**Ex No: 1**
**Date:**

# Static Node.js Server (without Express)

## AIM:

To create a NodeJS server that serves static HTML and CSS files to the user without using Express.

## ALGORITHM:

**Step 1:** Import required core modules: `http`, `fs`, and `path`.

**Step 2:** Create an HTTP server using `http.createServer()`.

**Step 3:** Parse the request URL to determine which file is being requested.

**Step 4:** Use `path.join()` to resolve the full path of the requested file. **Step**

**5:** Check the file extension and set appropriate content-type headers. **Step 6:**

Use `fs.readFile()` to read the file from the file system.

**Step 7:** Send the file content back in the response.

**Step 8:** Handle 404 errors for missing files.

**Step 9:** Handle 500 errors for server or file read issues.

**Step 10:** Start the server using `server.listen(PORT)` and test in the browser

**Step 11:** Create a dedicated public directory to organize HTML, CSS, and JS files separately from the server code.

**Step 12:** Set a default file (like index.html) to serve when no specific file is requested (i.e., when the URL is just /).

**Step 13:** Use fs.existsSync() or check fs.stat() to verify the file exists before attempting to read it, for more graceful error handling.

**Step 14:** Ensure MIME types (like .css, .js, .png) are handled dynamically using a content-type map or mime module for scalability.

**Step 15:** Log each request (e.g., method, URL, status) in the console to monitor server activity and aid in debugging.

**DESIGN:**


1. The program uses modular architecture by importing Node.js core modules like `http`, `fs`, and `path`, avoiding external dependencies for lightweight execution.
2. It maps incoming HTTP requests to corresponding file paths using `path.join()` and URL parsing, which enables flexible routing of static files.
3. The server identifies file extensions and dynamically sets the appropriate `Content-Type` headers, ensuring correct rendering of HTML, CSS, JavaScript, and image files in the browser.
4. Static assets are served from a dedicated `public` directory, maintaining a clear separation between server logic and user interface content.
5. The design incorporates robust error handling for both `404` (File Not Found) and `500` (Internal Server Error), enhancing user experience and simplifying debugging.

**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>Student Login</title>
  <link rel="stylesheet" href="css/login.css" />
</head>
<body>
  <div class="login-container">
    <h2> Student Login</h2>
    <form id="loginForm">
      <label for="email">Email:</label>
      <input type="email" name="email" id="email" required />

      <label for="rollno">Roll Number:</label>
      <input type="text" name="rollno" id="rollno" required />

      <button type="submit">Login</button>
    </form>
  </div>
  <script src="script.js"></script>
</body>
</html>
```

Style.css

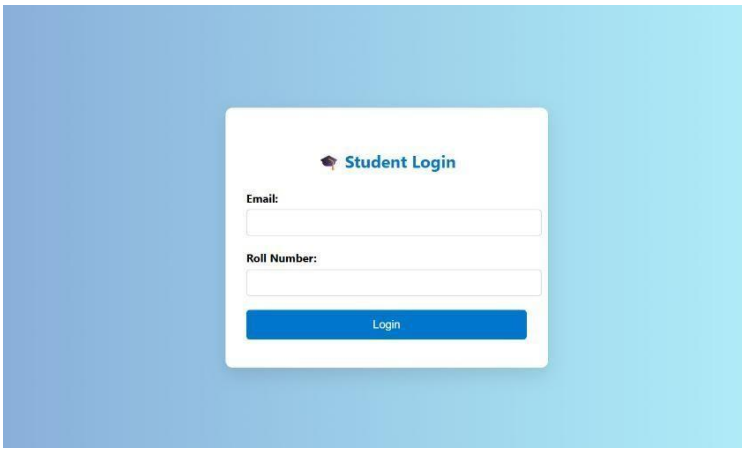
```
body {
    margin: 0;
    font-family: 'Segoe UI', sans-serif;
    background: linear-gradient(to right, #83a4d4, #b6fbff);
    display: flex;
    justify-content: center;
    align-items: center;
    height: 100vh;
  }

