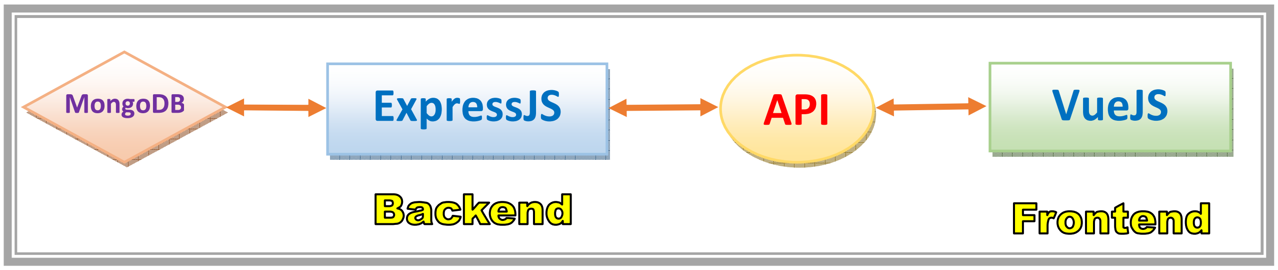
LAB 4

❖ CONTENT

- Enable Restful API exchange in backend with "cors" package
- Initialize new VueJS project as frontend
- Consume Restful APIs from backend with "axios" package

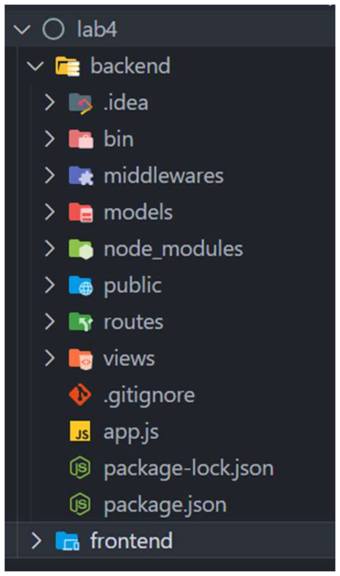
❖ INTRODUCTION

- CORS: Cross-Origin Resource Sharing. It is a security feature implemented in web browsers to control how web applications running at one origin can interact with resources from a different origin.
- VueJS is a progressive JavaScript framework used for building user interfaces and single-page applications. Vue.js is known for its simplicity, flexibility, and fine-grained reactivity.
- Some alternatives to VueS: ReactJS, AngularJS, SvelteJS
- Some ways to consume Restful API with VueJS:
  - *Axios: a promise-based HTTP client*
  - Fetch API: a browser built-in web API
- System architecture diagram:



❖ INSTRUCTION

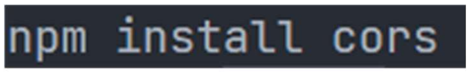
1. Continue with previous project and set it as backend project



```
lab4
  backend
    .idea
    bin
    middlewares
    models
    node_modules
    public
    routes
    views
    .gitignore
    app.js
    package-lock.json
    package.json
  frontend
```

Figure 1 - Project structure

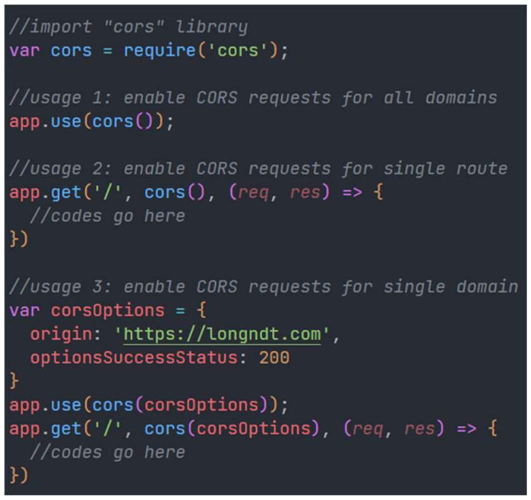
2. Install new package: CORS



```
npm install cors
```

Figure 2 - Install new package

3. Enable CORS in backend side for Restful API exchange



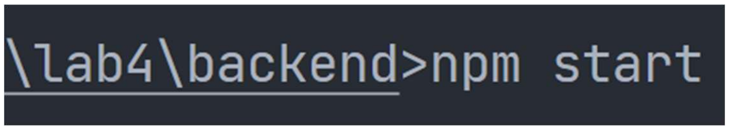
```javascript
//import "cors" library
var cors = require('cors');

//usage 1: enable CORS requests for all domains
app.use(cors());

//usage 2: enable CORS requests for single route
app.get('/', cors(), (req, res) => {
  //codes go here
})

//usage 3: enable CORS requests for single domain
var corsOptions = {
  origin: 'https://longndt.com',
  optionsSuccessStatus: 200
}
app.use(cors(corsOptions));
app.get('/', cors(corsOptions), (req, res) => {
  //codes go here
})
```

