

WORKSHEET 1

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1. Aim: Full Stack Development (MERN). The primary aim of this experiment is to provide students or developers with an understanding of full-stack development involving MongoDB, Node.js, React, and Express.

- 1. Problem 1.1.1: Give understanding of MongoDB, Nodejs, React, Express.
- 2. Problem 1.1.2: Create a Frontend design of Login/Signup pages and create a backend of it.
- 3. Problem 1.1.3: Test the Backend API Using Postman.

2. Objective:

- Understand how to use MongoDB as a NoSQL database for managing user data.
- Learn to set up and use Node.js as a backend server to handle API requests.
- Explore Express.js for creating routes and managing HTTP requests in Node.js.
- Build a simple frontend interface with React for user interactions like login and signup.
- Test backend APIs using tools like Postman to verify server responses.
- Integrate the React frontend with the backend API to develop a full-stack authentication system.
- Implement password hashing with bcrypt.js to enhance security.

3. Source code/Implementation:

Backend

```
mkdir backend
cd backend
npm init -y
npm install express mongoose cors bcryptjs
jsonwebtoken
```

Server.js

```
const express = require('express');
const mongoose = require('mongoose');
const cors = require('cors');
const dotenv = require('dotenv');
const authRoutes = require('./routes/authRoutes');
dotenv.config();
const app = express();
app.use(express.json());
app.use(cors());
mongoose.connect(process.env.MONGO_URI, {
useNewUrlParser: true, useUnifiedTopology: true })
  .then(() => console.log('MongoDB connected'))
  .catch((err) => console.error('MongoDB connection
error:', err));
app.use('/api', authRoutes);
const port = process.env.PORT || 5000;
app.listen(port, () => console.log(`Server running on
http://localhost:${port}`));
```

Users.js

```
const mongoose = require('mongoose');

const UserSchema = new mongoose.Schema({
   email: { type: String, required: true, unique:
   true },
   password: { type: String, required: true },
});

module.exports = mongoose.model('User', UserSchema);
```

authRoutes.js

```
const express = require('express');
const bcrypt = require('bcryptjs');
const jwt = require('jsonwebtoken');
const User = require('../models/User');
const router = express.Router();
// Signup
router.post('/signup', async (req, res) => {
 const { email, password } = req.body;
 try {
   const existingUser = await User.findOne({ email });
   if (existingUser) {
     return res.status(400).json({ message: 'User already exists' });
   const hashedPassword = await bcrypt.hash(password, 10);
   const newUser = new User({ email, password: hashedPassword });
   await newUser.save();
   res.status(201).json({ message: 'User created successfully' });
  } catch (error) {
   console.error('Signup error:', error);
    res.status(500).json({ message: 'Server error' });
});
router.post('/login', async (req, res) => {
  const { email, password } = req.body;
  try {
   const user = await User.findOne({ email });
   if (!user) {
     return res.status(404).json({ message: 'User not found' });
    const isMatch = await bcrypt.compare(password, user.password);
   if (!isMatch) {
     return res.status(400).json({ message: 'Invalid credentials' });
   const token = jwt.sign({ userId: user._id }, process.env.JWT_SECRET,
{
      expiresIn: '1h',
   });
    res.json({ message: 'Login successful', token });
 } catch (error) {
  console.error('Login error:', error);
    res.status(500).json({ message: 'Server error' });
});
module.exports = router;
```

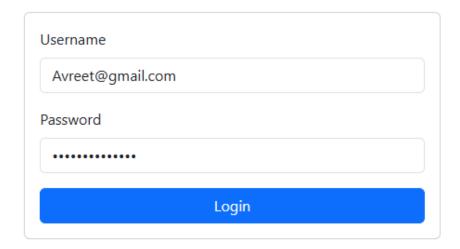
my-auth-app

```
npm create vite@latest my-auth-app --template
react cd my-auth-app
npm install
```

App.jsx

```
import React from 'react';
import { BrowserRouter as Router, Routes, Route } from 'react-router-dom';
import Login from './Login';
import Signup from './Signup';
const App = () => {
 return (
   <Router>
     <div className="App">
          <Route path="/" element={<Login />} />
          <Route path="/signup" element={<Signup />} />
        </Routes>
      </div>
    </Router>
 );
};
export default App;
```

4. Screenshots of outputs:



5. Learning Outcomes:

- Understand and implement MongoDB as a NoSQL database for managing user data.
- Build and configure a Node.js backend server using Express.js to handle API requests and routes.
- Design and develop user-friendly interfaces for login and signup using React.
- Securely authenticate users by implementing password hashing and JSON Web Tokens (JWT).
- Test and validate backend APIs using Postman to ensure proper functionality and error handling.
- Integrate frontend and backend components to create a complete and secure full-stack authentication system.