# Random Question Generator Documentation

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## Overview

The Random Question Generator is a web application designed to generate random questions related to Coulomb's Law and Electric Field Strength. The application pulls questions from a predefined list and presents three random questions with their corresponding answers. This allows users to practice and test their knowledge of electrostatics concepts in a dynamic and engaging way.

## Features

1. **Random Question Selection:** Upon clicking the "Get Random Questions" button, the system selects and displays three random questions from a question library.
2. **Dynamic Display:** Questions are displayed in a clean, user-friendly interface with each question and its answer clearly presented.
3. **Interactive UI:** The page features a button that users can click to load random questions.

## Code Structure

The code consists of three major sections: HTML, CSS, and JavaScript. Each of these sections has a specific role in ensuring the functionality and appearance of the web application.

### HTML Section

The HTML defines the structure and content of the page. It includes the layout of the button, the output container, and the heading of the page.

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Random Question Generator</title>
  <style>
    /* Styles for page layout */
  </style>
</head>
<body>
  <h1>Coulomb's Law and Electric Field Strength<br>Random Question Generator</h1>
  <button onclick="loadRandomQuestions()">Get Random Questions</button>

  <div id="output" class="output"></div>
</body>
</html>
```

### CSS Section

The CSS section defines the styles for the page. It ensures that the content is displayed clearly and in a user-friendly manner. The button, text, and output container have specific styles that provide an interactive and visually appealing experience.

```
body {
  font-family: Arial, sans-serif;
  text-align: center;
  margin: 20px;
  background-color: #f4f4f9;
}
button {
  padding: 10px 20px;
```

```
  font-size: 16px;
  cursor: pointer;
  background-color: #4CAF50;
  color: white;
  border: none;
  border-radius: 5px;
}
button:hover {
  background-color: #45a049;
}
.output {
  margin-top: 20px;
  padding: 20px;
  background-color: #fff;
  border: 1px solid #ccc;
  border-radius: 5px;
  box-shadow: 0 4px 8px rgba(0, 0, 0, 0.1);
}
.question {
  font-size: 18px;
  font-weight: bold;
}
.answer {
  font-size: 16px;
  color: #555;
}
```

### JavaScript Section

The JavaScript section is responsible for the functionality of the web page. It contains the logic for loading and displaying random questions, as well as for shuffling the array of questions to ensure variability.

```
const questionsLibrary = [
  { question: "Two point charges of +3  C  and -4  C  are placed 0.5 m apart. What is the
      electrostatic force between them?", answer: "  2  .16 N" },
  { question: "A charge of +5  C  is placed in an electric field of 200 N/C. What is the force
      on the charge?", answer: "1.0 N" },
  // More questions here
];

function loadRandomQuestions() {
  const shuffledQuestions = shuffleArray(questionsLibrary).slice(0, 3);
  let outputDiv = document.getElementById('output');
  outputDiv.innerHTML = '';
  shuffledQuestions.forEach((q, index) => {
    outputDiv.innerHTML += `<div><p class="question">Q${index + 1}: ${q.question}</p><p class
        ="answer">Ans: ${q.answer}</p></div><hr>`;
  });
}

function shuffleArray(array) {
  return array.sort(() => Math.random() - 0.5);
}
```

#### Explanation of JavaScript Code

- `questionsLibrary`: This is an array of objects that stores the questions and their corresponding answers. Each object in the array contains two properties: `question` and `answer`.
- `loadRandomQuestions()`: This function is triggered when the user clicks the "Get Random Questions" button. It:
  - Shuffles the `questionsLibrary` array using the `shuffleArray()` helper function.
  - Selects the first 3 questions from the shuffled array.
  - Dynamically updates the `output` div to display the selected questions and answers.
- `shuffleArray()`: This helper function uses the `sort()` method to shuffle the `questionsLibrary` array randomly. It works by comparing two elements at a time and swapping their positions, ensuring that the array is shuffled.

## Libraries Used

- **HTML**: HTML (HyperText Markup Language) is the core technology used to structure the web page. It defines elements such as the title, button, and output div.
- **CSS**: CSS (Cascading Style Sheets) is used to style the web page elements, making it visually appealing and user-friendly. This includes styling for buttons, text, and the overall layout.

- **JavaScript**: JavaScript is the programming language used to implement the logic for generating random questions. It dynamically updates the page based on user interactions.

## How It Works

1. **User Interaction:** The user clicks the "Get Random Questions" button, which triggers the `loadRandomQuestions()` function.
2. **Random Selection:** The function shuffles the `questionsLibrary` array and selects three random questions.
3. **Display Questions and Answers:** The selected questions and answers are dynamically inserted into the HTML structure within the `output` div.

## Conclusion

This Random Question Generator is a simple yet effective tool for testing knowledge in the field of electrostatics. It uses a combination of HTML, CSS, and JavaScript to provide an interactive user experience, ensuring that each time the user clicks the button, a new set of random questions is presented.