Lesson 6: DOM Animations with JavaScript

Lesson Duration: ~ 2 hours

Lesson Goals:

- Understand the principles behind DOM animations.
- Explore how JavaScript complements CSS for interactive animations.
- Implement animations using `requestAnimationFrame` and basic event handling.

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1. Introduction to DOM Animations (10 min.)

- Explanation:
  - How animations enhance user experience.
  - CSS vs. JavaScript animations: strengths and ideal use-cases.

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2. Demo 1: Moving Box Animation (10 min. [student] + 10 min. [take up])

- Objective:
  - Implement basic animation using `requestAnimationFrame`.
  - Move a box horizontally across the screen.
- Task:

```
function moveBox() {
    // Move 2 pixels per frame
    // Reverse direction at boundaries
    // Use requestAnimationFrame
}
```

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3. Demo 2: Fade In & Fade Out Animation (10 min. [student] + 10 min. [take up])

- Objective:
  - Control opacity to create smooth fade effects.
  - Handle start/stop of animations using button events.
- Task:

```
function fade() {
    // Gradually adjust opacity to fade text
    // Implement toggle between fading in and fading out
    // Handle button click to start/stop animation
}
```

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4. Demo 3: Progress Bar Animation (10 min. [student] + 10 min. [take up])

- Objective:
  - Animate a progress bar filling up.
  - Control animation start/reset via button events.
- Task:

```
startBtn.addEventListener("click", () => {
  // Animate progress bar filling up
});

resetBtn.addEventListener("click", () => {
  // Reset progress bar animation
});
```

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5. Interactive Task: Animated Bouncing Ball (30 min. [student] + 15 min. [take up])

- Objective:
  - Combine previous animation skills into an interactive task:
  - Animate a ball that responds to gravity, bouncing, and user key events (arrows).

- Key implementation points:

```
function handleKeyDown(e) {
  // Respond to arrow keys for direction and speed
}

function updatePosition() {
  // Calculate physics of movement and bouncing
}

function animate() {
  // Continuously animate ball with requestAnimationFrame
}
```

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6. Recap & Discussion (5 min.)

- Review animation techniques and best practices.