Web Technologies – Lab

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Lab 10 — Advanced JavaScript: Objects, Arrays, JSON, ES6

Course: Web Programming
Topic: ES6, JSON, Fetch API, Arrays & Objects
Tools: VS Code, Modern Browser, Fetch API

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1. Objective

The objective of this lab is to:

- Practice **ES6 features** (let/const, arrow functions, template literals, destructuring, spread/operator).
- Fetch and display **JSON data** from a local file or online API.
- Use array methods (filter, sort, map) to manipulate and display data.
- Build a small UI to render products dynamically.

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2. Tasks Performed

✓ Task 1: Fetch JSON Data

- A products.json file was created.
- The app fetches and displays product data dynamically using **Fetch API**.

✓ Task 2: Use ES6 Features

Implemented:

- **let/const**
- **Arrow functions**
- **Template literals**
- **Destructuring**
- **Spread operator**
- **Array methods:** map(), filter(), sort()

✓ Task 3: Filtering and Sorting

- Filter by price
- Sort by price (low → high, high → low)

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3. Code Implementation

📄 **index.html**

```
<!DOCTYPE html>
<html lang="en">
<head>
 <meta charset="UTF-8">
 <meta name="viewport" content="width=device-width, initial-scale=1.0">
 <title>Product List (ES6 + JSON)</title>
 <link rel="stylesheet" href="style.css">
</head>
<body>
 <div class="container">
  <h1>Product List</h1>
  <div class="controls">
   <button id="sortAsc">Sort Price ↑</button>
   <button id="sortDesc">Sort Price ↓</button>
   <button id="filterCheap">Price < 1000</button>
   <button id="showAll">Show All</button>
  </div>
  <div id="productContainer" class="products"></div>
 </div>
 <script src="app.js"></script>
```

```
</body>
</html>
```

📁 products.json

(Place this in your project folder)

```
[
 { "id": 1, "name": "Laptop", "price": 1200, "category": "Electronics" },
 { "id": 2, "name": "Headphones", "price": 300, "category": "Electronics" },
 { "id": 3, "name": "Watch", "price": 900, "category": "Accessories" },
 { "id": 4, "name": "Smartphone", "price": 1500, "category": "Electronics" }
]
```

🎨 style.css

```
body {
 font-family: Arial, sans-serif;
 background: #f6f6f6;
}
.container {
 width: 600px;
 margin: 50px auto;
 background: white;
 padding: 20px;
 border-radius: 8px;
}
h1 {
 text-align: center;
```

```
}
.controls button {
  margin-right: 10px;
  padding: 8px 12px;
  border: none;
  background: #007bff;
  color: white;
  border-radius: 4px;
  cursor: pointer;
}
.controls button:hover {
  background: #005fcc;
}
.products {
  margin-top: 20px;
}
.product {
  background: #fafafa;
  padding: 10px;
  margin-bottom: 10px;
  border-radius: 6px;
}
```

⚙️ **app.js (ES6 + Fetch + Filter/Sort)**

```
const productContainer = document.getElementById("productContainer");
let products = [];
```

```
// ------------------------------
// Fetch JSON Data (Using Fetch API)
// ------------------------------
const loadProducts = async () => {
  const response = await fetch("products.json");
  const data = await response.json();
  // Using ES6 spread operator
  products = [...data];
  renderProducts(products);
};
// ------------------------------
// Render Products
// ------------------------------
const renderProducts = (items) => {
  productContainer.innerHTML = "";
  items.forEach(({ name, price, category }) => {   // ES6 destructuring
    const div = document.createElement("div");
    div.classList.add("product");
    // Template literals
    div.innerHTML = `
      <h3>${name}</h3>
      <p>Category: ${category}</p>
      <p><strong>Price: $${price}</strong></p>
    productContainer.appendChild(div);
  });
};
```

```
// ------------------------------
// Sorting and Filtering
// ------------------------------
document.getElementById("sortAsc").addEventListener("click", () => {
  const sorted = [...products].sort((a, b) => a.price - b.price);
  renderProducts(sorted);
});
document.getElementById("sortDesc").addEventListener("click", () => {
  const sorted = [...products].sort((a, b) => b.price - a.price);
  renderProducts(sorted);
});
document.getElementById("filterCheap").addEventListener("click", () => {
  const filtered = products.filter(product => product.price < 1000);
  renderProducts(filtered);
});
document.getElementById("showAll").addEventListener("click", () => {
  renderProducts(products);
});
// Load initial data
loadProducts();
```