*Figure 3 - Config CORS in backend (select 1 usage only) (**app.js**)*

4. Start the backend server and keep it running along with frontend server.

   ⇨ ***Do not stop it***, otherwise, 2 servers can not exchange data

   Note: Default web server address for **ExpressJS** : **http://localhost:3000**



```
\lab4\backend>npm start
```

Figure 4 - Start the backend web server

5. Develop frontend side with VueJS framework.
   - Initialize new VueJS project

     npm create vue@latest *project_name*

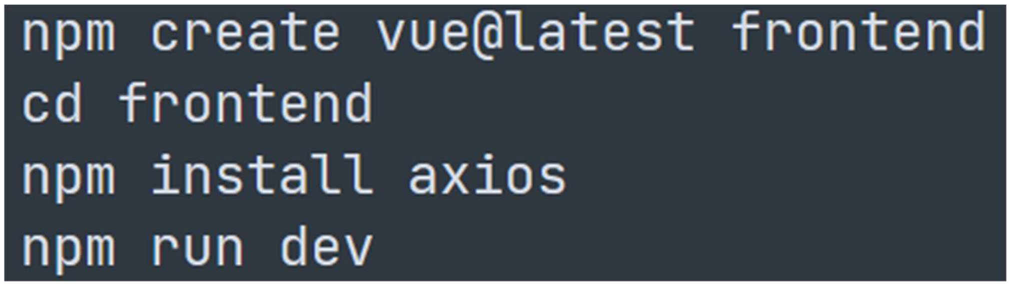
   - Install axios package to consume API

     npm install axios

   - Start frontend web server

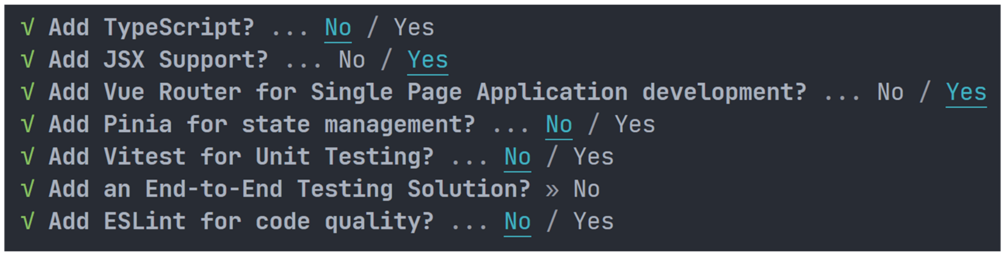
     npm run dev

   Note: Default web server address for **VueJS** : **http://localhost:5173**



```
npm create vue@latest frontend
cd frontend
npm install axios
npm run dev
```

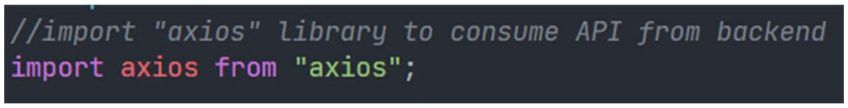
Figure 5 - Initialize VueJS project and install library in a new terminal



```
√ Add TypeScript? ... No / Yes
√ Add JSX Support? ... No / Yes
√ Add Vue Router for Single Page Application development? ... No / Yes
√ Add Pinia for state management? ... No / Yes
√ Add Vitest for Unit Testing? ... No / Yes
√ Add an End-to-End Testing Solution? » No
√ Add ESLint for code quality? ... No / Yes
```

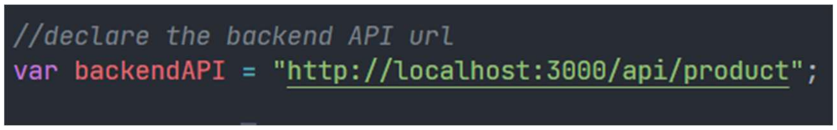
Figure 6 - Config parameter when initializing VueJS project