  .login-container {
    background: #fff;
    padding: 40px 30px;
    border-radius: 10px;
    box-shadow: 0 10px 25px rgba(0, 0, 0, 0.1);
```

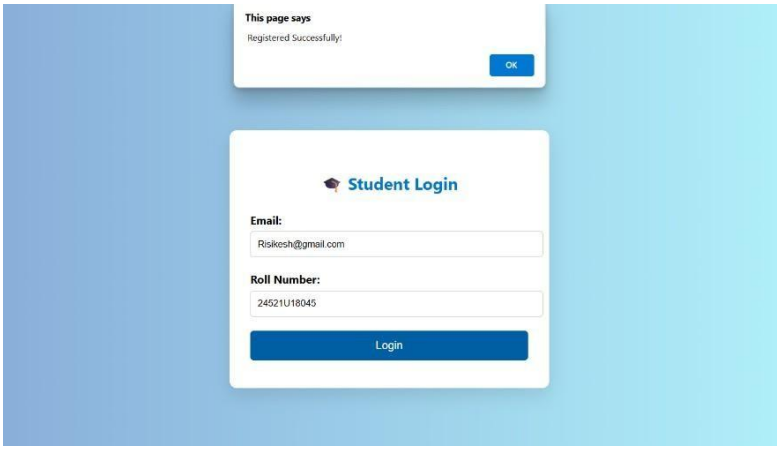
```
  width: 100%;
  max-width: 400px;
}

.login-container h2 {
  margin-bottom: 25px;
  text-align: center;
  color: #0077cc;
}

form label {
  display: block;
  margin-bottom: 6px;
  font-weight: bold;
}

form input {
  width: 100%;
  padding: 10px;
  margin-bottom:  20px;
  border: 1px solid #ccc;
  border-radius: 5px;
}
```

Script.js

```
document.getElementById('loginForm').addEventListener('submit', function(event) {
    event.preventDefault(); // prevent actual form submission
    const email = document.getElementById('email').value;
    const rollno = document.getElementById('rollno').value;

    if (email && rollno) {
      alert(" Registered Successfully!");
      this.reset();
    }
  });
```

**OUTPUT:**

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| COE (30): | |
| OBSERVATION(10) | |
| RECORD (10): | |
| VIVA (10): | |
| TOTAL (60): | |

**RESULT :**

A static Html, Css and JavaScript page is successfully served to the browser using a basic NodeJS HTTP server without using Express framework was executed successfully.

**Ex No: 2**
**Date:**

# Form Data Handling and Display Using Express.js and Handlebars in Node.js

## AIM:

To create a NodeJS server using Express that stores form data in a JSON file and displays it using Handlebars templating on a separate page.

## ALGORITHM:

**Step 1:** Initialize an Express project and install necessary packages (`express`, `body-parser`, `express-handlebars`, `fs`).

**Step 2:** Set up middleware to parse form data from `req.body`.

**Step 3:** Configure Handlebars view engine.

**Step 4:** Create an HTML form to take input from the user.

**Step 5:** Handle `POST` requests and retrieve form data.

**Step 6:** Store the form data in a `.json` file using `fs.writeFile()`.

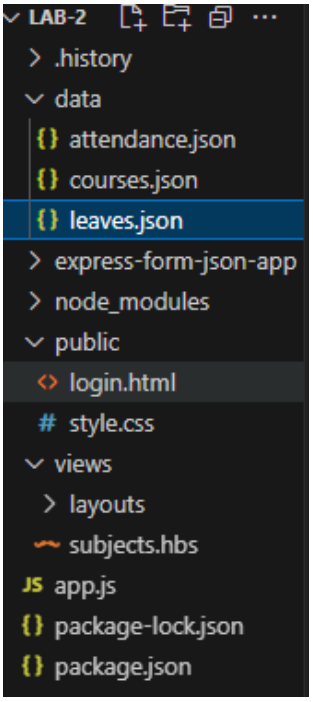
**Step 7:** Redirect the user to a new route after saving.

**Step 8:** Read JSON file data and pass it to Handlebars for rendering.

**Step 9:** Render the view and show the data in formatted layout.

**Step 10:** Start the server and validate the input/output process.

**DESIGN:**




1. The program uses Express with modular middleware for handling routes and form data.
2. Handlebars is used to separate UI design from server logic.
3. Form input is stored in a `.json` file for simple data persistence.
4. GET and POST routes manage form submission and result display.

The result page shows total and CGPA dynamically using template rendering.

**SOURCE CODE**:

**Form.handlebar**

