**E-Commerce Project Upgrade To-Do List**

## 1️⃣ Authentication & Authorization (Login System)

**Goal:** Users & admin can login/register with roles

- **1.1 Backend**
  - Add **User model** with fields:
    - name, email, password (hashed), role (user / admin)
  - Implement **Register API**
    - Validate email/password
    - Hash password
    - Assign default role = user
  - Implement **Login API**
    - Check email + password
    - Generate **JWT token**
    - Return token + role
  - Middleware: **isAuthenticated**
  - Middleware: **isAdmin** (protect admin routes)
- **1.2 Frontend**
  - Create /login & /register pages
  - Form validation (email, password)
  - Store JWT in localStorage
  - Route protection:
    - /admin/* → only admin
    - /cart, /order → only authenticated users

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## 2️⃣ Admin Dashboard

**Goal:** Admin can manage products, orders, users

- **2.1 Backend APIs**
    - Products:
        - GET all products
        - POST add product
        - PUT edit product
        - DELETE product
    - Orders:
        - GET all orders
        - PATCH update order status (pending → shipped → delivered)
        - DELETE order (optional)
    - Users:
        - GET all users
        - PATCH change role / block user
        - DELETE user (optional)
    - Stats (optional): total users, total sales, best-selling products
- **2.2 Frontend**
    - /admin/dashboard → overview (stats)
    - /admin/products → CRUD product management
    - /admin/orders → order list + update status
    - /admin/users → user list + role change
    - Optional: Charts (Chart.js / Recharts)

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### 3️⃣ Order Management Upgrades

**Goal:** Better order handling for users

- **3.1 Backend**
    - Add order.status field: pending, shipped, delivered, cancelled

- Optional: generate invoice link / PDF
- Endpoint: user can **view their own orders**
- Optional: cancel order API

- **3.2 Frontend**
  - /orders page for user
  - Show order status
  - Button to cancel (if allowed)
  - Show invoice / order details

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### 4️⃣ Payment Integration

**Goal:** Users can pay online

- **4.1 Backend**
  - Setup **Stripe / Razorpay sandbox**
  - Payment API endpoint (create session, verify payment)
  - Update order status on payment success
- **4.2 Frontend**
  - Add **"Pay Now" button** on checkout
  - Redirect to payment gateway
  - Handle success / failure callback
  - Update order status in UI

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### 5️⃣ Search, Filter & Sort

**Goal:** Help users find products faster

- **5.1 Backend**
  - Filter products by:
    - Category

        - Price range
        - Rating
    - Search endpoint (by name or keyword)
    - Optional: sort by newest, price low → high, popularity
- **5.2 Frontend**
    - Search bar + category dropdown
    - Filter sidebar / dropdown
    - Sort selector

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### 6️⃣ User Experience (Frontend Enhancements)

**Goal:** Smooth, professional feel

- Responsive design (mobile-first)
- Cart persists after refresh (localStorage)
- Add/remove product animations
- Product reviews & ratings
- Optional: Wishlist / Save for later

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### 7️⃣ Security Improvements

**Goal:** Keep the app safe

- Hash passwords (bcrypt)
- JWT verification on protected routes
- Input validation & sanitization
- Limit login attempts
- Optional: HTTPS for deployment

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### 8️⃣ Notifications

**Goal:** Keep users/admin informed

- Backend:
  - Email on order placed / shipped / delivered
  - Optional: in-app notifications
- Frontend:
  - Toast notifications for actions
  - Admin notification panel

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### 9️⃣ Analytics / Dashboard Stats

**Goal:** Help admin see system performance

- Backend:
  - Total sales (day/week/month)
  - Best-selling products
  - Active users
- Frontend:
  - Dashboard charts
  - Summary cards (e.g., total orders, revenue)

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### 🔟 Bonus / Future Upgrades

- Coupons / discount codes
- Multi-language support
- Chatbot / live support
- Product recommendations / AI suggestions

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### ⚡ Order to Implement

1. Authentication & Authorization ✅ Must do first

2. Admin dashboard
3. Order management upgrades
4. Payment integration
5. Search, filter & sort
6. Frontend UX improvements
7. Security improvements
8. Notifications
9. Analytics / Dashboard stats
10. Bonus features