6. Update the default view page **src/App.vue** to fetch data from backend



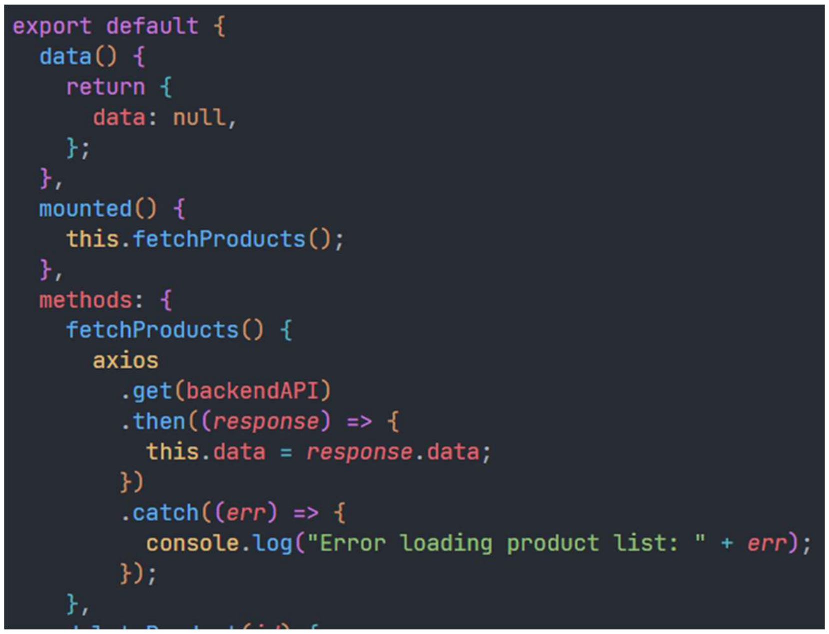
```
//import "axios" library to consume API from backend
import axios from "axios";
```

*Figure 7 - import "**axios**" library*



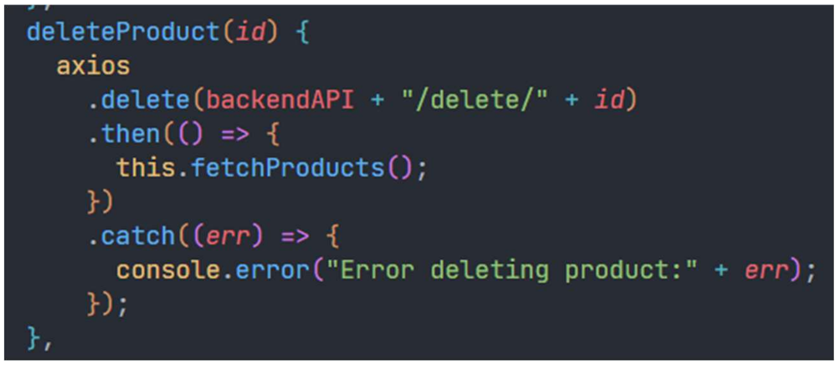
```
//declare the backend API url
var backendAPI = "http://localhost:3000/api/product";
```

Figure 8 - declare backend API



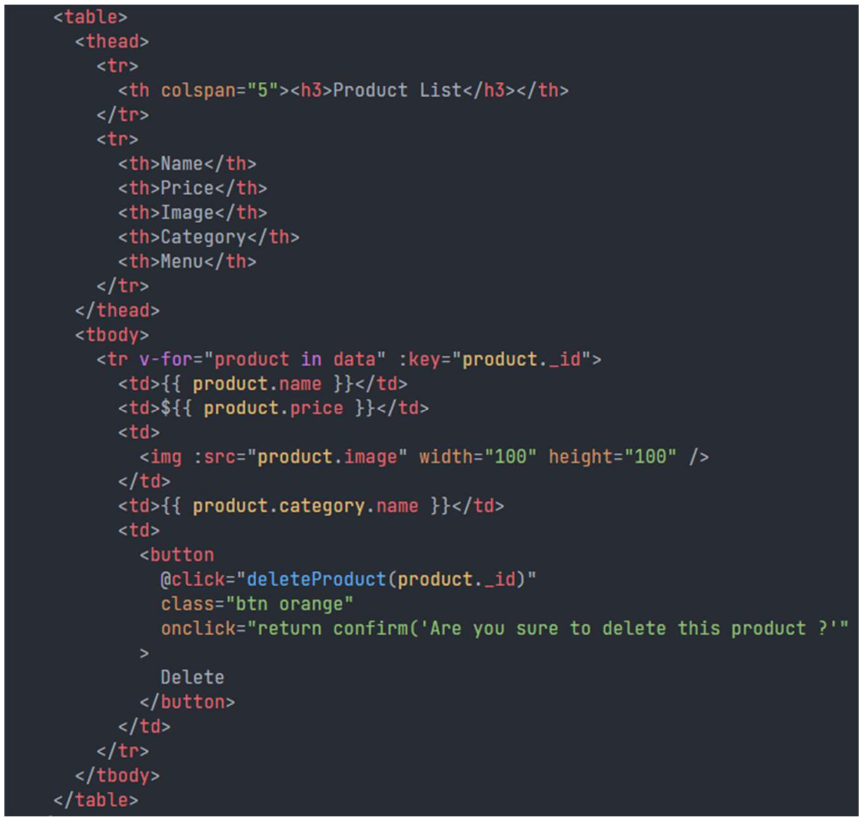
```
export default {
  data() {
    return {
      data: null,
    };
  },
  mounted() {
    this.fetchProducts();
  },
  methods: {
    fetchProducts() {
      axios
        .get(backendAPI)
        .then((response) => {
          this.data = response.data;
        })
        .catch((err) => {
          console.log("Error loading product list: " + err);
        });
    },
```

