

AWT PROGRESS # awt_01 # Web Technology Lab – Experiments Summary

This repository contains all experiments and classwork done as part of the *Advanced Web Technology (AWT)* lab.

Each experiment focuses on different web technologies including HTML, CSS, JavaScript, jQuery, AngularJS, and Node.js.

Table of Contents

1. Experiment 1
 2. Experiment 2
 3. Experiment 3
 4. Experiment 4
 5. Experiment 5
 6. Experiment 5_6
 7. Experiment 7
 8. Experiment 8
 9. Experiment 9&10
 10. Conclusion
-

Experiment 1

Topic: Basic HTML, CSS, and JavaScript Integration

Files: index.html, d1.js, s.css

What I learned: - Creating basic web pages using HTML. - Linking CSS and JS files to an HTML document. - Handling basic DOM manipulation using JavaScript.

Code

index.html

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>LAB EXP 1</title>
  <script src="https://ajax.googleapis.com/ajax/libs/jquery/3.7.1/jquery.min.js"></script>
  <link rel="stylesheet" href="s.css">
</head>
<body>

  <div class="container">
```

```

        <h1>1. Right-Click Disabled</h1>
        <p>Try right-clicking anywhere on this page. The context menu will not appear.</p>
    </div>

    <hr>

    <div class="container">
        <h1>2. Show/Hide Message</h1>
        <button id="showBtn">Show Message</button>
        <button id="hideBtn">Hide Message</button>
        <div id="messageDiv">
            <p>Hello! This message can be hidden and shown using the buttons above.</p>
        </div>
    </div>

    <hr>

    <div class="container">
        <h1>3. Paragraph Color Change on Hover</h1>
        <p class="hover-para">This paragraph changes color.</p>
    </div>

    <hr>

    <div class="container" style="height: 1200px;">
        <h1>4. Scroll to Top</h1>
        <p>Scroll down this page to see the image in the bottom-right corner. Clicking it will
    </div>

    <script src="d1.js"></script>

</body>
</html>

```

s.css

```

body {
    font-family: Arial, sans-serif;
    margin: 20px;
    padding-bottom: 1500px;
}
.container {
    margin-bottom: 40px;
}

```

```

}
h1 {
    color: orchid;
}
p {
    font-size: 1.1em;
    cursor: pointer;
    transition: color 0.3s ease;
}
#messageDiv {
    padding: 20px;
    border: 1px solid yellowgreen;
    background-color: white;
    margin-top: 10px;
    border-radius: 8px;
    display: none;
}
button {
    padding: 10px 15px;
    margin-right: 10px;
    cursor: pointer;
    border: none;
    border-radius: 5px;
    background-color: pink ;
    color: white;
}
button:hover {
    background-color: red;
}
#scrollToTopBtn {
    position: fixed;
    bottom: 20px;
    right: 20px;
    width: 50px;
    height: 50px;
    cursor: pointer;
    border: 2px solid beige;
    border-radius: 50%;
    background-color: powderblue;
    box-shadow: 0 4px 6px black;
}

```

d1.js

```
$(document).on("selectstart", function(e){
```

```

        e.preventDefault();
    });

$(document).on("keydown", function(e) {
    if (e.ctrlKey && e.keyCode === 67) e.preventDefault();
});

$(document).ready(function() {
    // 1. Disable the right-click menu
    $(document).on("contextmenu", function(e) {
        e.preventDefault();
    });

    // 2. Display and hide a message
    $("#showBtn").click(function() {
        $("#messageDiv").show('slow');
    });
    $("#hideBtn").click(function() {
        $("#messageDiv").hide('slow');
    });

    // 3. Change paragraph color on mouseover
    $(".hover-para").mouseover(function() {
        $(this).css("color", "red");
    });
    $(".hover-para").mouseout(function() {
        $(this).css("color", "#333");
    });

    // 4. Click an image to scroll to the top
    $("#scrollToTopBtn").click(function() {
        $("html, body").animate({ scrollTop: 0 }, 'slow');
    })

});

```

output

Challenges faced: - Understanding how external JS and CSS files are connected.
 - Debugging syntax errors in JavaScript.

Experiment 2

Topic: Advanced JavaScript – Events and DOM

Files: index.html, d2.js, s.css

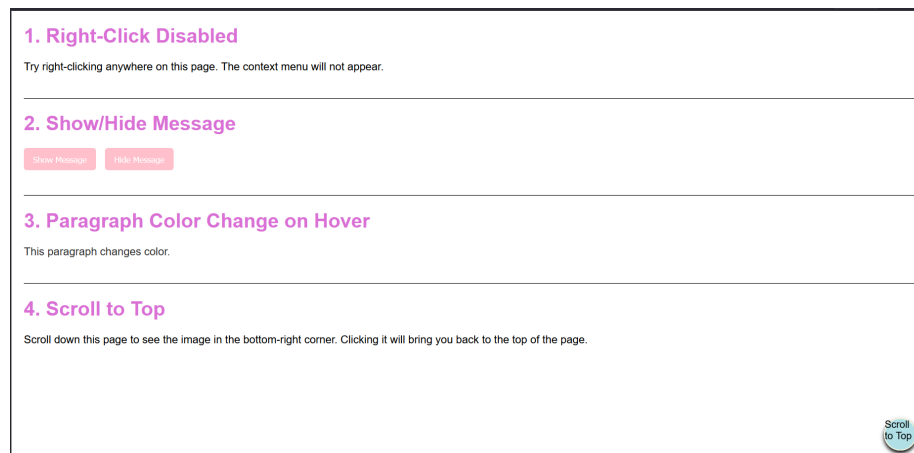


Figure 1: Output Screenshot

What I learned: - Implementing DOM manipulation using JavaScript. - Handling user events like click, hover, etc. - Understanding internal vs external JS files.

Code

index.html

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Lab exp 2</title>
  <link rel="stylesheet" href="s.css">
  <script src="https://code.jquery.com/jquery-3.6.0.min.js"></script>
</head>
<body>
  <div class="container">
    <h1>Add a class to an element</h1>
    <button id="addbtn">Add border</button>
    <p id="adclass">Click the button to add a border to me</p>
  </div>

  <hr>

  <div class="container">
    <h1>Access element's position</h1>
    <button id="getposition">Get position</button>
```

```

    <div id="result"></div>
    <div id="pele">This is the positioned element</div>
</div>

<hr>

<div class="container">
  <h1>Animate multiple CSS properties</h1>
  <button id="animatebtn">Animate box</button>
  <div id="animatedBox"></div>
</div>

<script src="d2.js"></script>
</body>
</html>

```

s.css

```

body {
  font-family: Arial, sans-serif;
  margin: 20px;
  padding-bottom: 1500px;
}
.container {
  margin-bottom: 40px;
}
h1 {
  color: #333;
}
.highlighted {
  border: 5px solid #ff0000;
  box-shadow: 0 0 10px rgba(255, 0, 0, 0.5);
}
#animatedBox {
  width: 100px;
  height: 100px;
  background-color: #ff9800;
  position: relative;
}
button {
  padding: 10px 15px;
  margin-right: 10px;
  cursor: pointer;
  border: none;
  border-radius: 5px;
  background-color: blue;
}

```

```
    color: white;
}
```

d2.js

```
$(document).ready(function(){
    $("#addbtn").click(function(){
        $("#adclass").addClass("highlighted");
    });

    $("#getposition").click(function(){
        var position = $("#pele").position();
        var res = "Top: " + position.top + "px, Left: " + position.left + "px";
        $("#result").text(res);
    });

    $("#animatebtn").click(function(){
        $("#animatedBox").animate({
            width: '200px',
            height: '200px',
            opacity: 0.5,
            marginLeft: '50px'
        }, 1000, function() {
            $(this).animate({
                width: '100px',
                height: '100px',
                opacity: 1,
                marginLeft: '0px'
            }, 1000);
        });
    });
});
```

output

Challenges faced: - Managing multiple event listeners. - Debugging issues caused by incorrect DOM element references.

