Medical Inventory Management System Using Salesforce

University College of Engineering,BIT Campus,Trichy

College Code: 8100

TEAM ID: NM2025TMID06681

TEAM SIZE: 4

TEAM MEMBERS:
Kamala V (810022205075)
Masaniselvi G(810022205308)
Tejashree S(810022205074)
Prabha T(810022205087)

Medical Inventory Management System

Introduction:

Salesforce is the world's leading cloud-based Customer Relationship Management (CRM) platform. It enables organizations to manage customer data, automate business processes, and deliver personalized experiences — all without installing any software.

Key features include:

- Fully cloud-based with no hardware requirements
- Highly customizable using custom objects, fields, and apps
- Powerful automation via Flows, Process Builder, and Apex
- Real-time reporting and interactive dashboards
- Robust security with profiles, roles, and permission sets
- Scalable from small clinics to global healthcare networks

For this project, we used the **free Salesforce Developer Edition**, which provides full access to build, test, and deploy custom applications like the Medical Inventory Management System.

Objectives:

The system was designed with the following goals:

- Maintain accurate, real-time inventory records of all medical items
- Automate procurement by generating purchase orders instantly
- Optimize distribution of supplies across departments and locations
- Eliminate manual errors using validation rules and workflows
- Ensure secure access with role-based permissions
- Support data-driven decisions with analytical reports and dashboards
- Enhance patient safety by guaranteeing availability of essential medicines

Ideation:

Originality of Ideas:

The Medical Inventory Management System Using Salesforce project presents a unique and creative problem statement from Salesforce projects. Unlike generic CRM use cases such as lead or opportunity tracking, this project focuses on healthcare-specific inventory challenges,shortages, overstocking, and expiry wastage,making it highly original.

It demonstrates innovative use of Salesforce features by integrating custom objects, Flows, Apex triggers, roll-up summaries, validation rules, and role-based security into a healthcare supply chain workflow, showcasing deep industry relevance.

- The project addresses a real-world challenge with clear justification: healthcare institutions face operational inefficiencies, financial losses, and patient safety risks due to poor inventory control, and this system directly mitigates those issues.
- The scope and approach show original thought: features like donor tracking, wastage analytics, and automated procurement extend beyond standard inventory apps, reflecting student creativity.
- There is no duplication from Trailhead or templates, full ownership through a custom-branded Lightning App with medical icon and a structured 15-milestone roadmap.

Feasibility of Ideas:

- The concept is technically achievable using only Salesforce Developer Edition, requiring no paid licenses or external tools, perfectly fitting student time constraints.
- Objectives are clearly defined and measurable: eight goals are listed with specific outcomes—for example, “Maintain Accurate Inventory Records” maps to CurrentStockLevel, and “Prevent Shortages” triggers low-stock alerts.
- There is direct mapping of Salesforce features to business goals: Roll-Up Summary calculates total cost, Flow auto-updates delivery dates, and Reports enable forecasting.
- The design is scalable with future scope for IoT sensors, AI forecasting, and ERP integration, while the current implementation is realistic and respects governor limits.
- The student demonstrates understanding of Salesforce limitations and strengths by using Flows over triggers for admin-friendly automation, bulkified Apex, and aggregate SOQL, avoiding hardcoding and complexity.

Requirement Analysis:

Completeness of Requirements:

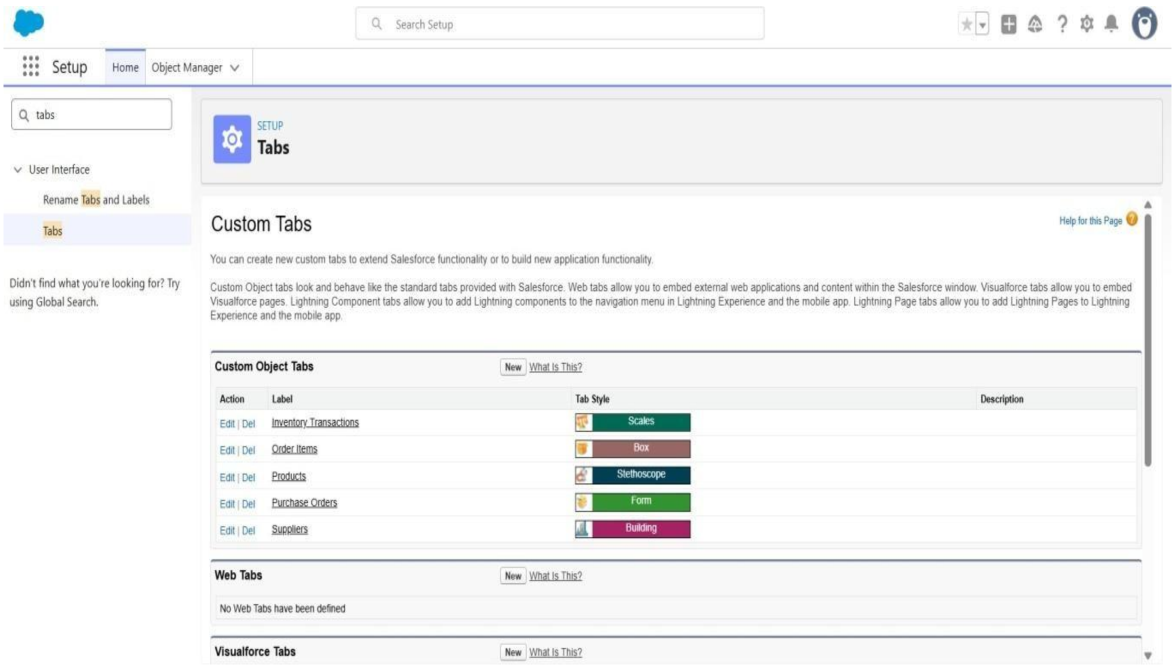
- All functional requirements are captured: tracking (real-time stock), procurement (purchase orders), distribution (inventory transactions), expiry alerts, donor/supplier/receiver tracking, and wastage reports.
- Non-functional requirements are fully addressed: real-time monitoring, role-based access, data security, and responsive UI.
- Object relationships are well-defined: PurchaseOrder → OrderItem → Product via lookup and master-detail, with Supplier and InventoryTransaction integrated.