```
<!DOCTYPE html>
<html lang="en">
<head><meta charset="UTF-8">
    <title>Student Login</title>
    <link rel="stylesheet" href="/style.css"></head>
<body>
    <div class="login-container">
        <h2>Student Login</h2>
        <div class="success-message" id="successMsg">Login successful! Redirecting...</div>
        <form id="loginForm" action="/login" method="POST">
            <label>User Name:</label>
```

```
            <input type="text" name="username" required>
            <label>Email:</label>
            <input type="email" name="email" required>
            <label>Roll No:</label>
            <input type="text" name="rollno" required>
            <button type="submit">Login</button>
        </form> </div>
  </body>
  </html
```

**subject.handlebar**

```
  <h2 class="headline">Current Semester Subjects</h2>
  <p class="user-info">Logged in as: {{student.username}} ({{student.email}}, Roll No:
  {{student.rollno}})</p>
  <table class="main-table">
    <tr>
      <th>Subject</th>
      <th>Attendance</th>
      <th>Action</th>
    </tr>
    {{#each subjects}}
      <tr>
        <td>{{this}}</td>
        <td style="text-align: center;">{{attendanceCount ../attendance this}} days</td>
        <td style="text-align: center;">
          <form action="/mark-attendance" method="POST" style="display:inline;">
            <input type="hidden" name="subject" value="{{this}}">
            <button type="submit">Mark Attendance</button>
          </form>
        </td>
      </tr>
    {{/each}}
  </table>
```

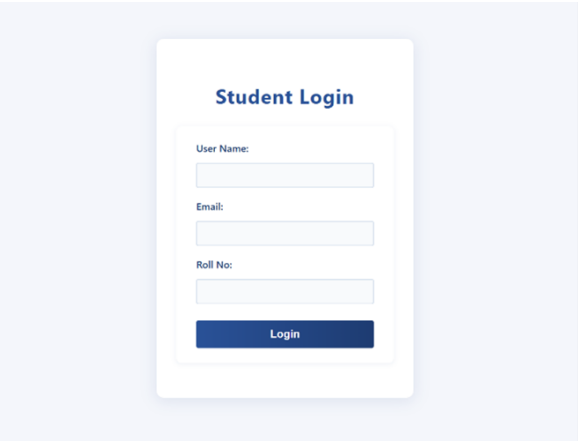
```
<h3 class="section-headline">Submit Leave Request</h3>
<form action="/submit-leave" method="POST" class="leave-form">
  <label for="subject">Subject:</label>
  <select name="subject" id="subject" required>
    <option value="">Select Subject</option>
    {{#each subjects}}
      <option value="{{this}}">{{this}}</option>
    {{/each}}
  </select>
  <label for="date">Date:</label>
  <input type="date" name="date" id="date" required>
  <label for="reason">Reason:</label>
  <input type="text" name="reason" id="reason" placeholder="Reason for leave" required>
  <button type="submit">Submit Leave</button>
</form>
<h3 class="section-headline">Your Leave Requests</h3>
<table class="main-table">
  <tr>
    <th>Subject</th>
    <th>Date</th>
    <th>Reason</th>
  </tr>
  {{#if leaves.length}}
    {{#each leaves}}
      <tr>
        <td>{{this.subject}}</td>
        <td>{{this.date}}</td>
        <td>{{this.reason}}</td>
      </tr>
    {{/each}}
  {{else}}
    <tr><td colspan="3" style="text-align:center;">No leave requests submitted.</td></tr>
  {{/if}}
</table>

<p style="text-align:center;"><a href="/logout">Logout</a></p>
```

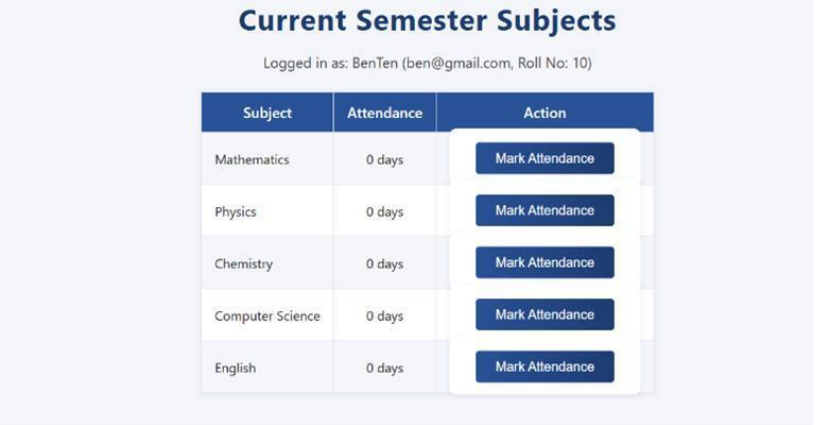
**Server.js**