Experiment 3

Topic: Introduction to Node.js

Files: index.html, app.js



Figure 2: Output Screenshot

What I learned: - Setting up a Node.js environment. - Creating a simple web server using Node.js. - Sending responses to client requests.

Code

index.html

```
<!doctype html>
<html ng-app="tableApp">
<head>
  <meta charset="utf-8">
  <title>Experiment 3 - AngularJS Tables</title>
  <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.8.3/angular.min.js"></script>
  <script src="app.js"></script>
  <style>
    table { border-collapse: collapse; width: 100%; }
    th, td { border: 1px solid #ccc; padding: 8px; }
    tr.even { background: #f8f8f8; }
    tr.odd { background: #ffffff; }
    th { background: #eee; }
  </style>
</head>
<body ng-controller="TableController as ctrl">
  <div class="container">
    <h1>AngularJS Table Examples</h1>

    <section>
      <h2>1. Display a Table</h2>
      <table>
        <thead>
```



```

        <tr>
            <th>#</th>
            <th>Name</th>
            <th>Age</th>
            <th>Department</th>
        </tr>
    </thead>
    <tbody>
        <tr ng-repeat="student in ctrl.students track by $index" ng-class-odd="'odd'" ng-c
            <td>{{$index + 1}}</td>
            <td>{{student.name}}</td>
            <td>{{student.age}}</td>
            <td>{{student.dept}}</td>
        </tr>
    </tbody>
</table>
</section>

<section>
    <h2>2. Display contents with orderBy filter</h2>
    <label>Sort by:
        <select ng-model="ctrl.sortKey">
            <option value="name">Name</option>
            <option value="age">Age</option>
            <option value="dept">Department</option>
        </select>
        <label><input type="checkbox" ng-model="ctrl.reverse"> Reverse</label>
    </label>

    <table>
        <thead>
            <tr>
                <th>#</th>
                <th>Name</th>
                <th>Age</th>
                <th>Department</th>
            </tr>
        </thead>
        <tbody>
            <tr ng-repeat="student in ctrl.students | orderBy:ctrl.sortKey:ctrl.reverse track
                <td>{{$index + 1}}</td>
                <td>{{student.name}}</td>
                <td>{{student.age}}</td>
                <td>{{student.dept}}</td>
            </tr>
        </tbody>
    </table>

```

```

        </table>
    </section>

    <section>
        <h2>3. Display Table with even and odd rows (styling already shown)</h2>
        <p>Notice rows have alternating backgrounds using <code>ng-class-even</code> and <code>ng-class-odd</code>.</p>
    </section>
</div>
</body>
</html>

```

app.js

```

angular.module('tableApp', [])
.controller('TableController', function() {
    const vm = this;

    vm.students = [
        { name: 'Asha', age: 22, dept: 'CSE' },
        { name: 'Bikram', age: 24, dept: 'ECE' },
        { name: 'Charu', age: 21, dept: 'ME' },
        { name: 'Deep', age: 23, dept: 'CSE' },
        { name: 'Esha', age: 20, dept: 'EE' }
    ];

    vm.sortKey = 'name';
    vm.reverse = false;
});

```

output

Challenges faced: - Installing Node.js packages using npm. - Understanding asynchronous execution in Node.js.

Experiment 4

Topic: HTML Forms and Data Handling

Files: bill.html, form.html

What I learned: - Creating HTML forms and input fields. - Using form attributes like action, method, and name. - Validating form inputs.

Code

AngularJS Table Examples

1. Display a Table

#	Name	Age	Department
1	Asha	22	CSE
2	Bikram	24	ECE
3	Charu	21	ME
4	Deep	23	CSE
5	Esha	20	EE

2. Display contents with orderBy filter

Sort by: ☐ Reverse

#	Name	Age	Department
1	Esha	20	EE
2	Charu	21	ME
3	Asha	22	CSE
4	Deep	23	CSE
5	Bikram	24	ECE

3. Display Table with even and odd rows (styling already shown)

Notice rows have alternating backgrounds using ng-class=even and ng-class=odd.

Figure 3: Output Screenshot

bill.html

```
<!DOCTYPE html>
<html lang="en" ng-app="billApp">
<head>
  <meta charset="UTF-8">
  <title>Bill Payment Record</title>
  <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.8.3/angular.min.js"></script>
  <style>
    body { font-family: Arial, sans-serif; margin: 20px; }
    table { border-collapse: collapse; width: 100%; margin-top: 20px; }
    th, td { border: 1px solid #ccc; padding: 8px; text-align: left; }
    th { background: #eee; }
    input, button { margin: 5px; padding: 6px; }
  </style>
</head>
<body ng-controller="BillController">

  <h2>Bill Payment Record</h2>

  <!-- Form to add new records -->
  <form name="billForm" ng-submit="addRecord(billForm)" novalidate>
    <label>
      Name:
      <input type="text" name="name" ng-model="newRecord.name" required>
    </label>
    <label>
      Amount:
    </label>
  </form>
</body>
</html>
```

```

        <input type="number" name="amount" ng-model="newRecord.amount" required min="0">
    </label>
    <label>
        Date:
        <input type="date" name="date" ng-model="newRecord.date" required>
    </label>
    <button type="submit" ng-disabled="billForm.$invalid">Add</button>
</form>

<!-- Records table -->
<table ng-if="records.length > 0">
    <thead>
        <tr>
            <th>#</th>
            <th>Name</th>
            <th>Amount</th>
            <th>Date</th>
        </tr>
    </thead>
    <tbody>
        <tr ng-repeat="record in records track by record.id">
            <td>{{ $index + 1 }}</td>
            <td>{{ record.name }}</td>
            <td>{{ record.amount | currency }}</td>
            <td>{{ record.date | date: 'mediumDate' }}</td>
        </tr>
    </tbody>
</table>

<script>
    angular.module('billApp', [])
        .controller('BillController', function($scope) {
            // Initial records
            $scope.records = [
                { id: 1, name: 'Electricity', amount: 1200, date: '2025-07-01' },
                { id: 2, name: 'Internet', amount: 799, date: '2025-07-05' }
            ];

            $scope.newRecord = {};

            // Add new record
            $scope.addRecord = function(form) {
                if (form.$valid) {
                    let newId = $scope.records.length + 1;
                    $scope.records.push({
                        id: newId,

```

```

        name: $scope.newRecord.name,
        amount: $scope.newRecord.amount,
        date: $scope.newRecord.date
    });
    $scope.newRecord = {};
    form.$setPristine();
    form.$setUntouched();
    }
    };
    });
</script>
</body>
</html>