Create tabs for:

`Product`,`PurchaseOrder`,`OrderItem`,`InventoryTransaction`, `Supplier`

Steps:

1. Setup→QuickFind:Tabs→New
2. SelectObject→ChooseTabStyle→Next
3. Keepdefaultprofiles→Uncheck"IncludeTab"inApp→Save



Custom Tabs

You can create new custom tabs to extend Salesforce functionality or to build new application functionality.

Custom Object tabs look and behave like the standard tabs provided with Salesforce. Web tabs allow you to embed external web applications and content within the Salesforce window. Visualforce tabs allow you to embed Visualforce pages. Lightning Component tabs allow you to add Lightning components to the navigation menu in Lightning Experience and the mobile app. Lightning Page tabs allow you to add Lightning Pages to Lightning Experience and the mobile app.

Custom Object Tabs New What Is This?

Action	Label	Tab Style	Description
Edit | Del	Inventory Transactions	Scales	
Edit | Del	Order Items	Box	
Edit | Del	Products	Stethoscope	
Edit | Del	Purchase Orders	Form	
Edit | Del	Suppliers	Building	

Web Tabs New What Is This?

No Web Tabs have been defined

Visualforce Tabs New What Is This?

- User roles—Inventory Manager, Purchase Manager, Pharmacist, Nurse, Admin—are specified early and linked to profiles and permission sets.
- Requirements are well-documented and traceable: Phase 1 lists five key objectives that thread through all 15 milestones.
- Dependencies and constraints are clearly identified: 4GB RAM, stable internet, modern browser (Chrome, Firefox, Edge), and Developer Org.
- There is perfect alignment between business needs and technical design: “Promote Patient Safety” maps to expiry alerts and stock-level dashboards.

Project Design:

Design Completeness:

- All five custom objects—Product, PurchaseOrder, OrderItem, InventoryTransaction, Supplier—are fully defined with 14+ fields and airtight relationships.
- Backend automation (Flow, Apex, validation) and frontend UI (Lightning App, tabs, layouts) are comprehensively covered.
- Role-based visibility is enforced via profiles, roles, and permission sets, ensuring pharmacists see only relevant data.
- Scalability and maintainability are built-in through modular Apex handlers and future-ready architecture.

Steps:

1. Setup → App Manager → New Lightning App

2. Upload medical-related image

3. Add items to Selected Items:

- Products

- Purchase Orders

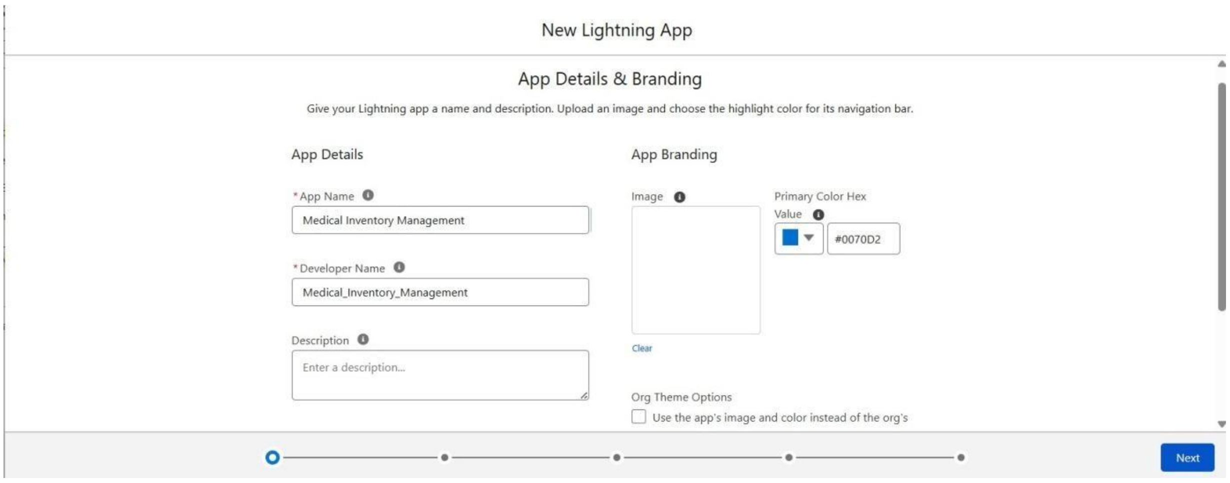
- Order Items

- Inventory Transactions

- Suppliers

- Reports

- Dashboards ,Assign to System Administrator → Save &Finish


New Lightning App

App Details & Branding

Give your Lightning app a name and description. Upload an image and choose the highlight color for its navigation bar.

App Details

*App Name: Medical Inventory Management

*Developer Name: Medical_Inventory_Management

Description: Enter a description...

