DOM JavaScript Roadmap with Projects and Assignments

This roadmap covers the key topics in DOM JavaScript, with integrated projects and assignments that reinforce the concepts learned. Projects will be implemented during class, while take-home assignments provide additional practice.

Phase 1: Introduction to the DOM and Basic Interaction

1. Introduction to the DOM
   - Concepts Learned:
     - What the DOM is and how JavaScript interacts with it.
     - Basic DOM structure: elements, nodes, and tree structure.
   - Key Topics:
     - `document.getElementById()`, `document.querySelector()`
     - Accessing elements, modifying content, and attributes.
   - No Project

2. Selecting and Manipulating DOM Elements
   - Concepts Learned:
     - Selecting and manipulating multiple DOM elements.
     - Modifying styles and class names dynamically.
   - Key Topics:
     - `document.querySelectorAll()`, `.style`, `.classList`
     - Changing styles and classes, hiding/showing elements.
   - Project 1: Building a Digital Clock
     - Concepts Learned:
       - DOM Manipulation

- Real-time updates using `setInterval()`

- Working with the `Date()` object and dynamically updating the DOM.

3. Assignment 1 (Take-Home): Building a Palindrome Checker

- Concepts Learned:

  - String manipulation and cleaning.

  - Recursion and iterative comparison.

- Reason for Assignment:

  - Solidifies understanding of DOM manipulation with recursion, string handling, and feedback display.

Phase 2: Working with Events and Dynamic Content

4. Event Handling in JavaScript

- Concepts Learned:

  - Listening for user interactions (click, submit, etc.).

  - Event listeners, `addEventListener()`.

- Key Topics:

  - `addEventListener()`, `this`, event propagation (bubbling and capturing).

- No Project

5. Dynamic Content Updates

- Concepts Learned:

  - Creating dynamic content based on user interaction.

  - Updating inner HTML and creating new elements.

- Key Topics:

  - `innerHTML`, `createElement()`, `appendChild()`, `removeChild()`.

- Project 2: Building a To-Do List to Learn DOM
  - Concepts Learned:
    - Event handling for adding tasks, marking them as completed, and deleting tasks.
    - Manipulating DOM elements dynamically (adding/removing list items).

6. Assignment 2 (Take-Home): Building a Rock-Paper-Scissors Game
   - Concepts Learned:
     - Event-driven interactions.
     - Dynamic content updates and maintaining game state.
   - Reason for Assignment:
     - Reinforces event handling and dynamic DOM manipulation in a fun, game-based context.

Phase 3: Advanced DOM Manipulation and Data Handling

7. Local Storage and Data Persistence
   - Concepts Learned:
     - How to store data in the browser using `localStorage`.
     - Retrieving and updating data dynamically.
   - Key Topics:
     - `localStorage.setItem()`, `localStorage.getItem()`, `JSON.stringify()`, `JSON.parse()`.
   - Project 3: Building a Bookmark Manager
     - Concepts Learned:
       - Dynamically adding and removing bookmarks.
       - Storing and updating data with localStorage, updating the DOM without reloading the page.

8. Assignment 3 (Take-Home): Building a Grade Analyzer
   - Concepts Learned:

    - Working with numerical data.
    - Filtering, sorting, and calculating statistics.
  - Reason for Assignment:
    - Encourages using arrays and DOM manipulation to display data dynamically, perform analysis, and use `localStorage` to persist grades.

9. Handling Complex DOM Interactions
  - Concepts Learned:
    - Using objects to represent real-world entities (e.g., books, vehicles).
    - Managing complex interactions with multiple DOM elements.
  - Key Topics:
    - Working with objects and updating DOM based on object states.
  - Project 4: Building a Library Management System
    - Concepts Learned:
      - Storing and displaying a library book collection from `localStorage`.
      - Removing and updating book entries dynamically in the DOM.

10. Assignment 4 (Take-Home): Building a Vehicle Rental System
  - Concepts Learned:
    - Object-oriented programming (OOP) concepts like classes and inheritance.
    - Dynamic vehicle selection and cost calculation.
  - Reason for Assignment:
    - Reinforces OOP with a focus on managing multiple objects in the DOM and displaying dynamic data based on user input.