```

form.html

```

<!DOCTYPE html>
<html lang="en" ng-app="formApp">
<head>
  <meta charset="UTF-8">
  <title>AngularJS Registration Form</title>
  <script src="https://ajax.googleapis.com/ajax/libs/angularjs/1.8.3/angular.min.js"></script>

  <style>
    .error { color: red; font-size: 14px; }
    input.ng-invalid.ng-touched { border: 2px solid red; }
    input.ng-valid.ng-touched { border: 2px solid green; }
    .success { color: green; margin-top: 10px; }
  </style>

</head>

<body ng-controller="FormController">

  <h2>User Registration</h2>
  <form name="regForm" novalidate ng-submit="register(regForm)">
    <label>Name:
      <input type="text" name="name" ng-model="user.name" required ng-minlength="3">
    </label>
    <div class="error"
      ng-show="(regForm.name.$touched || submitted) && regForm.name.$invalid">
      Name must be at least 3 characters.
    </div>
    <br><br>

    <label>Email:

```

```

        <input type="email" name="email" ng-model="user.email" required>
    </label>
    <div class="error"
        ng-show="(regForm.email.$touched || submitted) && regForm.email.$invalid">
        Enter a valid email.
    </div>
    <br><br>

    <label>Password:
        <input type="password" name="password" ng-model="user.password" required ng-minlength=
    </label>
    <div class="error"
        ng-show="(regForm.password.$touched || submitted) && regForm.password.$invalid">
        Password must be at least 6 characters.
    </div>
    <br><br>

    <button type="submit">Register</button>
</form>

<p class="success" ng-if="success">{{success}}</p>

<script>
    angular.module('formApp', [])
        .controller('FormController', function($scope) {
            $scope.user = {};
            $scope.submitted = false;
            $scope.success = '';

            $scope.register = function(form) {
                if (form.$valid) {
                    // In real app, send data to server
                    $scope.success = 'Registration successful for ' + $scope.user.name;
                    $scope.user = {};
                    form.$setPristine(); // Reset form state
                    form.$setUntouched(); // Reset touched state
                    $scope.submitted = false;
                } else {
                    $scope.success = '';
                    $scope.submitted = true; // Show validation messages
                }
            };
        });
</script>
</body>
</html>

```

output-bill

Bill Payment Record			
Name: <input type="text"/> Amount: <input type="text"/> Date: <input type="text"/> <input type="button" value="Add"/>			
#	Name	Amount	Date
1	Electricity	\$1,200.00	Jul 1, 2025
2	Internet	\$799.00	Jul 5, 2025
3	water	\$5,000.00	Oct 7, 2025

The screenshot shows a web browser window with a dark theme. On the left, there is a 'User Registration' form with fields for Name, Email, and Password, and a 'Register' button. Below the form, a green message says 'Registration successful for sonal'. On the right, a 'Save password' dialog is open, showing the username 'vpsond413@gmail.com' and a masked password. The dialog has 'Save' and 'Not now' buttons. The browser's address bar shows the URL 'http://127.0.0.1:5500/awt_01/lab/Experiment_4/form.html'.

output-form

Challenges faced: - Handling form validation using JavaScript. - Designing a clean and structured form layout.

Experiment 5__6

Topic: Express.js and Modular Node.js Applications

Files: server.js, package.json

What I learned: - Installing and using Express.js framework. - Creating routes and handling requests in Express. - Understanding package.json and dependencies.

Code

server.js

```
const express = require('express');
const app = express();
const PORT = process.env.PORT || 3000;

// Hello World endpoint
app.get('/', (req, res) => {
  res.send('Hello, World!');
});

// String replacement endpoint
app.get('/replace', (req, res) => {
  const { text } = req.query;
```

```

    if (!text) {
        return res.status(400).json({ error: 'Text parameter is required' });
    }

    const regex = /a{2,}/g;
    const result = text.replace(regex, 'b');
    res.json({ original: text, replaced: result });
});

// Calculator endpoint
app.get('/calculate', (req, res) => {
    const { operation, num1, num2 } = req.query;
    const n1 = parseFloat(num1);
    const n2 = parseFloat(num2);

    if (isNaN(n1) || isNaN(n2)) {
        return res.status(400).json({ error: 'Invalid numbers provided' });
    }

    let result;
    switch(operation) {
        case 'add':
            result = n1 + n2;
            break;
        case 'subtract':
            result = n1 - n2;
            break;
        case 'multiply':
            result = n1 * n2;
            break;
        case 'divide':
            result = n2 !== 0 ? n1 / n2 : 'Error: Division by zero';
            break;
        default:
            return res.status(400).json({ error: 'Invalid operation. Use add, subtract, multiply' });
    }

    res.json({ operation, num1: n1, num2: n2, result });
});

// Array iteration endpoint
app.get('/iterate', (req, res) => {
    const array = [10, 20, 30, 40, 50];
    const iterations = [];

    // Using for loop

```



```

iterations.push("Using for loop:");
for (let i = 0; i < array.length; i++) {
  iterations.push(`Index ${i}: ${array[i]}`);
}

// Using forEach
iterations.push("Using forEach:");
array.forEach((item, index) => {
  iterations.push(`Index ${index}: ${item}`);
});

// Using for...of
iterations.push("Using for...of:");
for (const item of array) {
  iterations.push(`Item: ${item}`);
}

res.json({ array, iterations });
});

app.listen(PORT, () => {
  console.log(`Server running at http://localhost:${PORT}`);
  console.log('Available endpoints:');
  console.log('  GET / - Hello World');
  console.log('  GET /replace?text=your_text - Replace multiple a\'s with b');
  console.log('  GET /calculate?operation=add&num1=5&num2=3 - Calculator');
  console.log('  GET /iterate - Array iteration examples');
});

```

package.json

```

{
  "name": "nodeja-lab",
  "version": "1.0.0",
  "description": "\"NodeJS basic exercices lab\"",
  "main": "index.js",
  "dependencies": {
    "accepts": "^2.0.0",
    "body-parser": "^2.2.0",
    "bytes": "^3.1.2",
    "call-bind-apply-helpers": "^1.0.2",
    "call-bound": "^1.0.4",
    "content-disposition": "^1.0.0",
    "content-type": "^1.0.5",
    "cookie": "^0.7.2",
    "cookie-signature": "^1.2.2",