App Branding

Image

Clear

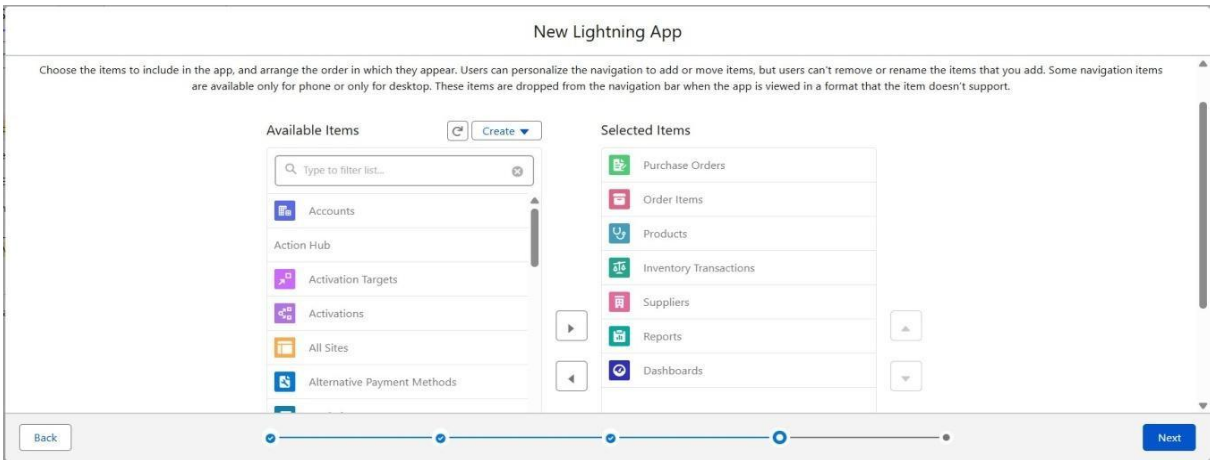
Primary Color Hex Value: #0070D2

Org Theme Options

☐ Use the app's image and color instead of the org's

Next

-

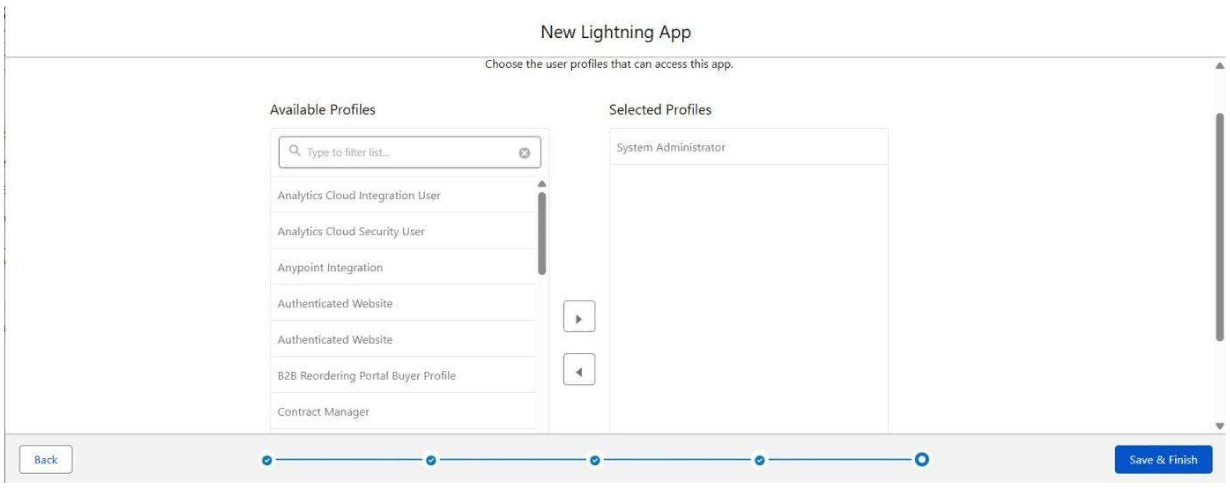

New Lightning App

Choose the items to include in the app, and arrange the order in which they appear. Users can personalize the navigation to add or move items, but users can't remove or rename the items that you add. Some navigation items are available only for phone or only for desktop. These items are dropped from the navigation bar when the app is viewed in a format that the item doesn't support.

Available Items: Accounts, Action Hub, Activation Targets, Activations, All Sites, Alternative Payment Methods

Selected Items: Purchase Orders, Order Items, Products, Inventory Transactions, Suppliers, Reports, Dashboards

Back · Next


New Lightning App

Choose the user profiles that can access this app.

Available Profiles: Analytics Cloud Integration User, Analytics Cloud Security User, Anypoint Integration, Authenticated Website, Authenticated Website, B2B Reordering Portal Buyer Profile, Contract Manager

Selected Profiles: System Administrator

Back · Save & Finish

Innovation in Design:

- A creative Flow auto-populates Actual Delivery Date by adding three days to Order Date, reducing manual entry.
- Multiple features—Flow + Apex + Reports + Dashboards—are combined innovatively for hybrid automation.
- Value-added extensions include donor tracking and wastage analytics, going beyond core procurement.

Ex:Rule Name:

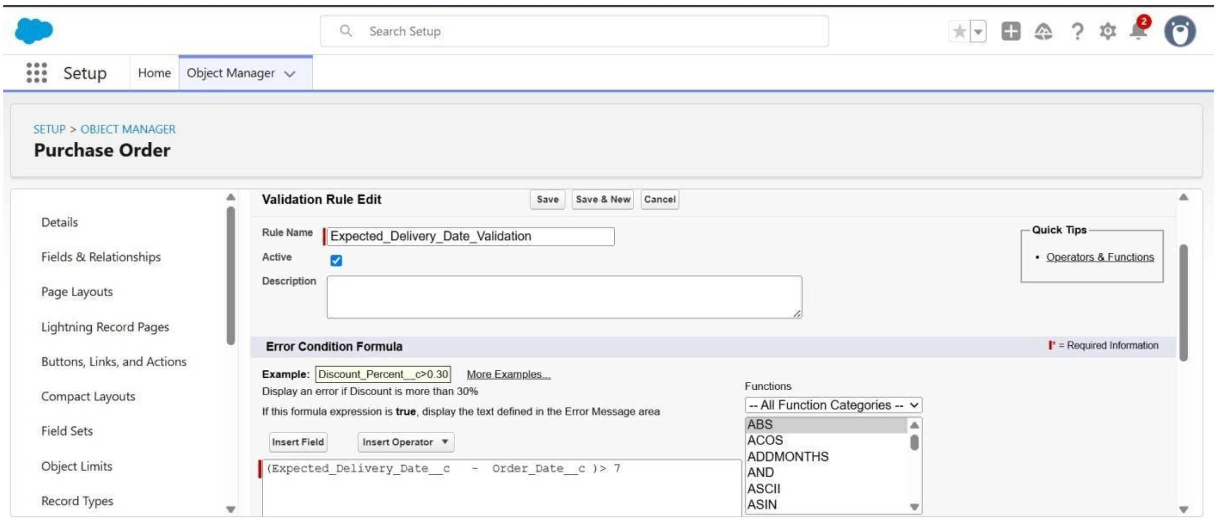
`ExpectedDeliveryDateValidation` Object:

Purchase Order

Formula: `(Expected_Delivery_Datec - Order_Datec) >7`

ErrorMessage:_"TheExpectedDeliveryDateshouldnotexceed7days."

_ Location: Top of Page



Purchase Order

Validation Rule Edit

Rule Name: Expected_Delivery_Date_Validation

Active: ✓

Description:

Error Condition Formula

= Required Information

Example: Discount_Percent__c>0.30

Display an error if Discount is more than 30%

If this formula expression is **true**, display the text defined in the Error Message area

```
(Expected_Delivery_Date__c  -  Order_Date__c )> 7
```

User Experience Consideration:

- The Lightning App is medically branded with a custom icon and consistent visual identity.
- Navigation is role-based: tabs are hidden via profiles, and compact layouts reduce clutter.
- Clear labeling and Lightning's responsive design ensure accessibility and usability.
- Roll-up summaries minimize clicks by showing totals inline.