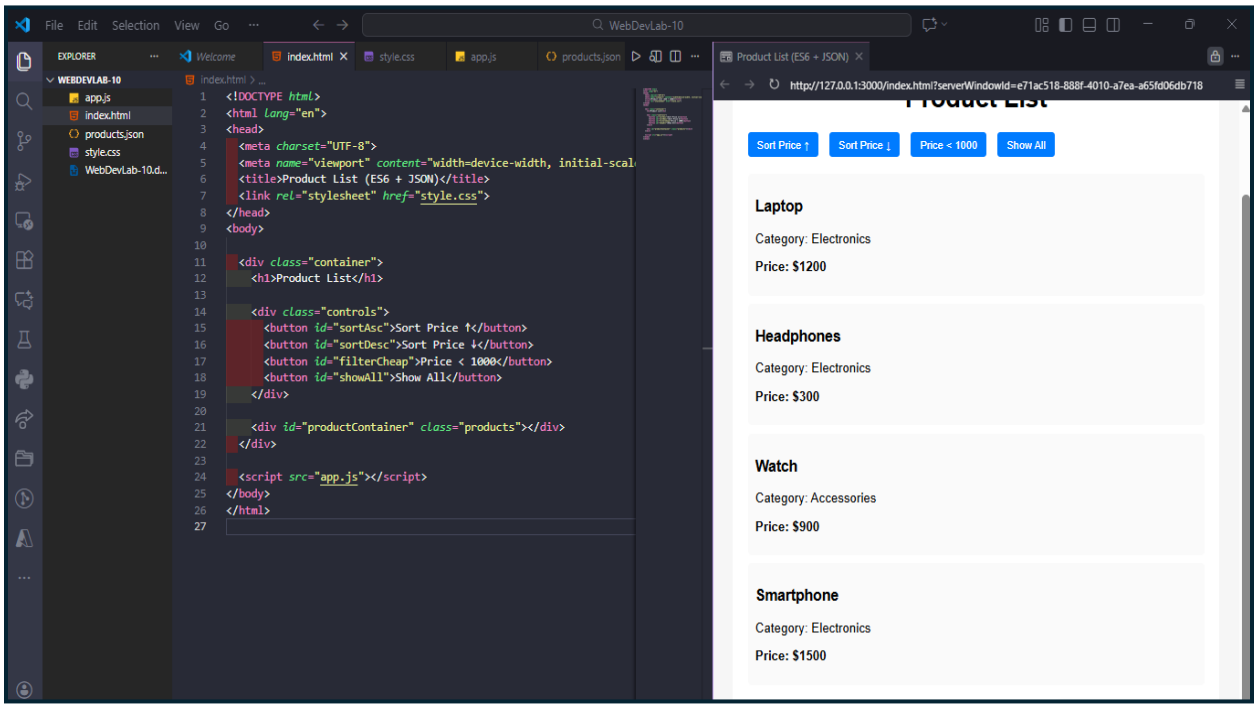
---

4. Results

After completing all tasks:

- JSON data is fetched and displayed dynamically.
- ES6 features are used throughout the code.
- Products can be sorted by price (ascending/descending).

- Products can be filtered (price < 1000).
- Clean and responsive UI



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5. Conclusion

This lab successfully demonstrates:

✓ ES6 syntax and features
✓ JSON data handling
✓ Fetch API usage
✓ DOM manipulation
✓ Sorting and filtering arrays

The application fulfills all requirements and provides a strong example of modern JavaScript practices.