```

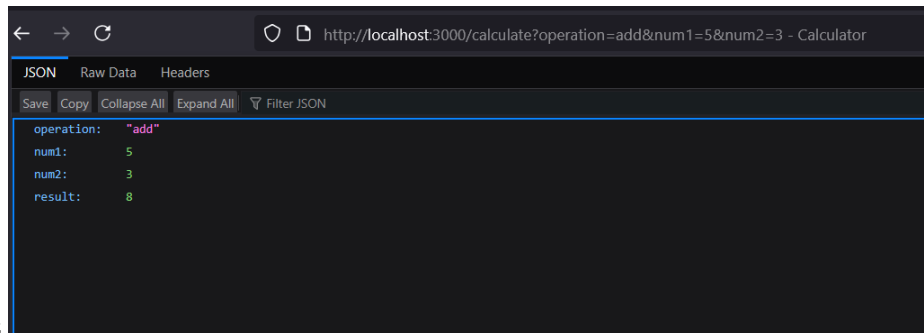
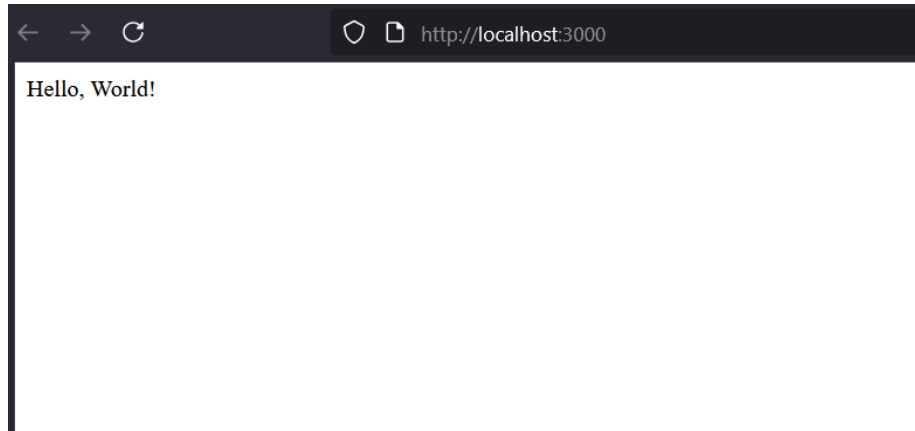
```
"debug": "^4.4.3",
"depd": "^2.0.0",
"dunder-proto": "^1.0.1",
"ee-first": "1.1.1",
"encodeurl": "2.0.0",
"es-define-property": "1.0.1",
"es-errors": "1.3.0",
"es-object-atoms": "1.1.1",
"escape-html": "1.0.3",
"etag": "1.8.1",
"express": "5.1.0",
"finalhandler": "2.1.0",
"forwarded": "0.2.0",
"fresh": "2.0.0",
"function-bind": "1.1.2",
"get-intrinsic": "1.3.0",
"get-proto": "1.0.1",
"gopd": "1.2.0",
"has-symbols": "1.1.0",
"hasown": "2.0.2",
"http-errors": "2.0.0",
"iconv-lite": "0.6.3",
"inherits": "2.0.4",
"ipaddr.js": "1.9.1",
"is-promise": "4.0.0",
"math-intrinsics": "1.1.0",
"media-typer": "1.1.0",
"merge-descriptors": "2.0.0",
"mime-db": "1.54.0",
"mime-types": "3.0.1",
"ms": "2.1.3",
"negotiator": "1.0.0",
"object-inspect": "1.13.4",
"on-finished": "2.4.1",
"once": "1.4.0",
"parseurl": "1.3.3",
"path-to-regexp": "8.3.0",
"proxy-addr": "2.0.7",
"qs": "6.14.0",
"range-parser": "1.2.1",
"raw-body": "3.0.1",
"router": "2.2.0",
"safe-buffer": "5.2.1",
"safer-buffer": "2.1.2",
"send": "1.2.0",
"serve-static": "2.2.0",
```

```

    "setprototypeof": "^1.2.0",
    "side-channel": "^1.1.0",
    "side-channel-list": "^1.0.0",
    "side-channel-map": "^1.0.1",
    "side-channel-weakmap": "^1.0.2",
    "statuses": "^2.0.2",
    "toidentifier": "^1.0.1",
    "type-is": "^2.0.1",
    "unpipe": "^1.0.0",
    "vary": "^1.1.2",
    "wrapappy": "^1.0.2"
  },
  "devDependencies": {},
  "scripts": {
    "test": "node server.js",
    "start": "node lab/Experiment_5_6/server.js"
  },
  "repository": {
    "type": "git",
    "url": "awt_01"
  },
  "keywords": [
    "[\"nodejs\"",
    "\"express\"",
    "\"lab\"]"
  ],
  "author": "sonal",
  "license": "ISC"
}

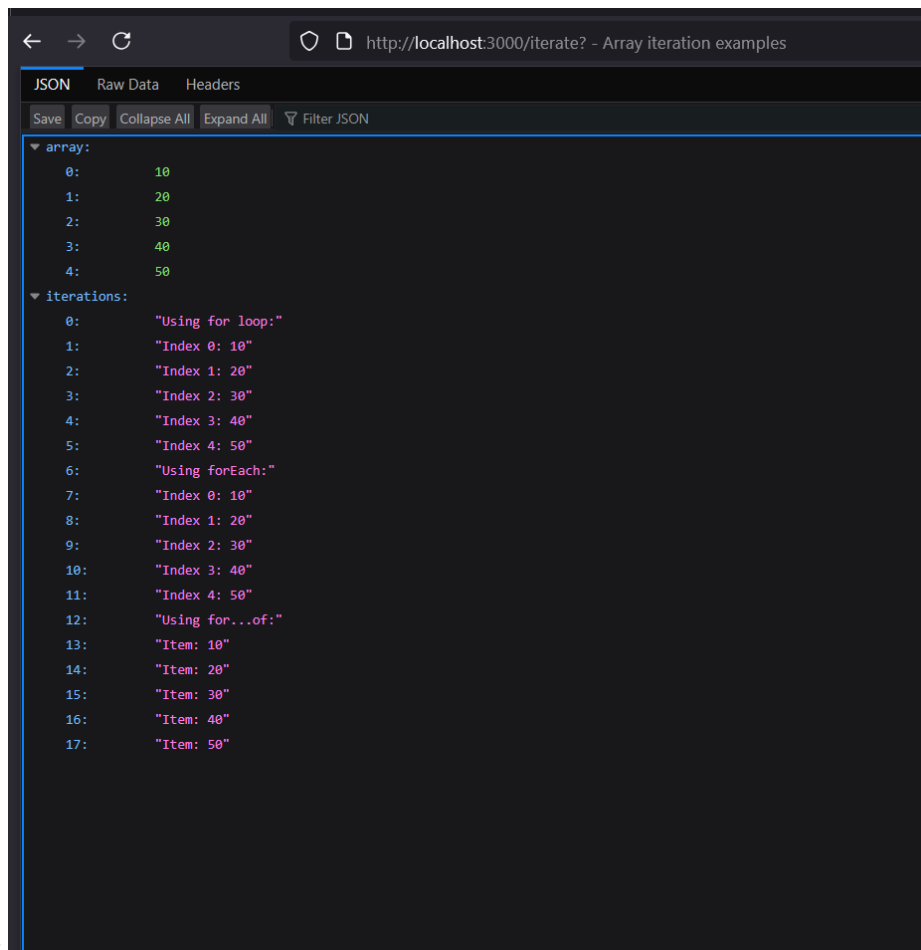
```