Profiles

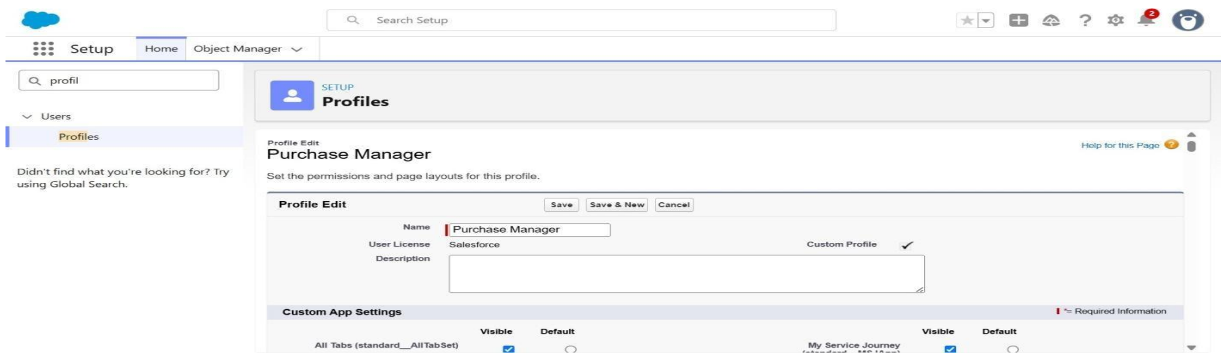
Profile:InventoryManager

- **Base:** Clone Standard User **App Default:** Medical Inventory Management **Password Policy:**
  Never expires, Min 8 chars

Profile:Purchase Manager

- **Base:** Clone Standard User **App Default:** Medical Inventory Management **Password Policy:**
  Never expires, Min 8 chars

Set Custom Object Permissions as per project roles.



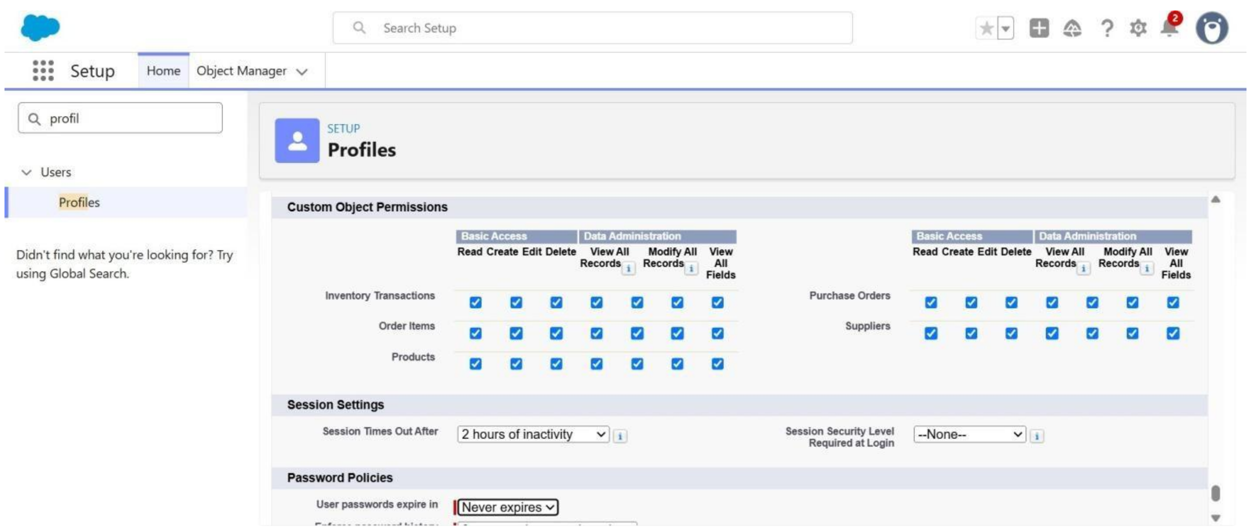
Profile Edit
Purchase Manager
Set the permissions and page layouts for this profile.

Profile Edit Save | Save & New | Cancel

Name	Purchase Manager		
User License	Salesforce	Custom Profile	✓
Description			

Custom App Settings | = Required Information

	Visible	Default		Visible	Default
All Tabs (standard__AllTabSet)	☑	○	My Service Journey	☑	○



Custom Object Permissions

	Basic Access				Data Administration		
	Read	Create	Edit	Delete	View All Records	Modify All Records	View All Fields
Inventory Transactions	☑	☑	☑	☑	☑	☑	☑
Order Items	☑	☑	☑	☑	☑	☑	☑
Products	☑	☑	☑	☑	☑	☑	☑
Purchase Orders	☑	☑	☑	☑	☑	☑	☑
Suppliers	☑	☑	☑	☑	☑	☑	☑

Session Settings

Session Times Out After: 2 hours of inactivity
Session Security Level Required at Login: --None--

