

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY,
CHITTOOR (AUTONOMOUS)

R.V.S Nagar, Chittoor-517 127. (A.P)

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B.Tech in CSE

DATA ENGINEERING FOUNDATION -5th SEM

PROJECT REPORT

Submitted By

Batch – 16 :

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Project Statement : Inventory Management System

Description:

Build a system for tracking inventory items, including product details, quantities, and suppliers.

Key Components:

Product table, Supplier table, Inventory table, SQL queries for inventory management.

High-Level Design:

The System includes tables for products, suppliers, and inventory items. SQL queries are used to add new products, update inventory quantities, and track supplier information.

Solution Overview:

Defines tables to store student, course, assignment, and grade information. Develop SQL queries to compute grades based on assignment scores and generate grade reports for students

Product Table:

Columns:

- Product ID(Primary Key)
- Product Name
- Description
- Supplier ID(Foreign Key referencing Supplier table)
- Unit Price
- Quantity in stock

Description : Stores information about each product, including its name, description, supplier, unit price, and quantity in stock.

Supplier Table :

Columns:

- Supplier ID (Primary Key)
- Supplier Name
- Contact Name
- Contact Title
- Address
- City
- Region
- Postal Code
- Country
- Phone
- Email

Description : Stores information about product suppliers, including their name, contact details, and address.

Inventory Transaction Table :

Columns :

- Transaction ID (Primary key)
- Product ID(Foreign Key referencing Product table)
- Transaction Type(e.g., "Purchase", "Sale", "Return")
- Quantity
- Transaction Date
- Notes

Description: Tracks inventory transactions such as purchases, sales, and returns. Each transaction is associated with a specific product and records the quantity, transaction type, data, and optional notes.

The **Inventory Management System** design includes well-defined tables and functionality for managing products, suppliers, and inventory transactions. Here's an organized and concise explanation of the solution.

Project Statement

Goal: Develop a system to manage inventory efficiently by tracking products, suppliers, and transactions.

Database Design

1. Product Table

Purpose: Store details of Product items.

ProductID: Unique identifier for products (Primary Key).

ProductName: Name of the product.

Description: Detailed description of the product.

SupplierID: Links to the Supplier table (Foreign Key).

UnitPrice: Cost per unit of the product.

QuantityInStock: Available stock count.

2. Supplier Table

Purpose: Store details about product suppliers.

SupplierID: Unique identifier for suppliers (Primary Key).

SupplierName: Name of the supplier.

ContactName: Name of the contact person.

ContactTitle: Contact's job title.

Address: Street address of the supplier.

City, Region, PostalCode, Country: Supplier location details.

Phone: Contact phone number.

Email: Contact email address.

3. Inventory Transaction Table

Purpose: Record inventory changes.

TransactionID: Unique identifier for transactions (Primary Key).

ProductID: Links to the Product table (Foreign Key).

TransactionType: Specifies the type (e.g., Purchase, Sale, Return).

Quantity: Number of items involved in the transaction.

TransactionDate: Date of the transaction.

Notes: Optional remarks or comments.

High-Level Design

- **Relationships:**

Supplier table links to the Product table via SupplierID.

Product table links to the InventoryTransaction table via ProductID.

- **SQL Queries:**

Add new products to the inventory.

Update stock quantities after purchases, sales, or returns.

Generate reports on stock levels, supplier information, and transaction histories.

Use Case Scenarios

Adding Products: Insert new entries into the Product table with supplier details and initial stock levels.

Processing Transactions: Update stock levels and log transactions in the InventoryTransaction table.

Reporting:

Generate stock availability reports.

List suppliers for products below a threshold quantity.

Summarize transaction histories for audits.

CREATE DATABASE InventoryManagement;

USE InventoryManagement;

Output				
Action Output				
#	Time	Action	Message	Duration / Fetch
1	21:51:23	show databases	5 row(s) returned	0.000 sec / 0.000 sec
2	21:52:11	CREATE DATABASE InventoryManagement	1 row(s) affected	0.016 sec
3	21:52:40	USE InventoryManagement	0 row(s) affected	0.000 sec

CREATE TABLE Supplier (

SupplierID INT AUTO_INCREMENT PRIMARY KEY,

SupplierName VARCHAR(100) NOT NULL,

ContactName VARCHAR(100),

ContactTitle VARCHAR(50),

Address VARCHAR(255),

City VARCHAR(50),

Region VARCHAR(50),

PostalCode VARCHAR(20),

Country VARCHAR(50),

Phone VARCHAR(20),

Email VARCHAR(100)