output



output

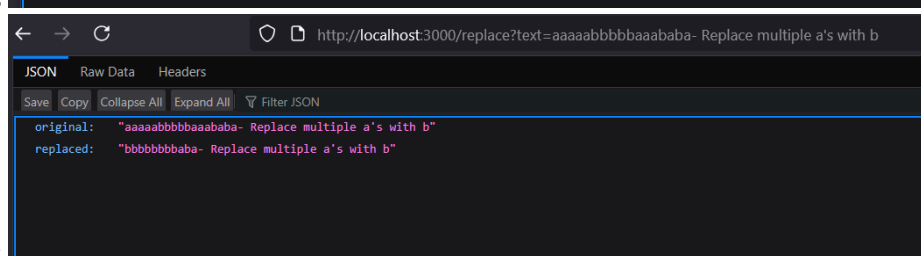
output



The screenshot shows a web browser at `http://localhost:3000/iterate? - Array iteration examples`. The JSON viewer displays the following data:

```
{
  "array": [
    10,
    20,
    30,
    40,
    50
  ],
  "iterations": [
    "Using for loop:",
    "Index 0: 10",
    "Index 1: 20",
    "Index 2: 30",
    "Index 3: 40",
    "Index 4: 50",
    "Using forEach:",
    "Index 0: 10",
    "Index 1: 20",
    "Index 2: 30",
    "Index 3: 40",
    "Index 4: 50",
    "Using for...of:",
    "Item: 10",
    "Item: 20",
    "Item: 30",
    "Item: 40",
    "Item: 50"
  ]
}
```

output



The screenshot shows a web browser at `http://localhost:3000/replace?text=aaaaabbbbbaababa- Replace multiple a's with b`. The JSON viewer displays the following data:

```
{
  "original": "aaaaabbbbbaababa- Replace multiple a's with b",
  "replaced": "bbbbbbbaababa- Replace multiple a's with b"
}
```

Challenges faced: - Configuring Express properly. - Managing multiple JavaScript files in one project.

Experiment 7

Topic: Node.js Sessions and Cookies

Files: source/, server.js, package.json

What I learned: - Using cookies and sessions in Node.js. - Maintaining user sessions across multiple pages. - Understanding middleware and session storage.

Code

cookie-example.js

```
const express = require('express');
const cookieParser = require('cookie-parser');

const app = express();
app.use(cookieParser());

app.get('/set-cookie', (req, res) => {
  res.cookie('username', 'JohnDoe', { maxAge: 900000 });
  res.send('Cookie has been set');
});

app.get('/get-cookie', (req, res) => {
  const user = req.cookies['username'];
  res.send(`Cookie Retrieved: ${user}`);
});

app.get('/delete-cookie', (req, res) => {
  res.clearCookie('username');
  res.send('Cookie deleted');
});

const PORT = process.env.PORT || 3000;

app.listen(PORT, () => {
  console.log(`Server started on http://localhost:${PORT}`);
});
```

session-example.js

```
const express = require('express');
const session = require('express-session');

const app = express();

app.use(session({
```

```

    secret: 'mysecretkey',
    resave: false,
    saveUninitialized: true
  }));

app.get('/', (req, res) => {
  if (req.session.views) {
    req.session.views++;
    res.send(`Welcome back! You visited ${req.session.views} times.`);
  } else {
    req.session.views = 1;
    res.send('Welcome to the session demo. Refresh to count visits.');
```

```
  }
});
```

```

app.get('/destroy', (req, res) => {
  req.session.destroy(err => {
    if (err) {
      return res.send('Error destroying session');
    }
    res.send('Session destroyed');
  });
});
```

```
const PORT = process.env.PORT || 3000;
```

```

app.listen(PORT, () => {
  console.log(`Server started on http://localhost:${PORT}`);
});
```

package.json

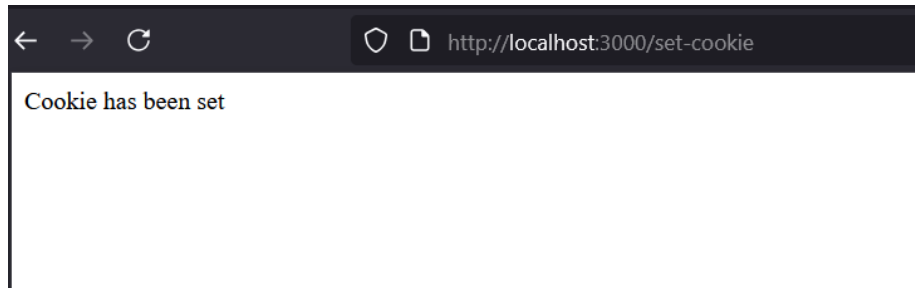
```

{
  "name": "experiment_7",
  "version": "1.0.0",
  "description": "",
  "main": "index.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "keywords": [],
  "author": "",
  "license": "ISC",
  "dependencies": {
    "cookie-parser": "^1.4.7",
    "express": "^5.1.0",

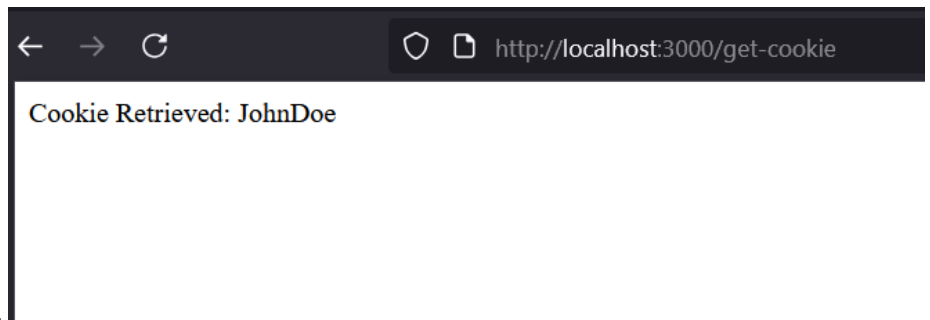
```

```
    "express-session": "^1.18.2"  
  }  
}
```