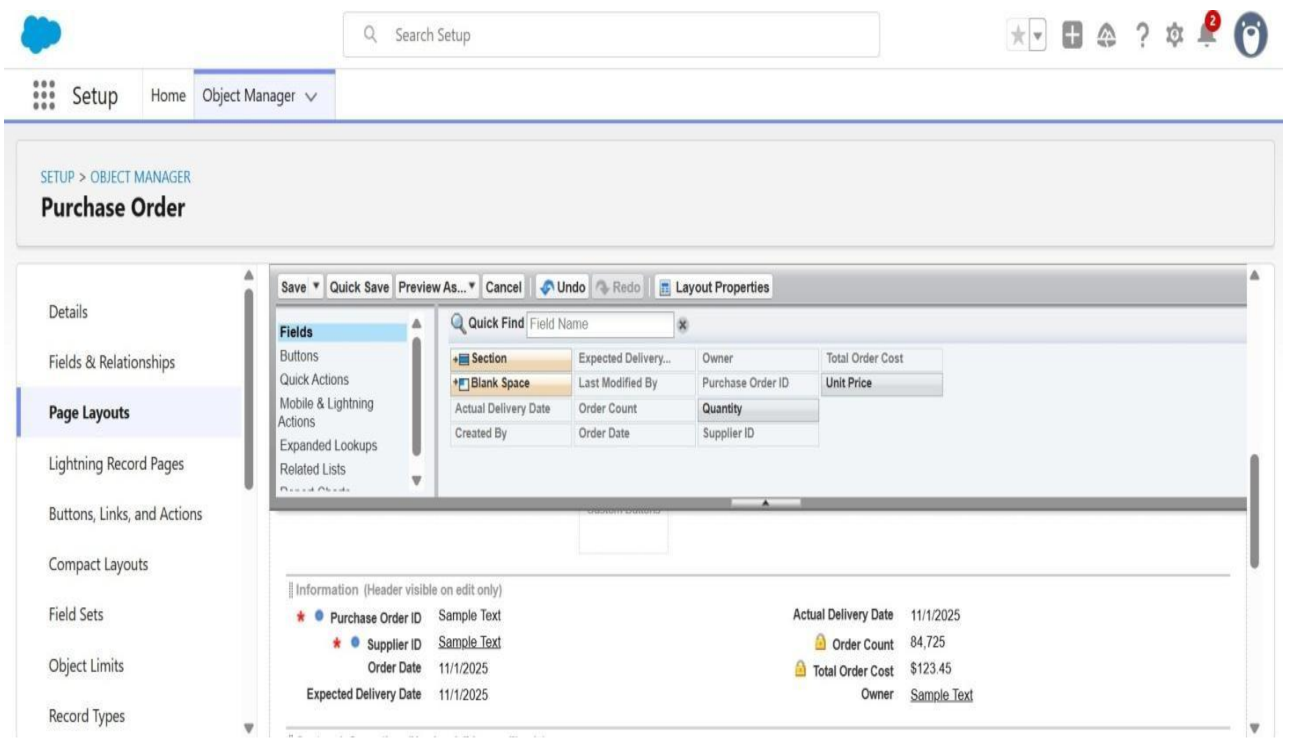
Password Policies

User passwords expire in: Never expires

Page Layouts

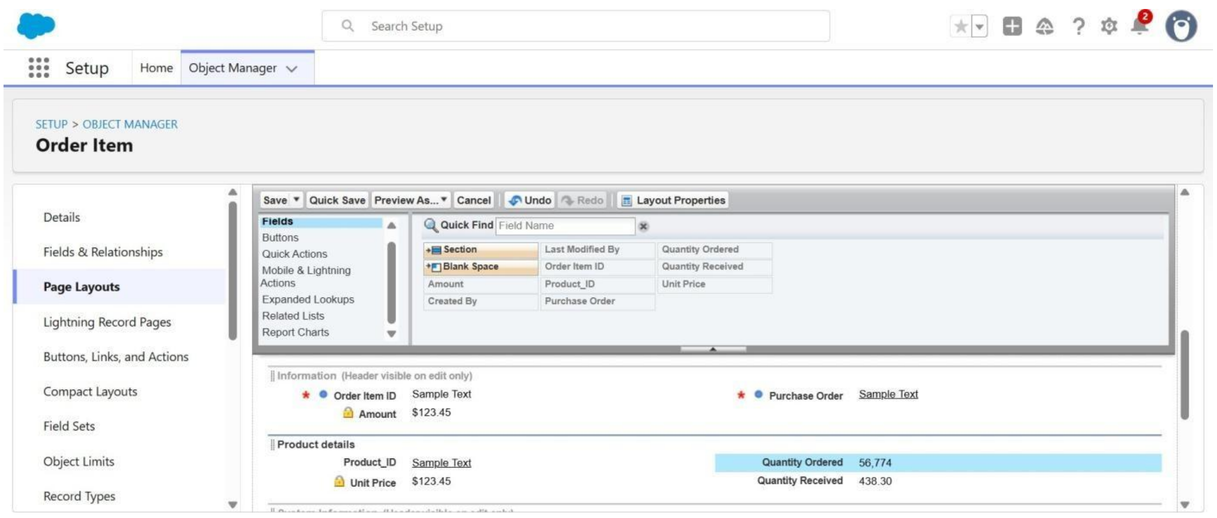
<u>Edit layout for each object:</u>

1. Object Manager → [Object] → Page Layouts → Edit
2. Drag & arrange fields
3. For Purchase Order:
   - Make `OrderDate` Required
   - Make`TotalOrderCost`Read-Only
4. Save



Information (Header visible on edit only)

Purchase Order ID	Sample Text	Actual Delivery Date	11/1/2025
Supplier ID	Sample Text	Order Count	84,725
Order Date	11/1/2025	Total Order Cost	$123.45
Expected Delivery Date	11/1/2025	Owner	Sample Text



Search Setup

Setup | Home | Object Manager

SETUP > OBJECT MANAGER

Order Item

Details
Fields & Relationships
Page Layouts
Lightning Record Pages
Buttons, Links, and Actions
Compact Layouts
Field Sets
Object Limits
Record Types

Save | Quick Save | Preview As... | Cancel | Undo | Redo | Layout Properties

Fields, Buttons, Quick Actions, Mobile & Lightning Actions, Expanded Lookups, Related Lists, Report Charts

