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Department of Computer Science and Engineering
UE21CS351A: Database Management Systems

Database Management Systems

(UE21CS351A)

Mini Project

on

Supply Chain Management

By,

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User Requirement Specification for Supply Chain Management -

Project Overview:

Our Supply Chain Management Database aims to streamline and optimize our supply chain operations by centralizing and automating key processes, ensuring efficient inventory management, order processing, and supplier relationship management.

Stakeholder Identification:

1. **Procurement Team:** Responsible for managing suppliers and placing orders.
2. **Inventory Managers:** Oversee stock levels and distribution.
3. **Sales Team:** Need access to order status and customer information. 4. **Warehouse Team:** Responsible for tracking and managing goods in storage. 5. **Executives:** Require high-level reporting and analytics.

Functional Requirements:

Inventory Management:
➔ Track stock levels for various products and locations.
➔ Receive alerts for low inventory levels.
➔ Support batch and serial number tracking.

Order Processing:

➔ Generate purchase orders automatically based on inventory levels.
➔ Allow sales teams to create customer orders.

➔ Monitor order status and provide real-time updates.

Demand Forecasting:

➔ Analyze historical sales data to predict future demand.
➔ Generate recommended reorder quantities based on forecasts.

Supplier Management:

➔ Maintain a supplier database with contact details and performance metrics.
➔ Automatically update prices and lead times from suppliers.

Warehouse Management:

➔ Track goods movement within warehouses.
➔ Optimize storage and picking processes.
➔ Generate picking lists and manage shipments.

Reporting and Analytics:

➔ Create customizable reports on inventory turnover, supplier performance, and sales trends.
➔ Visualize data with charts and graphs.
➔ Support ad-hoc querying for specific data analysis.

User Roles and Permissions:

1. **<u>Admin</u>**: Full access to all features and data.
2. **<u>Procurement</u>**: Create and manage purchase orders, access supplier data.
3. **<u>Sales</u>**: Create and manage customer orders, access customer data. 4. **<u>Inventory Managers</u>**: Manage inventory and receive alerts.
5. **<u>Warehouse Team</u>**: Track goods movement and shipments.
6. **<u>Executives</u>**: Access high-level reports and analytics.

User Interface Requirements:

➢ Intuitive and user-friendly interface.
➢ Dashboard with key metrics for each user role.
➢ Search functionality for easy data retrieval.
➢ Mobile access for on-the-go users.

Integration Requirements:

➢ Integrate with existing ERP systems for financial data.
➢ Connect with supplier databases for real-time updates.
➢ API integration for third-party logistics and shipping carriers.

Performance Requirements:

➢ Response time for critical operations should be less than 2 seconds. ➢ System should handle concurrent users without significant slowdowns. ➢ Data should be backed up regularly to prevent data loss.

Security Requirements:

➢ User authentication with strong password policies.
➢ Role-based access control.
➢ Data encryption in transit and at rest.

Compliance and Regulations:

➢ Compliance with industry-specific regulations (e.g., FDA, ISO, etc.).
➢ GDPR compliance for data privacy.

Scalability and Future Growth:

➢ Design for scalability to accommodate future growth and increased data volume.
➢ Easy integration of additional modules or features.

Testing and Quality Assurance:

➢ Rigorous testing to ensure data accuracy and system reliability.
➢ User acceptance testing with stakeholders' involvement.

Training and Documentation:

➢ Provide user training for all roles.
➢ Maintain detailed user documentation and FAQs.

