**MAIN PLAN**  
**Planning Stage**

Define Requirements: Understand the features and functionalities needed for the e-commerce website. This will include user roles, product categories, payment methods, etc.

Research: Investigate the technologies, libraries, and APIs you'll need. Given your proficiency in JavaScript and Node.js, Next.js, Tailwind, Redux, and Mongoose are excellent choices.

Action Plan: Create a detailed action plan, including a timeline and milestones.

**Development Stage**

Setup Environment: Configure your development environment, including databases, servers, and any other services.

Backend Development: Implement the server-side logic, database models, and APIs.

Frontend Development: Develop the user interface using Next.js and Tailwind. Integrate Redux for state management.

**Testing Stage**

Unit Tests: Write unit tests for individual components and functions.

Integration Tests: Test the interaction between different parts of the application.

**Deployment Stage**

Staging: Deploy the application to a staging environment for final testing.

Production: Once everything is tested and approved, deploy the application to the production environment.

**BREAKDOWN OF MAIN PLAN**

**Define Requirements**

**User Roles: Identify the different types of users who will interact with the application (e.g., customers, admins, vendors).**

**Features and Functionalities: List out the features you want to include. For an e-commerce site, this could be product search, user authentication, cart functionality, and payment processing.**

**Data Models: Define what kind of data you'll be storing and how it will be structured. This will help in setting up the database later.**

**APIs and Third-Party Services: Decide on any third-party services you'll need, such as payment gateways or email services.**

**UI/UX Design: Sketch out the basic design elements, keeping in mind the user experience.**

**Requirements Document for E-commerce Project**

**1. Introduction**

**Purpose: To build a full-stack e-commerce application.**

**Scope: The application will include features for browsing products, user authentication, cart management, and payment processing.**

**2. User Roles**

**Customer: Can browse products, add to cart, and make purchases.**

**Admin: Manages product listings, order processing, and user accounts.**

**Vendor: Optional role can list and manage their own products.**

**3. Features and Functionalities**

**Product Search: Users can search for products by name, category, or tags.**

**User Authentication: Secure login and registration process.**

**Cart Functionality: Users can add/remove products to/from their cart.**

**Payment Processing: Integration with a payment gateway for transactions.**

**Order Tracking: Users can track the status of their orders.**

**4. Data Models**

**User: Contains information like username, password, and order history.**

**Product: Includes details like name, description, price, and category.**

**Order: Captures details of transactions, including products, quantities, and payment status.**

**5. APIs and Third-Party Services**

**Payment Gateway: To handle transactions (e.g., Stripe).**

**Email Service: For sending order confirmations and notifications (e.g., SendGrid).**

**6. UI/UX Design**

**Layout: Responsive design compatible with various screen sizes.**

**Theme: Consistent color scheme and typography.**

**User Experience: Intuitive navigation and user-friendly interface.**

**7. Technology Stack**

**Frontend: Next.js, Tailwind, Redux**

**Backend: Node.js, Express.js, Mongoose**

**Database: MongoDB**

**8. Timeline and Milestones**

**To be determined based on the action plan.**

**Next Steps**

**Research: We'll investigate the specific libraries and packages that can be used for each feature. For example, we might consider using Passport.js for authentication.**

**Action Plan: We'll create a detailed action plan, breaking down each feature into smaller tasks and assigning deadlines. This will serve as our roadmap.**

**Environment Setup: Once the action plan is ready, we'll set up the development environment, including the database and any necessary third-party services.**

**1. Authentication**

**Google OAuth 2.0: Implement Google OAuth 2.0 and traditional email/password login using Passport.js.**

**Email and Password: Implement a secure login and registration system using Passport.js' Local strategy. This will include hashing passwords and possibly implementing two-factor authentication for added security.**

**2. Product Management**

**Implement product categorization, search, and filtering without external libraries.**

**3. Cart and Payment**

**Stripe: Since we've decided on Stripe, we'll investigate its Node.js SDK and how to integrate it for payment processing.**

**Cart Management: Research state management solutions for handling cart items. Redux Toolkit is a good fit here.**

**4. Email Notifications**

**SendGrid: Explore the SendGrid Node.js library for sending transactional emails like order confirmations.**

**5. UI/UX**

**Given that we're using Tailwind, we'll use Tailwind UI pre-designed, customizable components.**

**6. Testing**

**Use Jest for both front-end and back-end testing.**

**7. Deployment**

**Deploy both front-end and back-end on Vercel using Next.js' full-stack capabilities.**

**Development Stage: Next Steps**

**Environment Setup: Initialize the Next.js project and set up the development environment, including Git for version control.**

**Authentication: Start with the authentication module. Implement Google OAuth 2.0 and traditional email/password login using Passport.js.**

**Product Management: Develop the product categorization, search, and filtering features.**

**Cart & Payment: Implement the cart management using Redux Toolkit and integrate Stripe for payments.**

**Email Notifications: Set up SendGrid for sending transactional emails.**

**UI/UX: Integrate Tailwind UI components and customize them according to our needs.**

**Testing: Set up Jest for both front-end and back-end testing. Given the extended time, we can be thorough.**

**Deployment: Once all modules are developed and tested, proceed to deploy the application on Vercel.**

**Review and Iterate: After deployment, test the live application and make any necessary adjustments.**

**Development Phase Steps**

**Database Setup: Initialize the MongoDB database and create the necessary collections.**

**Backend API: Develop the backend API routes for user authentication, product management, and order processing.**

**Frontend Development: Create the front-end pages and components using Next.js and Tailwind CSS.**

**State Management: Implement state management using Redux Toolkit.**

**User Authentication: Integrate Passport.js for Google OAuth 2.0 and email/password authentication.**

**Payment Gateway: Integrate Stripe for handling transactions.**

**Email Notifications: Use SendGrid for sending order confirmation emails.**

**Testing: Write unit and integration tests using Jest.**

**Deployment: Deploy the application to Vercel.**