```
const express = require('express');
const exphbs = require('express-handlebars');
const bodyParser = require('body-parser');
const fs = require('fs');
const path = require('path');

const app = express();
const PORT = 3000;
const hbs = exphbs.create({
  extname: 'hbs',
  helpers: {
    attendanceCount: function(attendance, subject) {
      return (attendance && attendance[subject]) ? attendance[subject].length : 0;
    }
  }
});
app.engine('hbs', hbs.engine);
app.set('view engine', 'hbs');
app.use(bodyParser.urlencoded({ extended: true }));
app.use(express.static('public'));
let currentStudent = null;
const semesterSubjects = [
"Mathematics",
  "Physics",
  "Chemistry",
  "Computer Science",
  "English"
];
const dataDir = path.join(__dirname, 'data');
if (!fs.existsSync(dataDir)) fs.mkdirSync(dataDir);
const attendanceFile = path.join(dataDir, 'attendance.json');
if (!fs.existsSync(attendanceFile)) fs.writeFileSync(attendanceFile, '{}');

function getAttendance() {
  return JSON.parse(fs.readFileSync(attendanceFile,  'utf-8'));
}
function saveAttendance(att) {
  fs.writeFileSync(attendanceFile, JSON.stringify(att, null, 2));
}
const leaveFile = path.join(dataDir, 'leaves.json');
if (!fs.existsSync(leaveFile)) fs.writeFileSync(leaveFile, '{}');

function getLeaves() {
  return JSON.parse(fs.readFileSync(leaveFile, 'utf-8'));
}
function saveLeaves(leaves) {
  fs.writeFileSync(leaveFile, JSON.stringify(leaves, null, 2));
}
app.get('/', (req, res) => {
  res.sendFile(path.join(__dirname, 'public', 'login.html'));
});
```

```
app.post('/login', (req, res) => {
  const { username, email, rollno } = req.body;
  currentStudent = { username, email, rollno };
  res.redirect('/subjects');
});

app.get('/subjects', (req, res) => {
  if (!currentStudent) return res.redirect('/');
  const attendance = getAttendance();
  const studentAttendance = attendance[currentStudent.email] || {};
  const leaves = getLeaves();
  const studentLeaves = leaves[currentStudent.email] || [];
  res.render('subjects', {
    student: currentStudent,
    subjects: semesterSubjects,
    attendance: studentAttendance,
    leaves: studentLeaves
  });
});
app.post('/mark-attendance', (req, res) => {
  if (!currentStudent) return res.redirect('/');
  const { subject } = req.body;
  if (!subject) return res.redirect('/subjects');
  const attendance = getAttendance();
  if (!attendance[currentStudent.email]) attendance[currentStudent.email] = {};
  if (!attendance[currentStudent.email][subject]) attendance[currentStudent.email][subject] =
[];
  const today = new Date().toISOString().slice(0, 10);
  if (!attendance[currentStudent.email][subject].includes(today)) {
    attendance[currentStudent.email][subject].push(today);
  }
  saveAttendance(attendance);
  res.redirect('/subjects');
});

app.post('/submit-leave', (req, res) => {
  if (!currentStudent) return res.redirect('/');
  const { subject, date, reason } = req.body;
  if (!subject || !date || !reason) return res.redirect('/subjects');
  const leaves = getLeaves();
  if (!leaves[currentStudent.email]) leaves[currentStudent.email] = [];
  leaves[currentStudent.email].push({ subject, date, reason });
  saveLeaves(leaves);
  res.redirect('/subjects');
});

app.get('/logout', (req, res) => {
  currentStudent = null;
  res.redirect('/');
});

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

**OUTPUT:**

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| COE (30): | |
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| RECORD (10): | |
| VIVA (10): | |
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**RESULT :**

Thus above program form data was successfully saved in a JSON file and displayed using Handlebars on a redirect page after submission was executed successfully.