ER Diagram:
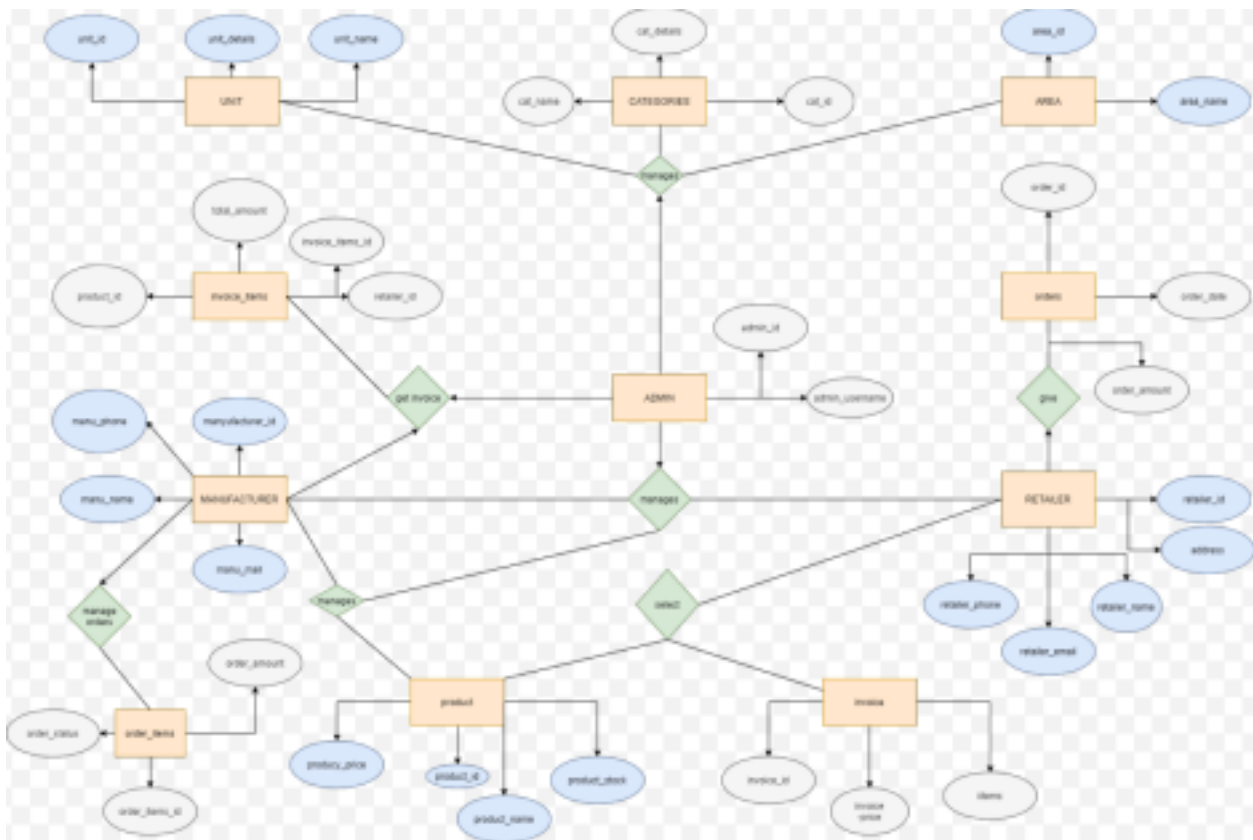
Relational Schema:
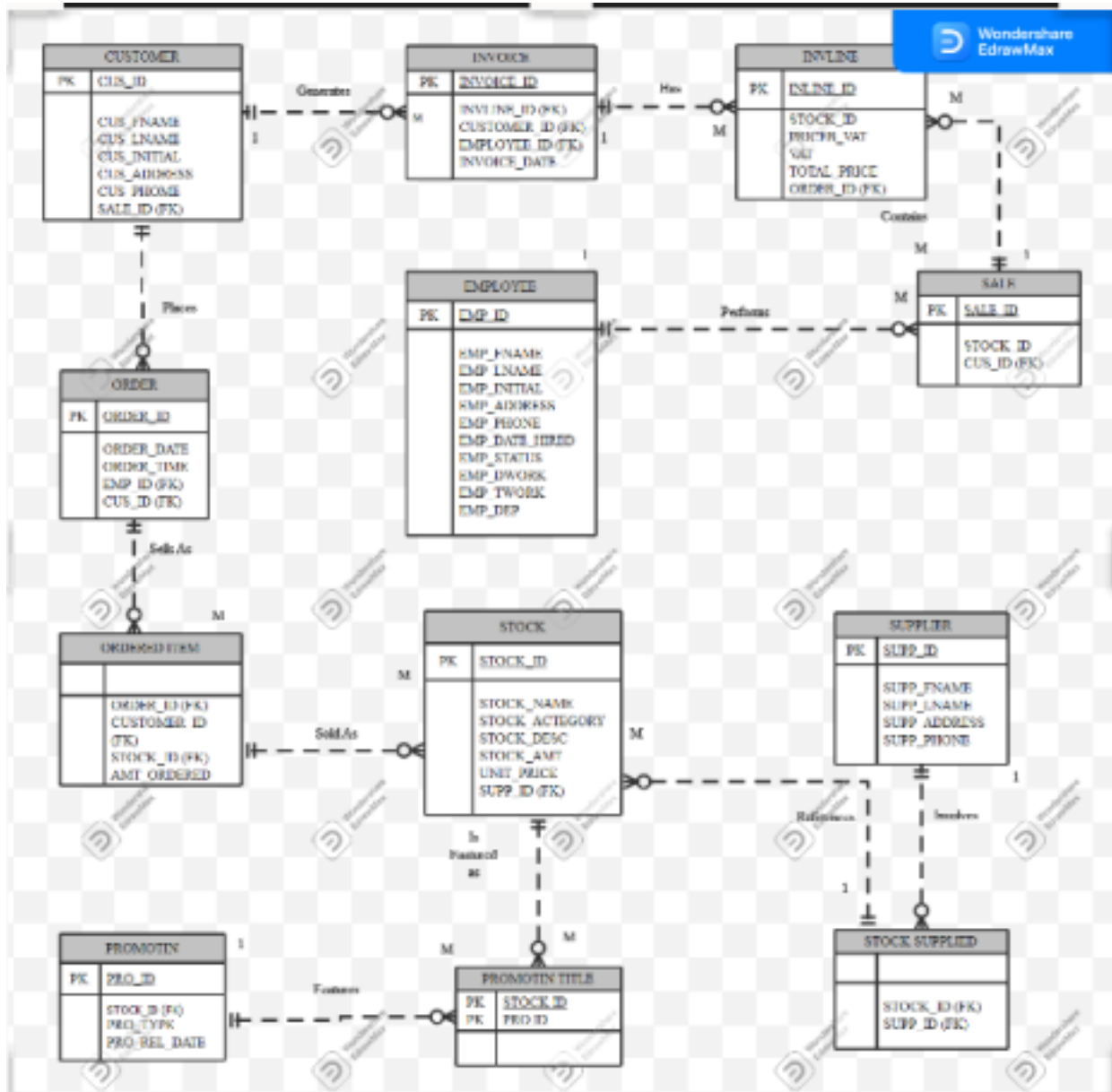
Output screenshots:

1. Login page
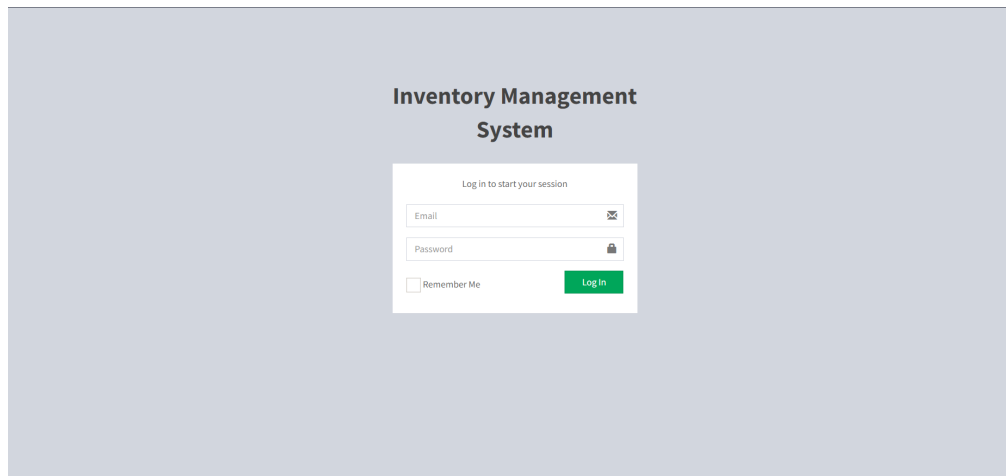
2. Dashboard visible to the seller
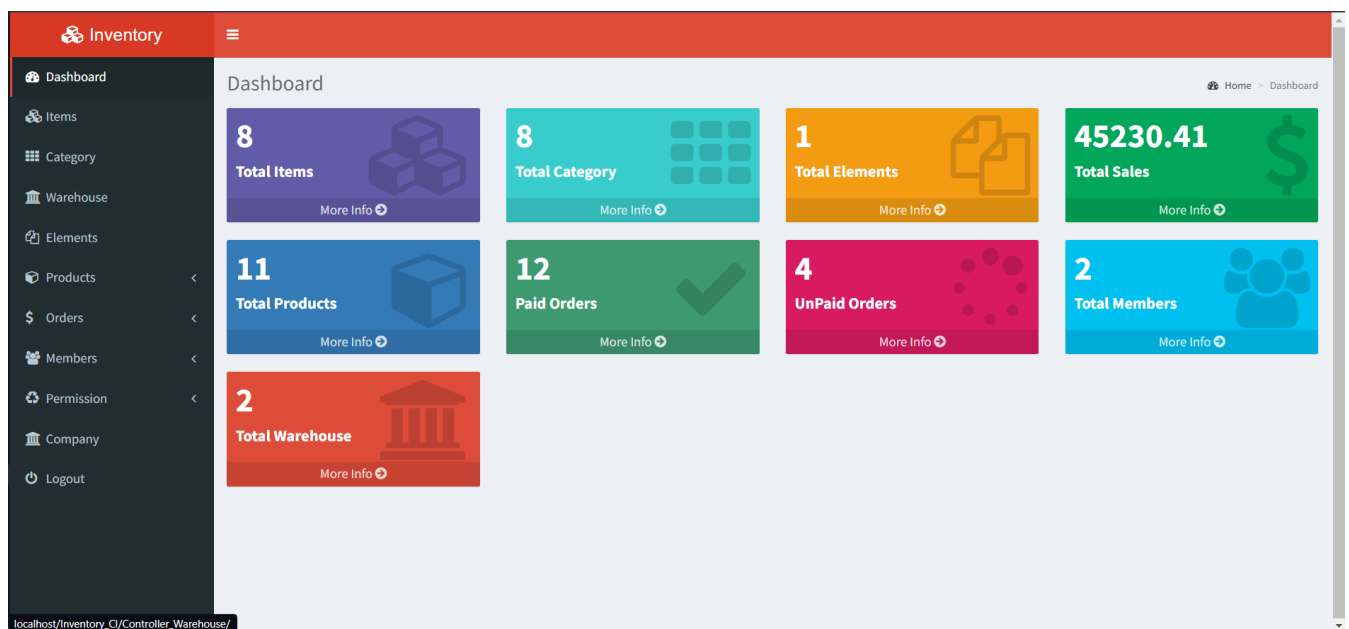
3. List of all tables in the database
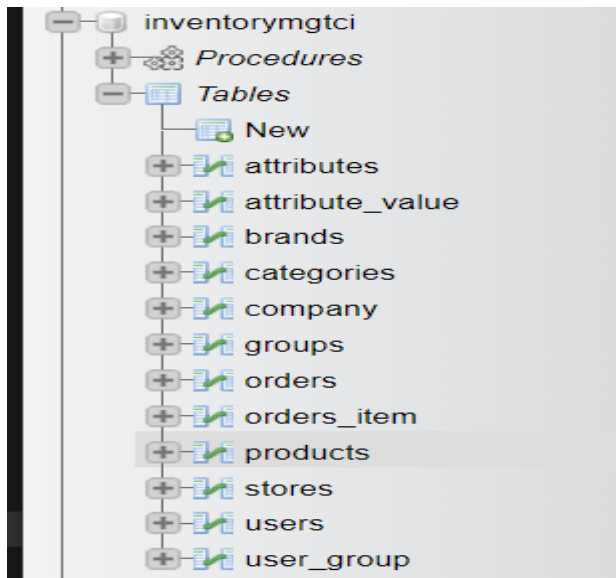
4. List of products before adding a new item