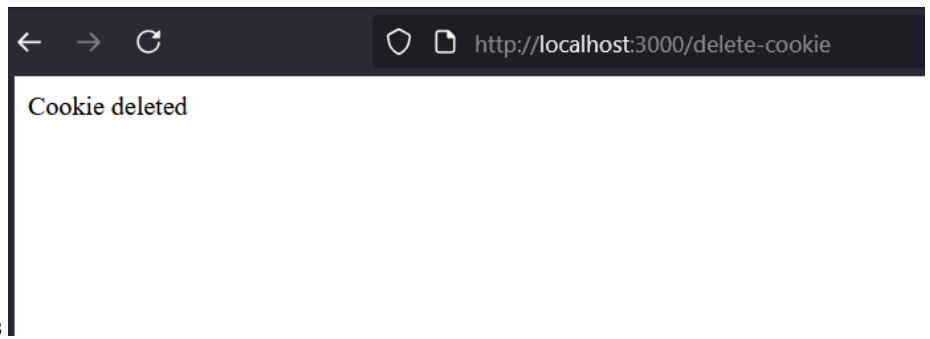
output-cookie.js



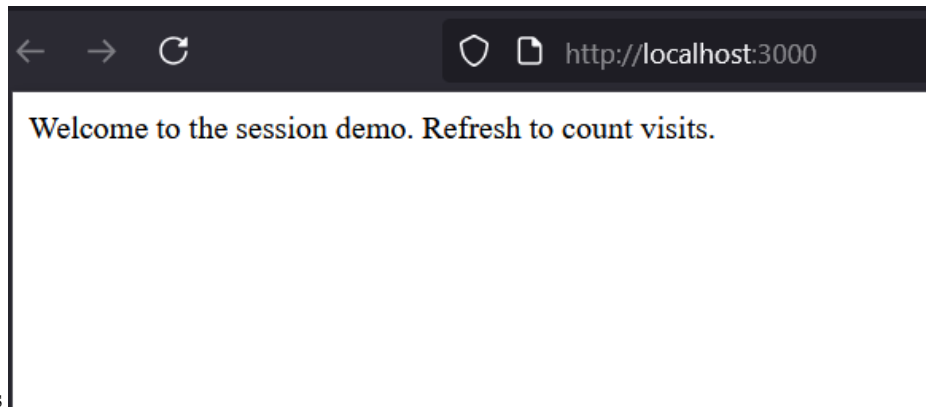
output-cookie.js



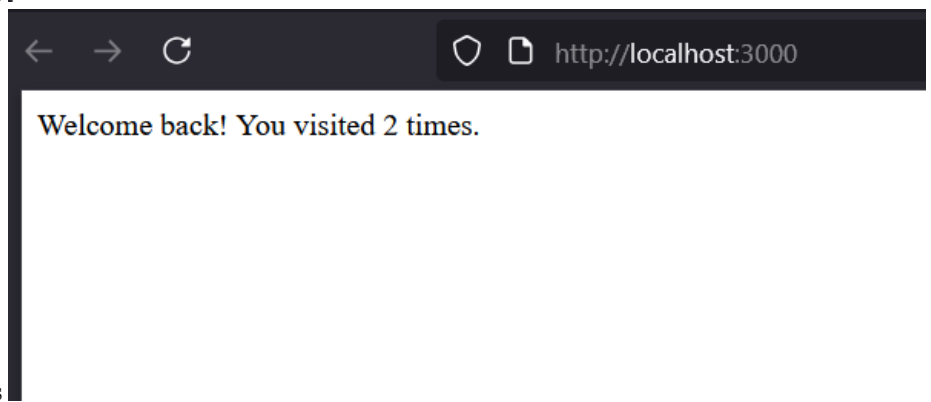
output-cookie.js



output-session.js



output-session.js



Challenges faced: - Configuring session middleware correctly. - Debugging cookie handling issues.

Experiment 8

Topic: NodeJS + MongoDB Integration, CRUD Operations. Files: * item.js, server.js, item.html, s.css, student.html, student.js.

What I learned: - Creating a NodeJS application to connect to a MongoDB database - Creating an application to store student details in a database - Creating a search application to find students based on criteria - Creating a shopping center application with full CRUD features

Code

shopping-app

item.html

```

<!DOCTYPE html>
<html>
<head>
  <title>Shopping Center</title>
  <link rel="stylesheet" href="s.css">
</head>
<body>

<h1>Shopping Center Management</h1>

<h2>Add Item</h2>
<form id="addForm">
  <input name="name" placeholder="Item Name" required><br>
  <input name="price" placeholder="Price" type="number" required><br>
  <input name="quantity" placeholder="Quantity" type="number" required><br>
  <button type="submit">Add Item</button>
</form>

<h2>Stock Report</h2>
<table border="1">
  <thead>
    <tr>
      <th>Name</th><th>Price</th><th>Qty</th><th>Actions</th>
    </tr>
  </thead>
  <tbody id="itemTable"></tbody>
</table>

<script src="item.js"></script>
</body>
</html>

```

s.css

```

/* ----- GLOBAL ----- */
body {
  font-family: Arial, Helvetica, sans-serif;
  background: #f4f6f9;
  margin: 0;
  padding: 40px;
}

h1, h2 {
  color: #222;
  margin-bottom: 15px;
}

```

```

h1 {
    font-size: 32px;
    font-weight: 700;
}

h2 {
    font-size: 22px;
    font-weight: 600;
}

/* ----- FORM AREA ----- */
form input {
    width: 280px;
    padding: 12px;
    margin: 8px 0;
    border: 1px solid #ccc;
    border-radius: 6px;
    font-size: 16px;
}

button {
    padding: 10px 18px;
    background: #0051a8;
    border: none;
    color: white;
    border-radius: 6px;
    font-size: 15px;
    cursor: pointer;
    margin-right: 8px;
    transition: 0.2s ease;
}

button:hover {
    background: #003d82;
}

/* ----- TABLE ----- */
table {
    width: 100%;
    background: #fff;
    margin-top: 20px;
    border-collapse: collapse;
    border-radius: 10px;
    overflow: hidden;
    box-shadow: 0 2px 10px rgba(0,0,0,0.1);
}

```

```

}

th {
  background: #0051a8;
  color: #fff;
  padding: 14px;
  font-size: 16px;
  text-align: left;
}

td {
  padding: 14px;
  font-size: 16px;
  border-bottom: 1px solid #eee;
}

/* row hover */
tr:hover {
  background: #f2f7ff;
}

/* buttons inside table */
.action-btn {
  padding: 6px 14px;
  margin-right: 6px;
  border-radius: 5px;
  cursor: pointer;
  border: none;
  font-weight: 500;
}

.delete-btn {
  background: #d9534f;
  color: white;
}

.update-btn {
  background: #0275d8;
  color: white;
}

.sale-btn {
  background: #5cb85c;
  color: white;
}

```

```

.delete-btn:hover { background: #c9302c; }
.update-btn:hover { background: #025aa5; }
.sale-btn:hover    { background: #449d44; }

/* ----- TABLE EMPTY STATE ----- */
.empty {
  text-align: center;
  padding: 20px;
  color: gray;
  font-style: italic;
  font-size: 18px;
}

```

item.js

```

// Load stock
async function loadItems() {
  let res = await fetch("/items");
  let items = await res.json();

  let table = document.getElementById("itemTable");
  table.innerHTML = "";

  items.forEach(i => {
    table.innerHTML += `
      <tr>
        <td>${i.name}</td>
        <td>${i.price}</td>
        <td>${i.quantity}</td>
        <td>
          <button onclick="deleteItem('${i._id}')">Delete</button>
          <button onclick="updateItem('${i._id}')">Update</button>
          <button onclick="saleItem('${i._id}')">Sale</button>
        </td>
      </tr>`;
  });
}

loadItems();

// Add item
document.getElementById("addForm").addEventListener("submit", async e => {
  e.preventDefault();

  let data = Object.fromEntries(new FormData(e.target).entries());

  await fetch("/items/add", {

```

```

        method: "POST",
        headers: { "Content-Type": "application/json" },
        body: JSON.stringify(data)
    });

    e.target.reset();
    loadItems();
});

// Delete
async function deleteItem(id) {
    await fetch(`/items/delete/${id}`, { method: "DELETE" });
    loadItems();
}

// Update
async function updateItem(id) {
    let price = prompt("Enter new price:");
    let qty = prompt("Enter new quantity:");

    await fetch(`/items/update/${id}`, {
        method: "PUT",
        headers: { "Content-Type": "application/json" },
        body: JSON.stringify({ price, quantity: qty })
    });

    loadItems();
}

// Sale
async function saleItem(id) {
    let qty = prompt("Enter quantity sold:");

    await fetch(`/items/sale/${id}`, {
        method: "PUT",
        headers: { "Content-Type": "application/json" },
        body: JSON.stringify({ quantity: qty })
    });

    loadItems();
}

server.js

const express = require("express");