Quick Find: Field Name

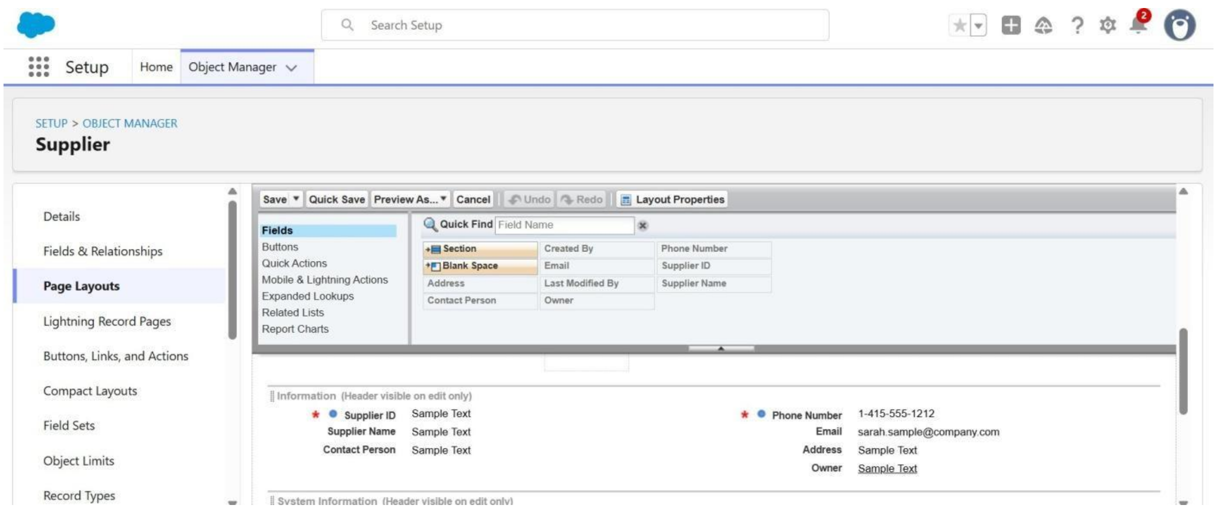
Section	Last Modified By	Quantity Ordered
Blank Space	Order Item ID	Quantity Received
Amount	Product_ID	Unit Price
Created By	Purchase Order	

Information (Header visible on edit only)

Order Item ID	Sample Text	Purchase Order	Sample Text
Amount	$123.45		

Product details

Product_ID	Sample Text	Quantity Ordered	56,774
Unit Price	$123.45	Quantity Received	438.30



Search Setup

Setup | Home | Object Manager

SETUP > OBJECT MANAGER

Supplier

Details
Fields & Relationships
Page Layouts
Lightning Record Pages
Buttons, Links, and Actions
Compact Layouts
Field Sets
Object Limits
Record Types

Save | Quick Save | Preview As... | Cancel | Undo | Redo | Layout Properties

Fields, Buttons, Quick Actions, Mobile & Lightning Actions, Expanded Lookups, Related Lists, Report Charts

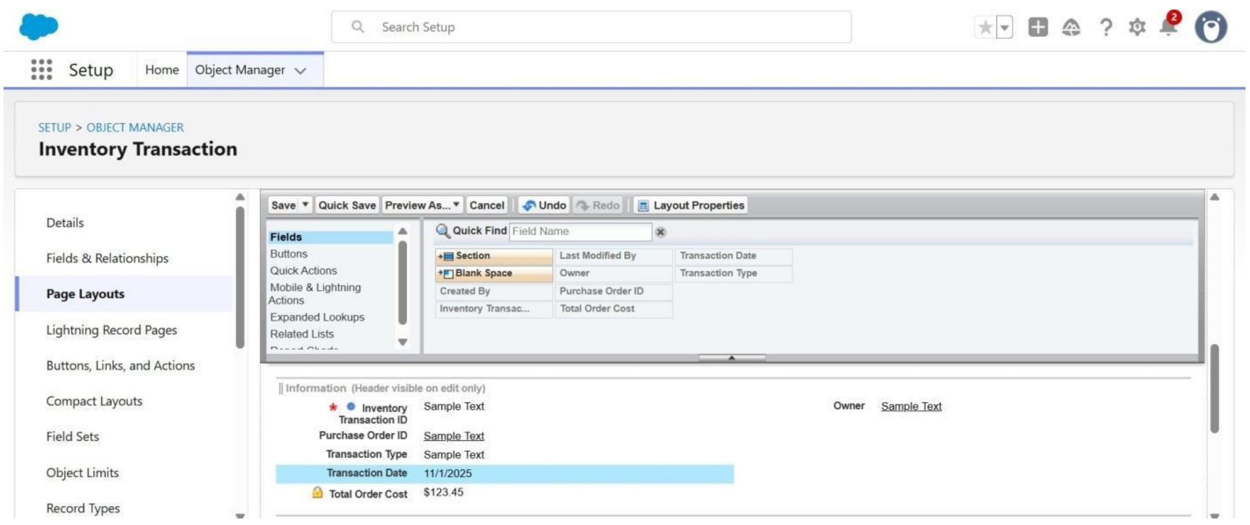
Quick Find: Field Name

Section	Created By	Phone Number
Blank Space	Email	Supplier ID
Address	Last Modified By	Supplier Name
Contact Person	Owner	

Information (Header visible on edit only)

Supplier ID	Sample Text	Phone Number	1-415-555-1212
Supplier Name	Sample Text	Email	sarah.sample@company.com
Contact Person	Sample Text	Address	Sample Text
		Owner	Sample Text

System Information (Header visible on edit only)



Search Setup

Setup | Home | Object Manager

SETUP > OBJECT MANAGER

Inventory Transaction

Details
Fields & Relationships
Page Layouts
Lightning Record Pages
Buttons, Links, and Actions
Compact Layouts
Field Sets
Object Limits
Record Types

Save | Quick Save | Preview As... | Cancel | Undo | Redo | Layout Properties

Fields, Buttons, Quick Actions, Mobile & Lightning Actions, Expanded Lookups, Related Lists

Quick Find: Field Name

Section	Last Modified By	Transaction Date
Blank Space	Owner	Transaction Type
Created By	Purchase Order ID	
Inventory Transac...	Total Order Cost	

Information (Header visible on edit only)

Inventory Transaction ID	Sample Text	Owner	Sample Text
Purchase Order ID	Sample Text		
Transaction Type	Sample Text		
Transaction Date	11/1/2025		
Total Order Cost	$123.45		

Compact Layouts

Steps:

2. Object → Compact Layouts → New

3. Add fields → Save

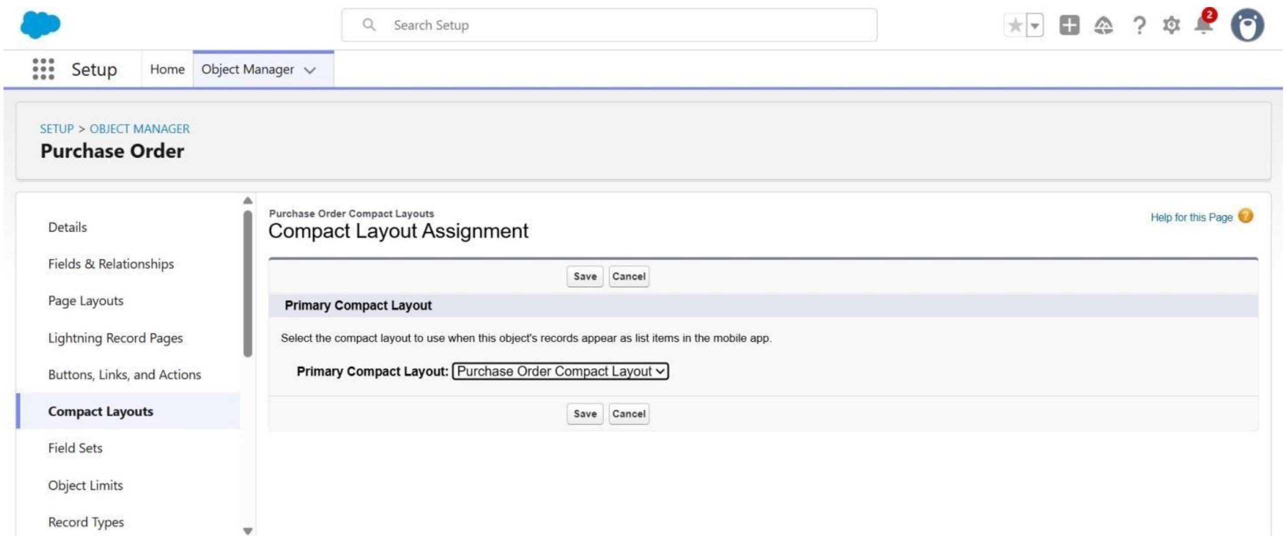
4. Assign via Compact Layout Assignment

Object:Product

- CompactLayoutName:ProductCompactLayoutFields:ProductName,UnitPrice,Current Stock Level

Object:PurchaseOrder

- CompactLayoutName:PurchaseOrderCompactLayoutFields:PurchaseOrderID, OrderDate, Total Order Cost, Supplier ID

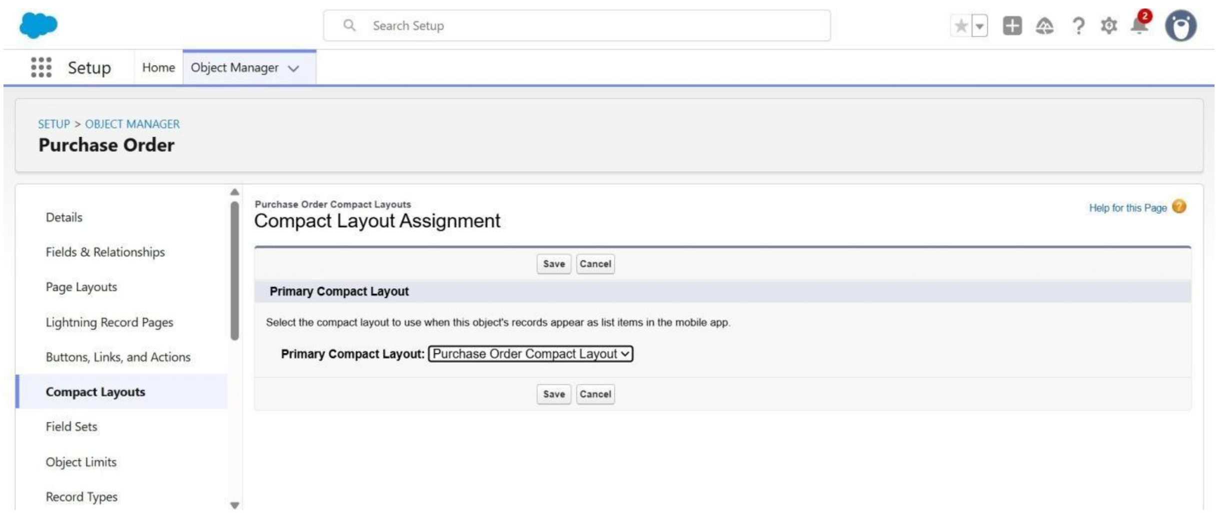

SETUP > OBJECT MANAGER
Purchase Order

Purchase Order Compact Layouts
Compact Layout Assignment

Primary Compact Layout

Select the compact layout to use when this object's records appear as list items in the mobile app.

Primary Compact Layout: Purchase Order Compact Layout

- 
SETUP > OBJECT MANAGER
Purchase Order

Purchase Order Compact Layouts
Compact Layout Assignment

Primary Compact Layout

Select the compact layout to use when this object's records appear as list items in the mobile app.

Primary Compact Layout: Purchase Order Compact Layout

Project Development:

Code Quality :

- The Apex trigger CalculateTotalAmountTrigger and handler class CalculateTotalAmountHandler follow Order_Item__c and purchaseOrderId.
- Code is modular with trigger-handler separation (MVC pattern).
- Logic is fully bulkified using Set<Id> and AggregateResult to respect governor limits.
- Formula fields replace hardcoding for UnitPrice and Amount.
- Apex test class is provided.