);

desc table Supplier;

Result Grid										
Filter Rows:										
Export: Wrap Cell Content:										
id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered
1	SIMPLE	Supplier	NULL	ALL	NULL	NULL	NULL	NULL	1	100.00

```

CREATE TABLE Product (
ProductID INT AUTO_INCREMENT PRIMARY KEY,
    ProductName VARCHAR(100) NOT NULL,
    Description TEXT,
    SupplierID INT,
    UnitPrice DECIMAL(10, 2) NOT NULL,
    QuantityInStock INT NOT NULL,
    FOREIGN KEY (SupplierID) REFERENCES Supplier(SupplierID)
);

```

Result Grid

Filter Rows:

Export:

Wrap Cell Content:

IA

	id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
▶	1	SIMPLE	Product	NULL	ALL	NULL	NULL	NULL	NULL	1	100.00	NULL

```

CREATE TABLE InventoryTransaction (
    TransactionID INT AUTO_INCREMENT PRIMARY KEY,
    ProductID INT NOT NULL,
    TransactionType ENUM('Purchase', 'Sale', 'Return') NOT NULL,
    Quantity INT NOT NULL,
    TransactionDate DATE NOT NULL,
    Notes TEXT,
    FOREIGN KEY (ProductID) REFERENCES Product(ProductID)
);

```

Result Grid

Filter Rows:

Export:

Wrap Cell Content:

	id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
▶	1	SIMPLE	InventoryTransaction	NULL	ALL	NULL	NULL	NULL	NULL	1	100.00	NULL

INSERT INTO Supplier (SupplierName, ContactName, ContactTitle, Address, City, Region, PostalCode, Country, Phone, Email)

VALUES

('Tech Supplies Co.', 'Alice Johnson', 'Manager', '123 Tech Lane', 'Tech City', 'Tech Region', '12345', 'USA', '123-456-7890', 'alice@techsupplies.com'),

('Hardware Inc.', 'Bob Smith', 'Sales Rep', '456 Hardware St', 'Hardware Town', 'Hardware Region', '67890', 'USA', '987-654-3210', 'bob@hardwareinc.com');

INSERT INTO Supplier (SupplierName, ContactName, ContactTitle, Address, City, Region, PostalCode, Country, Phone, Email)

VALUES

('Office Essentials Ltd.', 'Sophia Taylor', 'Sales Manager', '789 Office Blvd', 'Metropolis', 'Central', '45678', 'USA', '555-123-4567', 'sophia@officeessentials.com'),

('Gadget World', 'Ethan Brown', 'CEO', '123 Tech Avenue', 'Innovate City', 'West Coast', '78901', 'USA', '444-567-8910', 'ethan@gadgetworld.com'),

('Industrial Tools Inc.', 'James Wilson', 'Procurement Head', '321 Industry Road', 'Tool Town', 'Midwest', '23456', 'USA', '333-890-1234', 'james@industrialtools.com'),

('Smart Solutions LLC', 'Olivia Johnson', 'Operations Director', '567 Smart Lane', 'Smart City', 'East', '54321', 'USA', '222-345-6789', 'olivia@smartsolutions.com'),

('Global Supplies Corp.', 'Charlotte White', 'Regional Manager', '908 Global Way', 'Globalville', 'South', '65432', 'USA', '111-789-4560', 'charlotte@globalsupplies.com'),

('TechParts Co.', 'Michael Green', 'Technical Manager', '345 Tech Street', 'Techburg', 'North', '34567', 'USA', '666-234-7890', 'michael@techparts.com'),

('EcoProducts', 'Emma Davis', 'Sustainability Manager', '567 Green Road', 'EcoCity', 'Northwest', '87654', 'USA', '777-345-8901', 'emma@ecoproducts.com'),

('Logistics Masters', 'Liam Garcia', 'Logistics Manager', '901 Cargo Ave', 'Port City', 'West', '12321', 'USA', '888-123-4321', 'liam@logisticsmasters.com'),

('NextGen Supplies', 'Amelia Martinez', 'Innovation Lead', '210 Future Blvd', 'Futuristic City', 'Tech Region', '98765', 'USA', '999-456-6543', 'amelia@nextgensupplies.com'),

('Precision Parts Ltd.', 'William Rodriguez', 'Parts Specialist', '111 Precision Lane', 'Mechanicsville', 'Central', '65478', 'USA', '321-789-1230', 'william@precisionparts.com');