*Figure 9 - fetch data with method **axios.get()***



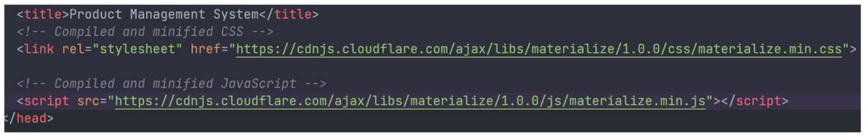
```
deleteProduct(id) {
  axios
    .delete(backendAPI + "/delete/" + id)
    .then(() => {
      this.fetchProducts();
    })
    .catch((err) => {
      console.error("Error deleting product:" + err);
    });
},
```

*Figure 10 - delete data with method **axios.delete()***



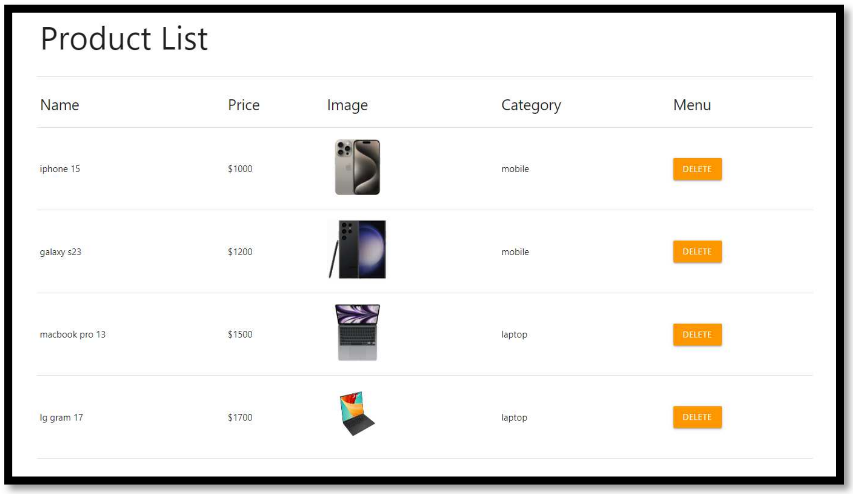
```
<table>
  <thead>
    <tr>
      <th colspan="5"><h3>Product List</h3></th>
    </tr>
    <tr>
      <th>Name</th>
      <th>Price</th>
      <th>Image</th>
      <th>Category</th>
      <th>Menu</th>
    </tr>
  </thead>
  <tbody>
    <tr v-for="product in data" :key="product._id">
      <td>{{ product.name }}</td>
      <td>${{ product.price }}</td>
      <td>
        <img :src="product.image" width="100" height="100" />
      </td>
      <td>{{ product.category.name }}</td>
      <td>
        <button
          @click="deleteProduct(product._id)"
          class="btn orange"
          onclick="return confirm('Are you sure to delete this product ?'"
        >
          Delete
        </button>
      </td>
    </tr>
  </tbody>
</table>
```

Figure 11 – Render the web template to display content



```
 <title>Product Management System</title>
 <!-- Compiled and minified CSS -->
 <link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/materialize/1.0.0/css/materialize.min.css">

 <!-- Compiled and minified JavaScript -->
 <script src="https://cdnjs.cloudflare.com/ajax/libs/materialize/1.0.0/js/materialize.min.js"></script>
</head>
```

Figure 12 - Import Materialize CSS framework to file ***src/index.html***



Product List

Name	Price	Image	Category	Menu
iphone 15	$1000		mobile	DELETE
galaxy s23	$1200		mobile	DELETE
macbook pro 13	$1500		laptop	DELETE
lg gram 17	$1700		laptop	DELETE

Figure 13 - Result of fetching data from backend