ITPFL4

ADVANCE WEB APPLICATION DEVELOPMENT

ENDTERM PROJECT

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BSIT 3-A

JANUARY 9, 2026

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1. PROJECT OVERVIEW

ScholarSpot is a specialized e-commerce platform designed to serve the academic community by integrating digital retail with real-time logistics visualization. The system enables students, faculty, and staff to procure academic supplies while providing administrators with granular control over inventory, orders, and delivery tracking. Unlike conventional e-commerce platforms, ScholarSpot introduces a real-time delivery simulation engine that maps and animates order transit, offering users a transparent and interactive delivery experience along-side diversity in mode of payment with feature such as cash on delivery or visa with the use of APIs to integrate.

TARGET USERS

- **Students & Faculty:** End-users who browse, purchase, and track academic supplies.

- **Administrators:** Platform managers responsible for catalog management, order fulfillment, coupon distribution, and system monitoring.

CORE FEATURES:

1. **User Authentication System** – Secure login/signup with optional Two-Factor Authentication

2. **Dynamic Product Catalog** – Filterable by category, price, and stock status.

3. **Client-Side Cart Management** – Uses localStorage for performance and offline readiness.

4. **Checkout & Payment Simulation** – Server-side stock validation, transaction recording, and diverse mode of payment.

5. **Real-Time Delivery Tracking** – Integrated Leaflet.js mapping with geocoding via LocationIQ API.

6. **Administrative Dashboard** – Centralized control for products, coupons, orders, and activity logs.

7. **Audit Logging** – Tracks user actions for security and compliance.

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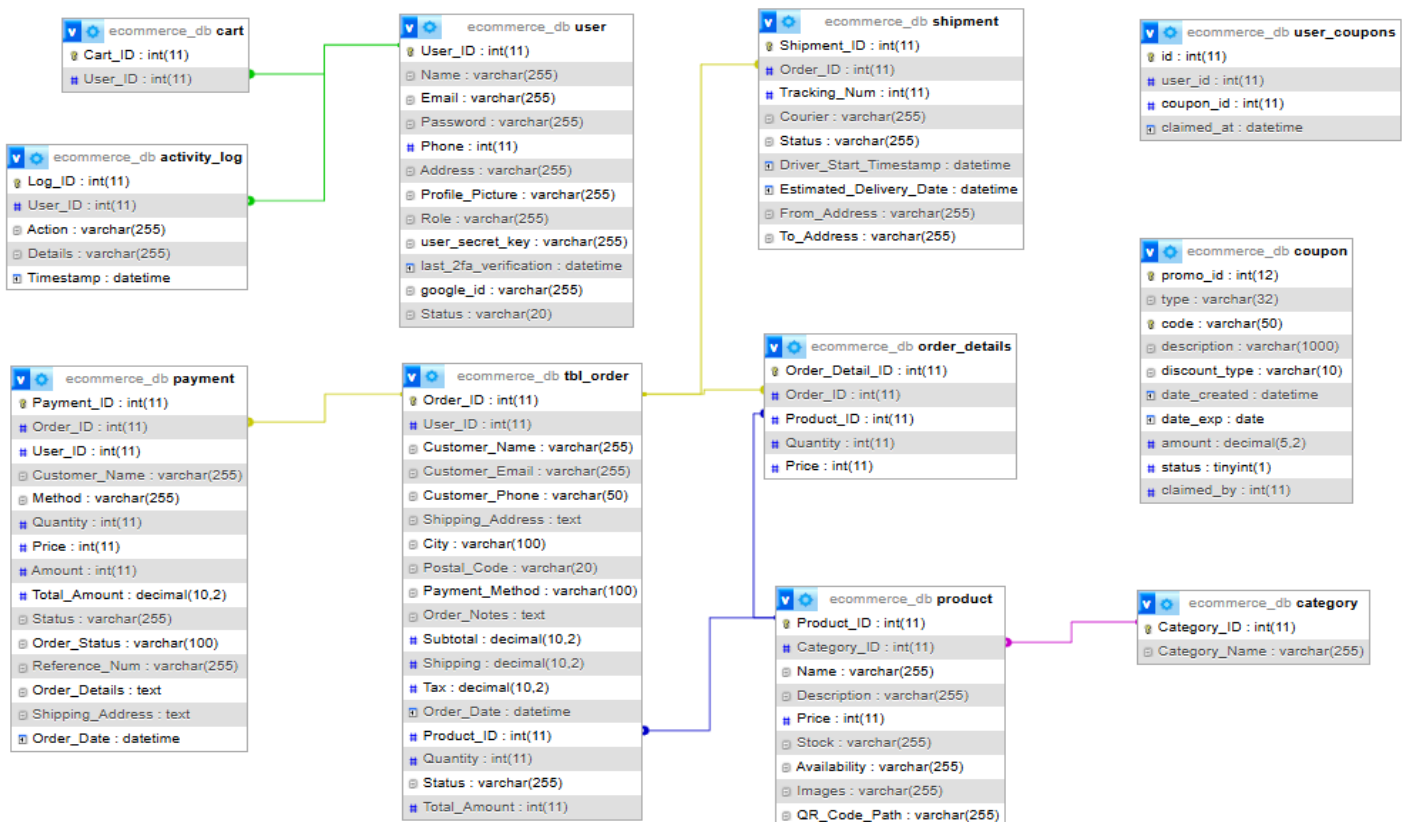
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2. SYSTEM OBJECTIVES

