**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.**

**Essential Collections for an E-Commerce Project:**

**Users: As you mentioned, this is a must-have. It should contain fields like userID, username, password, email, address, roles (admin, customer, etc.), and other personal details.**

**Products: This collection will store all the information about the products you're selling. Fields might include productID, name, description, price, stockQuantity, categoryID, images, ratings, etc.**

**Categories: To categorize products. Fields could be categoryID, name, description, and perhaps a parentCategoryID for nested categories.**

**Orders: This will track all customer orders. Fields could include orderID, userID, totalAmount, status (processing, shipped, etc.), paymentMethod, orderDate, and an array of productIDs with quantities.**

**Cart: To hold items that a user is considering purchasing. Fields might include cartID, userID, and an array of productIDs with quantities.**

**Reviews: For customer reviews of products. Fields could include reviewID, userID, productID, rating, comment, and datePosted.**

**Payment: To store payment methods and transactions. Fields could be paymentID, userID, orderID, paymentMethod, transactionID, status, and date.**

**Shipping: To manage shipping details. Fields could include shippingID, orderID, userID, status, trackingNumber, and estimatedArrival.**

**Wishlist: To store products that a user wishes to buy in the future. Fields might include wishlistID, userID, and an array of productIDs.**

**Coupons: To manage discount coupons. Fields could include couponID, code, description, discountAmount, validFrom, and validTo.**

**Logs: For auditing and debugging. Fields could include logID, action, userID, date, and details.**

**Notifications: To manage notifications for users. Fields could include notificationID, userID, message, status, and date.**

**User Authentication: Implement routes for user registration, login, and token verification. This is crucial as many other routes will require user authentication.**

**User Profile: After authentication, you can work on routes for fetching and updating the user profile.**

**Products: Implement CRUD (Create, Read, Update, Delete) operations for products. This will be one of the core functionalities.**

**Cart: Once you have products, you can implement the cart functionality. This would include adding items to the cart, updating quantities, and removing items.**

**Orders: After the cart is functional, you can work on placing orders, which would involve creating new orders, updating their status, and listing orders for a user.**

**Reviews: Implement routes for adding, updating, and deleting product reviews.**

**Wishlist: Implement routes for adding and removing items from the wishlist.**

**Payment: Implement routes for handling payments, which could be triggered when an order is placed.**

**Shipping: Implement routes for updating and tracking shipping information.**

**Optional Features: If you decide to add coupons, logs, or notifications later, they can be implemented last.**

**Backend API Development**

**User Authentication**

**You've already implemented routes for user registration and login. Next, you could add routes for token verification, password reset, and email verification.**

**User Profile**

**Create routes to fetch and update user profile information. This could include changing the password, updating the email, and editing personal details.**

**Products**

**Implement CRUD operations for products. This will involve creating new products, reading product information, updating existing products, and deleting products.**

**Cart**

**Implement routes for cart operations. This includes adding items to the cart, updating item quantities, and removing items from the cart.**

**Orders**

**Create routes for order management. This involves placing new orders, updating order status, and fetching order history for a user.**

**Reviews**

**Implement routes for product reviews. This includes adding new reviews, updating existing reviews, and deleting reviews.**

**Wishlist**

**Create routes for managing the wishlist. This involves adding items to the wishlist and removing items from it.**

**Payment**

**Implement routes for payment processing. This could involve integrating with Stripe to handle transactions.**

**Shipping**

**Create routes for shipping management. This involves updating shipping status and tracking information.**

**Optional Features**

**If you decide to implement coupons, logs, or notifications, these can be added last. Create routes for managing these features.**

**Frontend Development**

**Create the necessary pages and components using Next.js and Tailwind CSS. Make sure to integrate them with your backend API.**

**State Management**

**Implement state management using Redux Toolkit. This will help you manage the application's state more efficiently.**

**Payment Gateway**

**Integrate Stripe for handling transactions. This will involve both frontend and backend work.**

**Email Notifications**

**Use SendGrid to send order confirmation emails and other notifications.**

**Testing**

**Write unit and integration tests using Jest to ensure that your application is robust and works as expected.**

**Deployment**

**Once everything is tested and ready, deploy your application to Vercel.**