Select * from Supplier;

	SupplierID	SupplierName	ContactName	ContactTitle	Address	City	Region	PostalCode	Country	Phone	Email
▶	1	Tech Supplies Co.	Alice Johnson	Manager	123 Tech Lane	Tech City	Tech Region	12345	USA	123-456-7890	alice@techsupplies.com
	2	Hardware Inc.	Bob Smith	Sales Rep	456 Hardware St	Hardware Town	Hardware Region	67890	USA	987-654-3210	bob@hardwareinc.com
	3	Office Essentials Ltd.	Sophia Taylor	Sales Manager	789 Office Blvd	Metropolis	Central	45678	USA	555-123-4567	sophia@officeessentials.com
	4	Gadget World	Ethan Brown	CEO	123 Tech Avenue	Innovate City	West Coast	78901	USA	444-567-8910	ethan@gadgetworld.com
	5	Industrial Tools Inc.	James Wilson	Procurement Head	321 Industry Road	Tool Town	Midwest	23456	USA	333-890-1234	james@industrialtools.com
	6	Smart Solutions LLC	Olivia Johnson	Operations Director	567 Smart Lane	Smart City	East	54321	USA	222-345-6789	olivia@smartsolutions.com
	7	Global Supplies Corp.	Charlotte White	Regional Manager	908 Global Way	Globalville	South	65432	USA	111-789-4560	charlotte@globalsupplies.com
	8	TechParts Co.	Michael Green	Technical Manager	345 Tech Street	Techburg	North	34567	USA	666-234-7890	michael@techparts.com
	9	EcoProducts	Emma Davis	Sustainability Manager	567 Green Road	EcoCity	Northwest	87654	USA	777-345-8901	emma@ecoproducts.com
	10	Logistics Masters	Liam Garcia	Logistics Manager	901 Cargo Ave	Port City	West	12321	USA	888-123-4321	liam@logisticsmasters.com
	11	NextGen Supplies	Amelia Martinez	Innovation Lead	210 Future Blvd	Futuristic City	Tech Region	98765	USA	999-456-6543	amelia@nextgensupplies.com
	12	Precision Parts Ltd.	William Rodriguez	Parts Specialist	111 Precision Lane	Mechanicsville	Central	65478	USA	321-789-1230	william@precisionparts.com
*	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

INSERT INTO Product (ProductName, Description, SupplierID, UnitPrice, QuantityInStock)

VALUES

('Laptop', 'High-performance laptop', 1, 1200.00, 50),

('Mouse', 'Wireless mouse', 2, 25.00, 200);

INSERT INTO Product (ProductName, Description, SupplierID, UnitPrice, QuantityInStock)

VALUES

('Office Chair', 'Ergonomic office chair with adjustable height and lumbar support', 1, 150.00, 25),

('Wireless Keyboard', 'Compact wireless keyboard with Bluetooth connectivity', 2, 45.00, 100),

('Power Drill', 'Heavy-duty cordless power drill with two batteries', 3, 120.00, 40),

('Smart Thermostat', 'Wi-Fi enabled thermostat for smart home automation', 4, 200.00, 30),

('Safety Goggles', 'Protective safety goggles for industrial use', 3, 15.00, 300),

('Laptop Charger', 'Universal laptop charger with multiple connectors', 2, 35.00, 150),

('Eco-Friendly Notebook', '100% recycled paper notebook', 7, 8.00, 500),

('Cargo Pallet', 'Standard-sized wooden cargo pallet', 8, 25.00, 50),

('3D Printer Filament', 'PLA 1.75mm filament for 3D printing', 9, 20.00, 200),

('Precision Screwdriver Set', 'Multi-piece precision screwdriver set', 10, 30.00, 100),

('Mechanical Keyboard', 'High-performance mechanical keyboard for gaming', 2, 120.00, 50),

('Recycled Printer Paper', 'Eco-friendly printer paper pack', 7, 12.00, 400),

('Industrial Work Gloves', 'Durable work gloves for industrial use', 3, 10.00, 250),

('Noise-Cancelling Headphones', 'Over-ear headphones with noise cancellation', 2, 300.00, 20),

('Solar Power Bank', 'Portable solar-powered charging bank', 7, 50.00, 75);

SELECT * from Supplier;

Result Grid

Filter Rows:

Edit:

Export/Import:

Wrap Cell Content:

	ProductID	ProductName	Description	SupplierID	UnitPrice	QuantityInStock
	1	Laptop	High-performance laptop	1	1200.00	50
	2	Mouse	Wireless mouse	2	25.00	200
	3	Laptop	High-performance laptop	1	1200.00	50
	4	Mouse	Wireless mouse	2	25.00	200
	5	Office Chair	Ergonomic office chair with adjustable height an...	1	150.00	25
	6	Wireless Keyboard	Compact wireless keyboard with Bluetooth conn...	2	45.00	100
	7	Power Drill	Heavy-duty cordless power drill with two batteries	3	120.00	40
	8	Smart Thermostat	Wi-Fi enabled thermostat for smart home autom...	4	200.00	30
	9	Safety Goggles	Protective safety goggles for industrial use	3	15.00	300
	10	Laptop Charger	Universal laptop charger with multiple connectors	2	35.00	150
	11	Eco-Friendly Note...	100% recycled paper notebook	7	8.00	500
	12	Cargo Pallet	Standard-sized wooden cargo pallet	8	25.00	50
	13	3D Printer Filament	PLA 1.75mm filament for 3D printing	9	20.00	200
	14	Precision Screwdr...	Multi-piece precision screwdriver set	10	30.00	100
	15	Mechanical Keybo...	High-performance mechanical keyboard for gam...	2	120.00	50
	16	Recycled Printer ...	Eco-friendly printer paper pack	7	12.00	400
	17	Industrial Work Gl...	Durable work gloves for industrial use	3	10.00	250
	18	Noise-Cancelling ...	Over-ear headphones with noise cancellation	2	300.00	20
	19	Solar Power Bank	Portable solar-powered charging bank	7	50.00	75
	NULL	NULL	NULL	NULL	NULL	NULL

INSERT INTO InventoryTransaction (ProductID, TransactionType, Quantity, TransactionDate, Notes)

VALUES

(1, 'Purchase', 50, '2024-11-01', 'Initial stock purchase'),
 (2, 'Purchase', 200, '2024-11-05', 'Initial stock purchase'),
 (1, 'Sale', 10, '2024-11-10', 'Sold to customer XYZ'),
 (2, 'Sale', 20, '2024-11-15', 'Sold to customer ABC');

INSERT INTO InventoryTransaction (ProductID, TransactionType, Quantity, TransactionDate, Notes)

VALUES

-- Purchases

(1, 'Purchase', 25, '2024-11-01', 'Initial stock purchase for Office Chairs'),
 (2, 'Purchase', 100, '2024-11-03', 'Initial stock purchase for Wireless Keyboards'),
 (3, 'Purchase', 40, '2024-11-05', 'Initial stock purchase for Power Drills'),
 (4, 'Purchase', 30, '2024-11-08', 'Initial stock purchase for Smart Thermostats'),

(5, 'Purchase', 300, '2024-11-10', 'Initial stock purchase for Safety Goggles'),

-- Sales

- (1, 'Sale', 5, '2024-11-15', 'Sold to OfficeCorp for conference room setup'),
- (2, 'Sale', 10, '2024-11-16', 'Sold to RetailTech for client event'),
- (3, 'Sale', 3, '2024-11-18', 'Sold to BuildSmart for construction project'),
- (4, 'Sale', 2, '2024-11-20', 'Sold to SmartHomes Inc.'),
- (5, 'Sale', 50, '2024-11-22', 'Bulk order for safety equipment distributor'),

-- Returns

- (1, 'Return', 2, '2024-11-25', 'Returned by OfficeCorp due to minor scratches'),
- (2, 'Return', 1, '2024-11-26', 'Customer complaint about packaging'),
- (3, 'Return', 1, '2024-11-27', 'Wrong model shipped to BuildSmart');

SELECT * from InventoryTransaction;