```

```

const path = require("path");
const mongoose = require("mongoose");

const app = express();
app.use(express.json());
app.use(express.urlencoded({ extended: true }));
app.use(express.static(__dirname));

// MongoDB Connection
mongoose.connect("mongodb://127.0.0.1:27017/shopDB")
  .then(() => console.log("MongoDB Connected"))
  .catch(err => console.log(err));

// Schema
const itemSchema = new mongoose.Schema({
  name: String,
  price: Number,
  quantity: Number
});

const Item = mongoose.model("Item", itemSchema);

// Serve UI
app.get("/", (req, res) => {
  res.sendFile(path.join(__dirname, "item.html"));
});

// Add Item
app.post("/items/add", async (req, res) => {
  let item = new Item(req.body);
  await item.save();
  res.json({ success: true });
});

// Get All Items (Stock Report)
app.get("/items", async (req, res) => {
  let items = await Item.find();
  res.json(items);
});

// Delete Item
app.delete("/items/delete/:id", async (req, res) => {
  await Item.findByIdAndDelete(req.params.id);
  res.json({ success: true });
});

```

```

// Update Item
app.put("/items/update/:id", async (req, res) => {
  await Item.findByIdAndUpdate(req.params.id, req.body);
  res.json({ success: true });
});

// Sale (reduce quantity)
app.put("/items/sale/:id", async (req, res) => {
  let item = await Item.findById(req.params.id);
  if (!item) return res.json({ success: false });

  let qty = Number(req.body.quantity);
  if (item.quantity < qty)
    return res.json({ success: false, msg: "Not enough stock" });

  item.quantity -= qty;
  await item.save();

  res.json({ success: true });
});

app.listen(3000, () => console.log("Server running on http://localhost:3000"));

```

code

student-app

item.html

```

<!DOCTYPE html>
<html>
<head>
  <title>Student Management</title>

  <style>
    body {
      font-family: Arial;
      padding: 30px;
      background: #f5f7fa;
    }
    h2 {
      color: #003366;
      border-left: 5px solid #003366;
      padding-left: 10px;
    }
    input {
      padding: 8px;
    }
  </style>

```



```

        margin: 5px 0;
        width: 250px;
        border: 1px solid #ccc;
        border-radius: 4px;
    }
    button {
        padding: 8px 16px;
        background: #003366;
        color: white;
        border: none;
        border-radius: 4px;
        cursor: pointer;
    }
    button:hover {
        background: #0055a5;
    }
    table {
        width: 80%;
        margin-top: 15px;
        border-collapse: collapse;
        background: white;
        box-shadow: 0 0 10px #ccc;
    }
    th, td {
        padding: 12px;
        border: 1px solid #ddd;
        text-align: left;
    }
    th {
        background: #003366;
        color: white;
    }
    .highlight {
        background: yellow !important;
        font-weight: bold;
    }
</style>
</head>

<body>

<h2>Add Student</h2>

<form id="addForm">
    <input type="text" name="name" placeholder="Name" required><br>
    <input type="number" name="roll" placeholder="Roll" required><br>

```

```

        <input type="text" name="branch" placeholder="Branch" required><br>
        <input type="number" name="year" placeholder="Year" required><br>
        <button type="submit">Add Student</button>
    </form>

    <hr><br>

    <h2>Search Student</h2>
    <input type="text" id="searchBox" placeholder="Enter name or roll" onkeyup="highlightSearch">
    <button onclick="highlightSearch()">Search</button>

    <hr><br>

    <h2>All Students</h2>

    <table>
        <thead>
            <tr>
                <th>Name</th>
                <th>Roll</th>
                <th>Branch</th>
                <th>Year</th>
            </tr>
        </thead>
        <tbody id="studentTable"></tbody>
    </table>

    <!-- Single JS file only -->
    <script src="student.js"></script>

</body>
</html>

```

student.js

```

// ADD student
document.getElementById("addForm").addEventListener("submit", async function (e) {
    e.preventDefault();

    let data = Object.fromEntries(new FormData(e.target).entries());

    let res = await fetch("/students/add", {
        method: "POST",
        headers: { "Content-Type": "application/json" },
        body: JSON.stringify(data)
    });

```

```

});

let result = await res.json();
if (result.success) {
  alert("Student Added!");
  e.target.reset();
  loadStudents();
}
});

// LOAD all students
async function loadStudents() {
  let res = await fetch("/students");
  let students = await res.json();

  let table = document.getElementById("studentTable");
  table.innerHTML = "";

  students.forEach(s => {
    table.innerHTML += `
      <tr>
        <td>${s.name}</td>
        <td>${s.roll}</td>
        <td>${s.branch}</td>
        <td>${s.year}</td>
      </tr>
    `;
  });
}
loadStudents();

// HIGHLIGHT SEARCH
async function highlightSearch() {
  let keyword = document.getElementById("searchBox").value.toLowerCase();

  let rows = document.querySelectorAll("#studentTable tr");

  rows.forEach(row => row.classList.remove("highlight"));

  if (keyword === "") return;

  rows.forEach(row => {
    let name = row.children[0].textContent.toLowerCase();
    let roll = row.children[1].textContent.toLowerCase();

    if (name.includes(keyword) || roll.includes(keyword)) {

```

```

        row.classList.add("highlight");
    }
    });
}

```

server.js

```

const express = require("express");
const path = require("path");
const mongoose = require("mongoose");

const app = express();

app.use(express.urlencoded({ extended: true }));
app.use(express.json());
app.use(express.static(__dirname));

// MongoDB Connection
mongoose.connect("mongodb://127.0.0.1:27017/studentDB")
  .then(() => console.log("MongoDB Connected"))
  .catch(err => console.log(err));

// Schema
const studentSchema = new mongoose.Schema({
  name: String,
  roll: Number,
  branch: String,
  year: Number
});

const Student = mongoose.model("Student", studentSchema);

// Serve the HTML page
app.get("/", (req, res) => {
  res.sendFile(path.join(__dirname, "student.html"));
});

// Add student
app.post("/students/add", async (req, res) => {
  try {
    await Student.create(req.body);
    res.json({ success: true });
  } catch (err) {
    res.json({ success: false, error: err });
  }
}

```

```

});

// Get all students
app.get("/students", async (req, res) => {
  const students = await Student.find();
  res.json(students);
});

// Search student (optional)
app.get("/students/search", async (req, res) => {
  const q = req.query.q;

  const result = await Student.find({
    $or: [
      { name: { $regex: q, $options: "i" } },
      { roll: Number(q) }
    ]
  });

  res.json(result);
});

app.listen(3000, () => {
  console.log("Server running on http://localhost:3000");
});

```

output

Shopping Center Management

Add Item

Stock Report

Name	Price	Qty	Actions
sugar	10	2	<input type="button" value="Delete"/> <input type="button" value="Update"/> <input type="button" value="Sale"/>

Add Student

Search Student

All Students

Name	Roll	Branch	Year
sonal	590018786	cs	2
Neha	590018415	cs	2
Megha	590017642	cs	2

Challenges faced: - Understanding how async/await works with database operations. - Forgetting to use `express.urlencoded()` which caused form data to not reach the backend. - Schema mistakes like missing fields or wrong data types. - Difficulty connecting to MongoDB Cloud due to IP access settings.