Current academic procurement systems are often fragmented, resulting in inefficient supply chains for educational materials, a lack of real-time delivery transparency for end-users, and manual, time-intensive inventory and order management for administrators. ScholarSpot addresses these challenges by automating inventory management and order processing, enhancing user trust through an interactive real-time delivery simulation, and significantly reducing administrative overhead via an integrated dashboard. Beyond its practical utility, the platform also serves as a comprehensive academic model of a secure, scalable, and user-centered full-stack system.

3. SYSTEM ARCHITECTURE

- **Frontend:** HTML5, CSS3, Vanilla JavaScript, Leaflet.js, Stripe

- **Backend:** PHP 8.2

- **Database:** MySQL 8.0

- **APIs:** Leaftlet(Maps), LocationIQ(Geocoding), Stripe(Payment)

4. DATABASE DESIGN

ERD SCREENSHOT

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TABLE DESCRIPTIONS

TABLE NAME	DESCRIPTION	KEY FIELDS
user	Stores customer/admin accounts	user_id, email, password_hash, role
product	Inventory items with stock levels	product_id, name, price, stock, category_id
category	Product grouping	category_id, name, description
tbl_order	Order header information	order_id, user_id, total, status, date
order_details	Line items per order	detail_id, order_id, product_id, qty
payment	Transaction records	payment_id, order_id, method, reference
shipment	Delivery tracking data	shipment_id, order_id, from_address, to_address, coordinates
coupon	Discount codes	coupon_id, code, discount_type, value
user_coupons	Tracks coupon usage per user	id, user_id, coupon_id, used
activity_log	Security and action audit trail	log_id, user_id, action, timestamp

DATA STRUCTURE

user

Column	Type	Null	Default	Links to	Comments	Media type
User_ID *(Primary)*	int(11)	No				
Name	varchar(255)	No				
Email	varchar(255)	No				
Password	varchar(255)	Yes	NULL			
Phone	int(11)	Yes	NULL			
Address	varchar(255)	Yes	NULL			
Profile_Picture	varchar(255)	Yes	NULL			
Role	varchar(255)	No				
user_secret_key	varchar(255)	Yes	NULL			
last_2fa_verification	datetime	Yes	NULL			
google_id	varchar(255)	Yes	NULL			
Status	varchar(20)	Yes	Active			

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product

Column	Type	Null	Default	Links to	Comments	Media type
Product_ID *(Primary)*	int(11)	No				
Category_ID	int(11)	No		category -> Category_ID		
Name	varchar(255)	No				
Description	varchar(255)	No				
Price	int(11)	No				
Stock	varchar(255)	No				
Availability	varchar(255)	No				
Images	varchar(255)	No				
QR_Code_Path	varchar(255)	Yes	*NULL*			

category

Column	Type	Null	Default	Links to	Comments	Media type
Category_ID *(Primary)*	int(11)	No				
Category_Name	varchar(255)	No				

tbl_order

Column	Type	Null	Default	Links to	Comments	Media type
Order_ID *(Primary)*	int(11)	No				
User_ID	int(11)	No				
Customer_Name	varchar(255)	Yes	*NULL*			
Customer_Email	varchar(255)	Yes	*NULL*			
Customer_Phone	varchar(50)	Yes	*NULL*			
Shipping_Address	text	Yes	*NULL*			
City	varchar(100)	Yes	*NULL*			
Postal_Code	varchar(20)	Yes	*NULL*			
Payment_Method	varchar(100)	Yes	*NULL*			
Order_Notes	text	Yes	*NULL*			
Subtotal	decimal(10,2)	Yes	*NULL*			
Shipping	decimal(10,2)	Yes	*NULL*			
Tax	decimal(10,2)	Yes	*NULL*			
Order_Date	datetime	Yes	current_timestamp()			
Product_ID	int(11)	No		product -> Product_ID		
Quantity	int(11)	No				
Status	varchar(255)	No				
Total_Amount	int(11)	No				