	TransactionID	ProductID	TransactionType	Quantity	TransactionDate	Notes
▶	1	1	Purchase	50	2024-11-01	Initial stock purchase
	2	2	Purchase	200	2024-11-05	Initial stock purchase
	3	1	Sale	10	2024-11-10	Sold to customer XYZ
	4	2	Sale	20	2024-11-15	Sold to customer ABC
	5	1	Purchase	25	2024-11-01	Initial stock purchase for Office Chairs
	6	2	Purchase	100	2024-11-03	Initial stock purchase for Wireless Keyboards
	7	3	Purchase	40	2024-11-05	Initial stock purchase for Power Drills
	8	4	Purchase	30	2024-11-08	Initial stock purchase for Smart Thermostats
	9	5	Purchase	300	2024-11-10	Initial stock purchase for Safety Goggles
	10	1	Sale	5	2024-11-15	Sold to OfficeCorp for conference room setup
	11	2	Sale	10	2024-11-16	Sold to RetailTech for client event
	12	3	Sale	3	2024-11-18	Sold to BuildSmart for construction project
	13	4	Sale	2	2024-11-20	Sold to SmartHomes Inc.
	14	5	Sale	50	2024-11-22	Bulk order for safety equipment distributor
	15	1	Return	2	2024-11-25	Returned by OfficeCorp due to minor scratches
	16	2	Return	1	2024-11-26	Customer complaint about packaging
	17	3	Return	1	2024-11-27	Wrong model shipped to BuildSmart
*	NULL	NULL	NULL	NULL	NULL	NULL

Inventory Management System Work in Backend

Add a New Product

```
INSERT INTO Product (ProductName, Description, SupplierID, UnitPrice, QuantityInStock)
```

```
VALUES ('Keyboard', 'Mechanical keyboard', 2, 50.00, 100);
```

	ProductID	ProductName	Description	SupplierID	UnitPrice	QuantityInStock
	12	Cargo Pallet	Standard-sized wooden cargo pallet	8	25.00	50
	13	3D Printer Filament	PLA 1.75mm filament for 3D printing	9	20.00	200
	14	Precision Screwdr...	Multi-piece precision screwdriver set	10	30.00	100
	15	Mechanical Keybo...	High-performance mechanical keyboard for gam...	2	120.00	50
	16	Recycled Printer ...	Eco-friendly printer paper pack	7	12.00	400
	17	Industrial Work Gl...	Durable work gloves for industrial use	3	10.00	250
	18	Noise-Cancelling ...	Over-ear headphones with noise cancellation	2	300.00	20
	19	Solar Power Bank	Portable solar-powered charging bank	7	50.00	75
	20	Keyboard	Mechanical keyboard	2	50.00	100
*	NULL	NULL	NULL	NULL	NULL	NULL

Update Stock after Sale

```
UPDATE Product
```

SET QuantityInStock = QuantityInStock - 5

WHERE ProductID = 2;

	ProductID	ProductName	Description	SupplierID	UnitPrice	QuantityInStock
▶	2	Mouse	Wireless mouse	2	25.00	195
*	NULL	NULL	NULL	NULL	NULL	NULL

Log a New Transaction

INSERT INTO InventoryTransaction (ProductID, TransactionType, Quantity, TransactionDate, Notes)

VALUES (2, 'Sale', 5, '2024-11-25', 'Sold to customer DEF');

	TransactionID	ProductID	TransactionType	Quantity	TransactionDate	Notes
▶	2	2	Purchase	200	2024-11-05	Initial stock purchase
	4	2	Sale	20	2024-11-15	Sold to customer ABC
	6	2	Purchase	100	2024-11-03	Initial stock purchase for Wireless Keyboards
	11	2	Sale	10	2024-11-16	Sold to RetailTech for client event
	16	2	Return	1	2024-11-26	Customer complaint about packaging
	18	2	Sale	5	2024-11-25	Sold to customer DEF
*	NULL	NULL	NULL	NULL	NULL	NULL

Generate Low Stock Report

```
SELECT ProductName, QuantityInStock
FROM Product
WHERE QuantityInStock < 10;
```

Result Grid	Filter Rows:	Export:	Wrap Cell Content:
ProductName	QuantityInStock		

- No product is available Less Than 10, Every Product have more than 10 in Quantity

List All Transactions for a Product

```
SELECT *
FROM InventoryTransaction
WHERE ProductID = 1;
```

	TransactionID	ProductID	TransactionType	Quantity	TransactionDate	Notes
▶	1	1	Purchase	50	2024-11-01	Initial stock purchase
	3	1	Sale	10	2024-11-10	Sold to customer XYZ
	5	1	Purchase	25	2024-11-01	Initial stock purchase for Office Chairs
	10	1	Sale	5	2024-11-15	Sold to OfficeCorp for conference room setup
	15	1	Return	2	2024-11-25	Returned by OfficeCorp due to minor scratches
*	NULL	NULL	NULL	NULL	NULL	NULL

Conclusion: The above work is done to work with a Inventory Management System in Database Design for a Commercial Stocks Analysis