Image	Product	Price	Qty	Warehouse	Availability	Action
Coke bottle	Coke bottle	$20	80	Dynamix	Active	
	Levis	$5000	6 Low	Dynamix	Active	
	Sample Product	$98	20	Taser	Active	
	Marbrasse 4-Trays Desk File Organizer	$35	71	Taser	Active	
	Razer BlackShark V2 X Gaming Headset: 7.1	$82	129	Taser	Active	
	Arctix Girls' Frost Insulated Winter Jacket	$47	112	Dynamix	Active	
	Homall Gaming Chair	$189	64	Dynamix	Active	
	Predator Helios 300	$1350	8 Low	Dynamix	Active	

5. After adding, the new list in frontend and database

Manage Products

Successfully created ✕

Add Product

Copy | CSV | Excel | Print

Search: _____

Image	Product	Price	Qty	Warehouse	Availability	Action
Apple watch	Apple watch	$10000	25	Dynamix	Active	✏️ 🗑️
Coke bottle	Coke bottle	$20	80	Dynamix	Active	✏️ 🗑️
	Levis	$5000	6 Low	Dynamix	Active	✏️ 🗑️
	Sample Product	$98	20	Taser	Active	✏️ 🗑️
	Marbrasse 4-Trays Desk File Organizer	$35	71	Taser	Active	✏️ 🗑️
	Razer BlackShark V2 X Gaming Headset: 7.1	$82	129	Taser	Active	✏️ 🗑️

🖊 Edit ⧉ Copy ⊖ Delete	16	Marbrasse 4-Trays Desk File Organizer	35	71	assets/images/product_image/6186a8e1267ab.jpg	`<p>` Our Office Desk Supplies Organizer is made ...	["23","21","22"]	["21"]	["14"]
🖊 Edit ⧉ Copy ⊖ Delete	17	Sample Product	98	20	assets/images/product_image/6186b18649b21.jpg	`<p>`This is a sample product for testing!`</p>`	["25","28","29","20","21","22"]	["21"]	["13"]
🖊 Edit ⧉ Copy ⊖ Delete	18	Levis	5000	6	assets/images/product_image/6555d0cbcc72a.jpg	`<p>`Denims`</p>`	["20","22"]	["16"]	["8"]
🖊 Edit ⧉ Copy ⊖ Delete	19	Coke bottle	20	80	`<p>`You did not select a file to upload.`</p>`	`<p>`Beverage`</p>`	null	null	null
🖊 Edit ⧉ Copy ⊖ Delete	21	Apple watch	10000	25	`<p>`You did not select a file to upload.`</p>`		null	null	null

6. Deleting an item (reflected frontend and database)

Before:

Image	Product	Price	Qty	Warehouse	Availability	Action
Apple watch	Apple watch	$10000	24	Dynamix	Active	✏️ 🗑️
Coke bottle	Coke bottle	$20	80	Dynamix	Active	✏️ 🗑️
	Levis	$5000	6 Low	Dynamix	Active	✏️ 🗑️

After:

Successfully updated ✕

Add Product

Copy CSV Excel Print

Search: _____

Image	Product	Price	Qty	Warehouse	Availability	Action
Coke bottle	Coke bottle	$20	80	Dynamix	Active	✏️ 🗑️
	Levis	$5000	6 Low	Dynamix	Active	✏️ 🗑️
	Sample Product	$98	20	Taser	Active	✏️ 🗑️

☐	✏️ Edit	✂️ Copy	⊘ Delete	17	Sample Product	98	20	assets/images/product_image/6186b18649b21.jpg	This is a sample product for testing!	["25","28","29","20","21","22"] ["21"]	["13"]
☐	✏️ Edit	✂️ Copy	⊘ Delete	18	Levis	5000	6	assets/images/product_image/6555d0cbcc72a.jpg	Denims	["20","22"]	["16"] ["8"]
☐	✏️ Edit	✂️ Copy	⊘ Delete	19	Coke bottle	20	80	You did not select a file to upload.	Beverage null	null	null

7. Update the quantity of products

Before:

Successfully updated			✕

Add Product

Copy	CSV	Excel	Print

Search: [   ]

Image	Product	Price	Qty	Warehouse	Availability	Action
Coke bottle	Coke bottle	$20	80	Dynamix	Active	✏ 🗑
	Levis	$5000	6 Low	Dynamix	Active	✏ 🗑
	Sample Product	$98	20	Taser	Active	✏ 🗑

						Price	Qty					
☐	✏ Edit	⧉ Copy	⊖ Delete	17	Sample Product	98	20	assets/images/product_image/6186b18649b21.jpg	\ This is a sample product for testing!\	["25","28","29","20","21","22"]	["21"]	["13"]
☐	✏ Edit	⧉ Copy	⊖ Delete	18	Levis	5000	6	assets/images/product_image/6555d0cbcc72a.jpg	\ Denims\	["20","22"]	["16"]	["8"]
☐	✏ Edit	⧉ Copy	⊖ Delete	19	Coke bottle	20	80	\ You did not select a file to upload.\	\ Beverage\	null	null	null

After:

Successfully updated			✕

Add Product

Copy	CSV	Excel	Print

Search: [   ]

Image	Product	Price	Qty	Warehouse	Availability	Action
Coke bottle	Coke bottle	$20	80	Dynamix	Active	✏ 🗑
	Levis	$5000	30	Dynamix	Active	✏ 🗑
	Sample Product	$98	20	Taser	Active	✏ 🗑