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order_details

Column	Type	Null	Default	Links to	Comments	Media type
Order_Detail_ID (Primary)	int(11)	No				
Order_ID	int(11)	No		tbl_order -> Order_ID		
Product_ID	int(11)	No		product -> Product_ID		
Quantity	int(11)	No				
Price	int(11)	No				

payment

Column	Type	Null	Default	Links to	Comments	Media type
Payment_ID (Primary)	int(11)	No				
Order_ID	int(11)	No		tbl_order -> Order_ID		
User_ID	int(11)	Yes	NULL			
Customer_Name	varchar(255)	Yes	NULL			
Method	varchar(255)	No				
Quantity	int(11)	No				
Price	int(11)	No				
Amount	int(11)	No				
Total_Amount	decimal(10,2)	Yes	NULL			
Status	varchar(255)	No				
Order_Status	varchar(100)	Yes	NULL			
Reference_Num	varchar(255)	No				
Order_Details	text	Yes	NULL			
Shipping_Address	text	Yes	NULL			
Order_Date	datetime	Yes	NULL			

coupon

Column	Type	Null	Default	Links to	Comments	Media type
promo_id (Primary)	int(12)	No				
type	varchar(32)	No				
code	varchar(50)	No				
description	varchar(1000)	No				
discount_type	varchar(10)	No	fixed			
date_created	datetime	No	current_timestamp()			
date_exp	date	No				
amount	decimal(5,2)	No				
status	tinyint(1)	No				
claimed_by	int(11)	Yes	NULL			

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cart

Column	Type	Null	Default	Links to	Comments	Media type
Cart_ID (Primary)	int(11)	No				
User_ID	int(11)	No		user -> User_ID		

activity_log

Column	Type	Null	Default	Links to	Comments	Media type
Log_ID (Primary)	int(11)	No				
User_ID	int(11)	No		user -> User_ID		
Action	varchar(255)	No				
Details	varchar(255)	Yes	NULL			
Timestamp	datetime	Yes	current_timestamp()			

shipment

Column	Type	Null	Default	Links to	Comments	Media type
Shipment_ID (Primary)	int(11)	No				
Order_ID	int(11)	No		tbl_order -> Order_ID		
Tracking_Num	int(11)	No				
Courier	varchar(255)	No				
Status	varchar(255)	No				
Driver_Start_Timestamp	datetime	Yes	NULL			
Estimated_Delivery_Date	datetime	No				
From_Address	varchar(255)	Yes	NULL			
To_Address	varchar(255)	Yes	NULL			

5. IMPLEMINTATION DETAILS

PROJECT FILE STRUCTURE

```
ScholarSpot/
├── css/
│   ├── style.css
│   └── styles.css
├── js/
│   └── marketplace.js
├── images/
│   ├── logonew.png        # Logo
│   └── [product_images]    # Uploaded product photos
├── vendor/            # Composer dependencies
│   ├── phpgangsta/
```

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```
│        └── autoload.php
├── admindashboard.php
├── admin_products.php
├── activity_log.php
├── cart.php
├── checkout.php
├── checkout_process.php
├── Claim.php
├── Create.php
├── dashboard.php
├── db_connect.php          # Database Connection Config
├── login.php
├── login_process.php
├── logout.php
├── middleware.php
├── orderdash.php
├── orderdetails.php
├── products.php
├── qrcode.php
├── setup_2fa.php
├── signup.php
├── signup_process.php
├── userprofile.php
├── user_coupon.php
├── validate_coupon.php
└── verify_2fa.php
```

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KEY MODULES EXPLAINED

Authentication & Security

- **Password Hashing:** password_hash() with PASSWORD_BCRYPT.
- **SQL Injection Prevention:** PDO prepared statements across all queries.
- **Session Management:** Role-based access control (user/admin).

Cart & Checkout Flow

1. **Client-Side Cart:** Stored in localStorage until checkout.
2. **Stock Validation:** On checkout, server verifies product.stock for each item.
3. **Transaction Integrity:** Uses BEGIN TRANSACTION in checkout_process.php to ensure atomic updates.

Real-Time Delivery Simulation

- **Geocoding:** Addresses converted to lat/long via LocationIQ.
- **Mapping:** Leaflet.js renders interactive map.
- **Animation:** JavaScript setInterval() moves marker along interpolated route.

SECURITY CONSIDERATION

- **Input Validation:** Server-side validation for all forms (e.g., email format, price ranges).
- **XSS Prevention:** htmlspecialchars() used on output.
- **CSRF Protection:** Token-based form submission in privileged actions.
- **Error Handling:** Custom error pages; no database details exposed to users.

CONCLUSION

ScholarSpot demonstrates a production-ready academic e-commerce system that balances functionality, security, and user experience. It serves as a comprehensive example of full-stack development, from frontend interactivity to backend transaction integrity and third-party API integration. The system is scalable, maintainable, and documented to third-year academic standards, providing a solid foundation for future enhancements.

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