Assignment: Usage of Web Workers in Modern Web Applications

Objective:

This assignment aims to explore the advanced capabilities and applications of Web Workers in modern web development. You will develop a sample application or enhance an existing one to utilize Web Workers for background tasks, thereby improving the performance and user experience.

Requirements:

Understanding Web Workers: Briefly explain what Web Workers are and their importance in web development.

Research: Conduct research on advanced use cases of Web Workers. Focus on scenarios where Web Workers can significantly impact performance and user experience, such as image processing, data fetching, and heavy computational tasks.

Development Task: Choose one of the following project ideas to implement:

1. **Data Processing Application:** Create a web application that performs heavy data processing (e.g., sorting large arrays, complex calculations) using Web Workers. Compare the performance with and without Web Workers.
2. **Image Processing Tool:** Develop a tool that uses Web Workers to apply filters and effects to images without blocking the UI. Include features for uploading an image, applying several filters, and displaying both the original and modified images side-by-side.
3. **Real-time Data Fetching and Processing:** Implement a dashboard that fetches data from an API in real-time and uses Web Workers to process this data before displaying it. This could involve aggregating data, performing calculations, or filtering results based on user input.

Deliverables:

1. **Code Repository:** Provide a link to a GitHub repository containing the project code.
2. **Demo:** Host your application on a platform such as GitHub Pages, Netlify, or Vercel, and provide a link to the live demo.
3. **Documentation:** Include a README file with:
    a. A brief description of the project.
    b. Instructions on how to run the project locally.
    c. A summary of your findings regarding the performance improvements or benefits provided by using Web Workers.
    d. Challenges faced and how you overcame them.

e. Any references or resources used.

Evaluation Criteria:

1. **Functionality:** The application works as intended without errors.
2. **Use of Web Workers:** Demonstrates effective and appropriate use of Web Workers for background tasks.
3. **Performance Improvement:** Shows a clear improvement in performance or user experience through the use of Web Workers.
4. **Code Quality:** The code is well-organized, commented, and follows best practices.
5. **Documentation:** The documentation is clear, concise, and complete.

Submission Guidelines:

A Google Classroom has been set up for this course. All participants are required to submit their assignments within this Classroom, following the provided instructions carefully.

https://classroom.google.com/c/NjU4MTI2MTU2MjYy?cjc=rcckgry

Please ensure that your submissions, including links to your code repository and any live demos, are complete and adhere to the guidelines specified. For access and detailed submission instructions, refer to the Google Classroom platform. Make sure your submission is finalized by the specified due date.

Ensure your submission is complete by **[5th Feb 2024]**.

Resources:

MDN Web Docs on Web Workers: https://developer.mozilla.org/en-US/docs/Web/API/Web_Workers_API

HTML5 Rocks - The Basics of Web Workers: https://www.html5rocks.com/en/tutorials/workers/basics/

Web workers in JavaScript and when to use them: https://benestudio.co/web-workers-in-javascript-and-when-to-use-them/

This assignment is designed to challenge your understanding and creativity in utilizing Web Workers in web development. It will help you grasp how offloading tasks to background threads can significantly enhance the performance and responsiveness of web applications.

Good luck!