☐	🖊 Edit ⊱ Copy ⊝ Delete	17	Sample Product	98	20	assets/images/product_image/6186b18649b21.jpg	This is a sample product for testing!	["25","28","29","20","21","22"]	["21"]	["13"]
☐	🖊 Edit ⊱ Copy ⊝ Delete	18	Levis	5000	30	assets/images/product_image/6555d0cbcc72a.jpg	Denims	["20","22"]	["16"]	["8"]
☐	🖊 Edit ⊱ Copy ⊝ Delete	19	Coke bottle	20	80	You did not select a file to upload.	Beverage	null	null	null

8. Creating a valid new order reflected on frontend and database

Edit Orders

Successfully updated   ✕

Date: 2023-12-02

Date: 06:44 am

Client Name   Ashley

Client Address   Enter Client Address

Client Phone   8387014183

Product	Qty	Rate	Amount	➕
Apple watch	1	10000	10000.00	✖

Gross Amount   10000.00

S-Charge 13 %   1300.00

Vat 10 %   1000.00

Discount   Discount

Manage Orders

Successfully updated   ✕

Add Order

Show 10 ∨ entries   Search: [_____]

Bill No.	Client	Contact	DateTime	Prod.Qty	Amount	Actions
BILPR-54B6	Ashley	8387014183	02-12-2023 06:44 am	1	$12300.00	🖨 🖊 🗑
BILPR-4F98	Saarth	09819928138	17-11-2023 06:44 am	1	$61500.00	🖨 🖊 🗑
BILPR-D515	Sathvik	797249691	17-11-2023 05:16 am	1	$100.86	🖨 🖊 🗑

☐	🖉 Edit	🗐 Copy	🚫 Delete	46	BILPR-1258	Utkarsh		09819248138	1700194444 15000.00	13	1950.00	10
☐	🖉 Edit	🗐 Copy	🚫 Delete	48	BILPR-D515	Sathvik		797249691	1700194601 82.00	13	10.66	10
☐	🖉 Edit	🗐 Copy	🚫 Delete	49	BILPR-4F98	Saarth	PES	09819928138	1700199881 50000.00	13	6500.00	10
☐	🖉 Edit	🗐 Copy	🚫 Delete	50	BILPR-54B6	Ashley		8387014183	1701495892 10000.00	13	1300.00	10

9. Invalid order triggers an error message! (used triggers)

Date: 06

Client Name   Vijay

Client Address   Punjab

Client Phone   9821949149

Product	Qty	Rate	Amount	+
Levis	1000	5000	5000000.00	✕

Gross Amount   5000000.00

S-Charge 13 %   650000.00

Vat 10 %   500000.00

Discount   Discount

Net Amount   6150000.00

A Database Error Occurred

Error Number: 1644

WRONG WRONG WRONG!!!! Product quantity in products cannot go below zero

10. Total earnings earned shown on the dashboard and database (calculated using procedures)

57530.41

Total Sales

More Info ➡
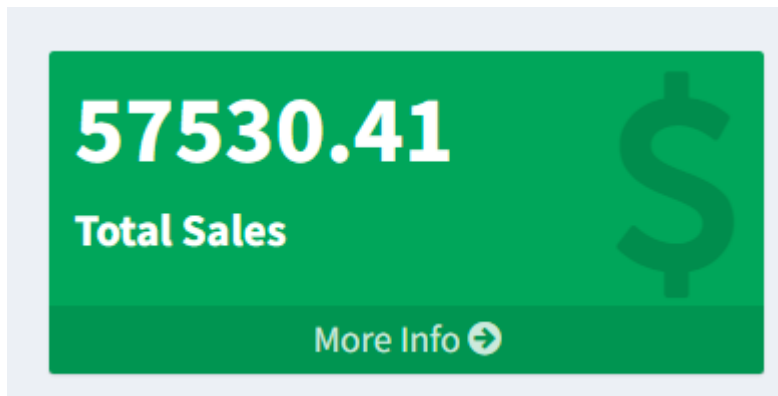
✔ Your SQL query has been executed successfully.
1 row affected by the last statement inside the procedure.

CALL `CalculateOrderTotalCost`(@p0); SELECT @p0 AS `total_cost`;

Execution results of routine `CalculateOrderTotalCost`

total_cost
57530.41