[i]];

}

}

[arr[i + 1], arr[right]] = [arr[right], arr[i + 1]];

return i + 1;

}

function updateTable(songs) {

const tbody = document.getElementById('songsTable').getElementsByTagName('tbody')[0];

tbody.innerHTML = '';

songs.forEach(song => {

const row = tbody.insertRow();

row.insertCell(0).innerText = song.name;

row.insertCell(1).innerText = song.artist;

row.insertCell(2).innerText = song.duration;

});

}

</script>

</body>

</html>