Experiment 9&10

Topic: SVG Basics, D3.js Visualizations, Interactive Graphics, CSV Data Handling
Files: csv.html,data.csv,exp.htm,index.html

What I learned: - Creating a bar chart using SVG and D3.js - Selecting and modifying particular elements using D3 - Creating circles and rectangles as interactive controls - Fetching data from CSV and creating a graph

Code

csv.html

```
<!DOCTYPE html>
<html>
<head>
<title>Experiment 10: CSV Graph</title>
<script src="https://d3js.org/d3.v7.min.js"></script>
</head>

<body>

<h1>Experiment 10: CSV → Graph using D3.js</h1>

<svg width="500" height="300"></svg>

<script>
const svg = d3.select("svg");
const width = 500;
const height = 300;
const barWidth = 50;

d3.csv("data.csv").then(data => {

  data.forEach(d => d.value = +d.value);

  svg.selectAll("rect")
    .data(data)
    .enter()
    .append("rect")
    .attr("x", (d, i) => i * (barWidth + 10))
    .attr("y", d => height - d.value * 5)
    .attr("width", barWidth)
    .attr("height", d => d.value * 5)
    .attr("fill", "teal");

  svg.selectAll("text")
    .data(data)
    .enter()
    .append("text")
    .text(d => d.name)
    .attr("x", (d, i) => i * (barWidth + 10) + 15)
    .attr("y", height - 5)
    .attr("fill", "black");
});
</script>
```

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

data.csv

```
name,value
A,10
B,20
C,15
D,25
```

exp.html

```
<!DOCTYPE html>
<html>
<head>
<title>Experiment 9: Combined Visualizations</title>
<script src="https://d3js.org/d3.v7.min.js"></script>

<style>
section {
  margin-bottom: 50px;
  padding: 20px;
  border: 2px solid #ddd;
  border-radius: 10px;
}
h2 { color: #003366; }
button { padding: 8px 15px; margin-right: 10px; }
</style>
</head>

<body>

<h1>Experiment 9: SVG + D3 (Combined)</h1>

<!-- ===== -->
<!-- ===== 1. BAR CHART ===== -->
<!-- ===== -->
<section>
<h2>1. Bar Chart using SVG + D3.js</h2>
<svg id="barChart" width="500" height="250"></svg>

<script>
const data = [10, 30, 20, 40, 25];
```



```

const svg1 = d3.select("#barChart");
const height1 = 250;
const barWidth = 50;

svg1.selectAll("rect")
  .data(data)
  .enter()
  .append("rect")
  .attr("x", (d, i) => i * (barWidth + 10))
  .attr("y", d => height1 - d * 5)
  .attr("width", barWidth)
  .attr("height", d => d * 5)
  .attr("fill", "steelblue");
</script>
</section>

<!-- ===== -->
<!-- ===== 2. INTERACTIVE SHAPES ===== -->
<!-- ===== -->
<section>
<h2>2. Interactive Shapes (Circles & Rectangles)</h2>

<svg id="shapes" width="500" height="250"></svg>

<script>
const svg2 = d3.select("#shapes");

// Circle
svg2.append("circle")
  .attr("cx", 100)
  .attr("cy", 120)
  .attr("r", 40)
  .attr("fill", "orange")
  .on("mouseover", () => d3.select("circle").attr("fill", "red"))
  .on("mouseout", () => d3.select("circle").attr("fill", "orange"));

// Rectangle
svg2.append("rect")
  .attr("x", 200)
  .attr("y", 100)
  .attr("width", 80)
  .attr("height", 60)
  .attr("fill", "green")
  .on("click", function(){ d3.select(this).attr("fill", "purple"); });

```

```

</script>
</section>

<!-- ===== -->
<!-- ===== 3. MODIFY ELEMENT USING D3 ===== -->
<!-- ===== -->
<section>
<h2>3. Modify Selected Element</h2>

<svg id="mod" width="400" height="200">
  <circle id="myCircle" cx="150" cy="100" r="50" fill="blue"></circle>
</svg>

<button onclick="changeColor()">Change Color</button>
<button onclick="increaseSize()">Increase Size</button>

<script>
function changeColor() {
  d3.select("#myCircle").attr("fill", "red");
}

function increaseSize() {
  d3.select("#myCircle").attr("r", 80);
}
</script>

</section>

</body>
</html>

```

index.html

```

<!DOCTYPE html>
<html>
<head>
<title>Data Visualization Experiments</title>

<style>
body {
  font-family: Arial;
  padding: 40px;
  background: #f5f7fa;
}

```

```

.box {
  border: 2px solid #003366;
  padding: 20px;
  border-radius: 8px;
  width: 350px;
  margin-bottom: 20px;
  background: white;
}
a {
  display: block;
  text-decoration: none;
  color: white;
  background: #003366;
  padding: 10px;
  text-align: center;
  border-radius: 6px;
}
a:hover { background: #0055a5; }
</style>
</head>

<body>

<h1>Data Visualization - Experiment 9 & 10</h1>

<div class="box">
  <h3>Experiment 9 (Combined)</h3>
  <p>Bar Chart + Interactive Shapes + Modify SVG Element</p>
  <a href="exp.html">Open Experiment 9</a>
</div>

<div class="box">
  <h3>Experiment 10</h3>
  <p>CSV → Graph using D3</p>
  <a href="csv.html">Open Experiment 10</a>
</div>

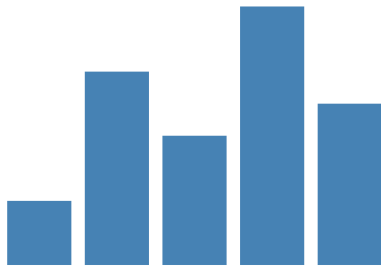
</body>
</html>

```

output

Experiment 9: SVG + D3 (Combined)

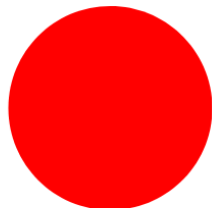
1. Bar Chart using SVG + D3.js



2. Interactive Shapes (Circles & Rectangles)



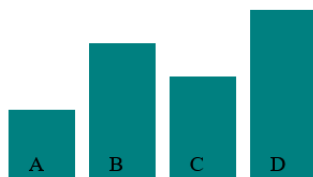
3. Modify Selected Element



Change Color

Increase Size

Experiment 10: CSV → Graph using D3.js



Challenges faced: - Understanding the enter-update-exit pattern of D3.js - Forgetting to include the D3 script link (leading to “d3 is not defined” errors). - Getting confused between pixel values and scale values. - Difficulty in making interactions (click/hover) work correctly.

Conclusion

This lab helped me gain hands-on experience in *front-end and back-end web development*.

I learned how to: - Design interactive front-end applications (HTML, CSS, JS, jQuery, Angular). - Build and deploy backend applications using *Node.js and Express*. - Handle user sessions, cookies, and server routing.

Overall Challenge:

Initially, understanding how client and server communicate was difficult, but through these experiments, I developed a clear understanding of *full-stack web development*.

Submitted by: Sonal

Course: Advanced Web Technology Lab

Tools Used: VS Code, Node.js, GitHub