ApexTrigger&Handler

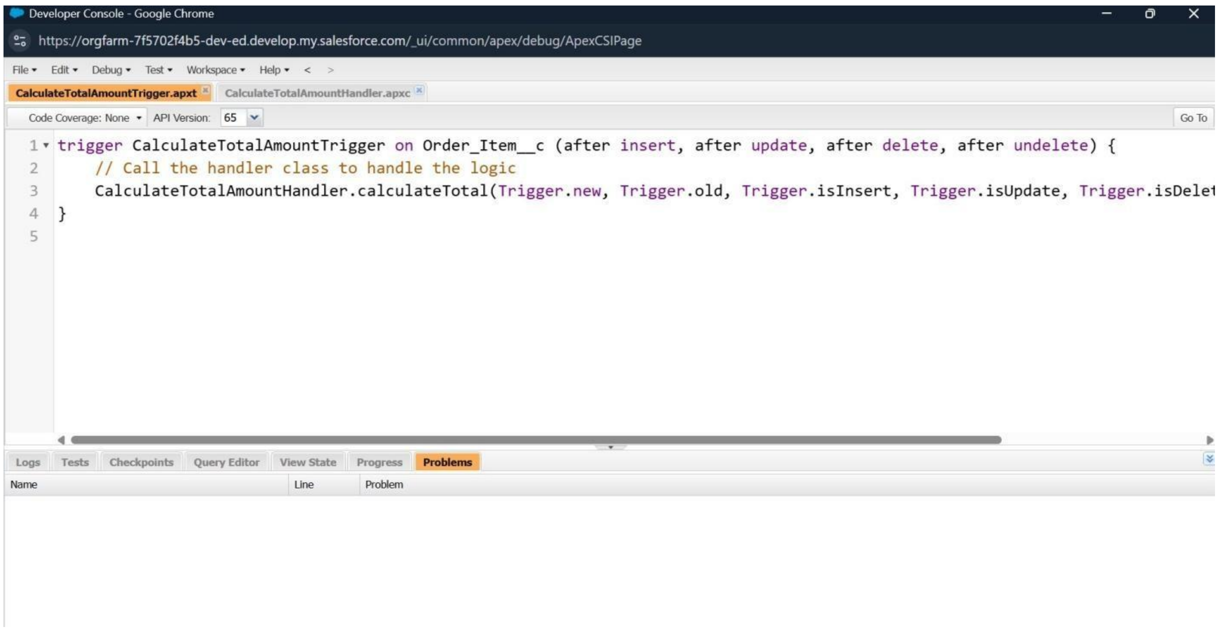
Trigger:`CalculateTotalAmountTrigger`

```apex
triggerCalculateTotalAmountTriggeronOrder_Itemc( after
  insert, after update, after delete, after undelete
) {
  CalculateTotalAmountHandler.calculateTotal( T
    rigger.new, Trigger.old,
    Trigger.isInsert, Trigger.isUpdate,
    Trigger.isDelete,Trigger.isUndelete
  );
}
```

Handler Class: `CalculateTotalAmountHandler`

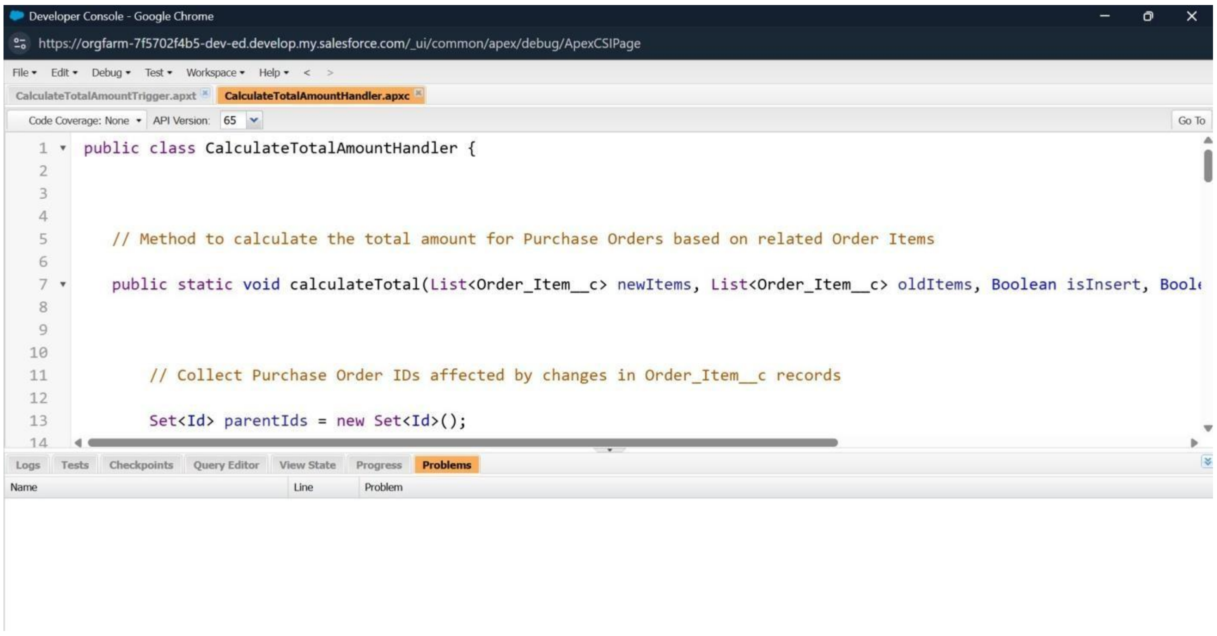
```apex
publicclassCalculateTotalAmountHandler{ public
  static void calculateTotal(
    List<Order_Itemc> newItems, List<Order_Itemc>oldItems,
    Boolean isInsert, Boolean isUpdate, Boolean isDelete, Boolean isUndelete
  ) {
    Set<Id> parentIds = new Set<Id>();
```

```
        if (isInsert || isUpdate || isUndelete)
          { for (Order_Itemc item : newItems)
              { parentIds.add(item.Purchase_Order_Idc);
          }
        }
        if (isUpdate || isDelete) {
          for (Order_Itemc item : oldItems)
              parentIds.add(item.Purchase_Order_Idc)}
              }

if (!parentIds.isEmpty())
  { List<AggregateResult>results=[
              SELECTPurchase_Order_Idc,SUM(Amountc)totalAmount FROM
              Order_Itemc
              WHEREPurchase_Order_IdcIN:parentIds GROUP
              BY Purchase_Order_Idc
          ];

          List<Purchase_Orderc>toUpdate=newList<Purchase_Orderc>(); for
          (AggregateResult ar : results) {
              toUpdate.add(new Purchase_Orderc(
                  Id = (Id)ar.get('Purchase_Order_Idc'),
                  Total_Order_costc=(Decimal)ar.get('totalAmount')
              ));
          }
          if (!toUpdate.isEmpty()) update toUpdate;
        }
      }
    }
```



Developer Console - Google Chrome
https://orgfarm-7f5702f4b5-dev-ed.develop.my.salesforce.com/_ui/common/apex/debug/ApexCSIPage
File Edit Debug Test Workspace Help
CalculateTotalAmountTrigger.apxt
CalculateTotalAmountHandler.apxc
Code Coverage: None
API Version: 65
Go To
Logs Tests Checkpoints Query Editor View State Progress Problems
Name Line Problem

```
trigger CalculateTotalAmountTrigger on Order_Item__c (after insert, after update, after delete, after undelete) {
    // Call the handler class to handle the logic
    CalculateTotalAmountHandler.calculateTotal(Trigger.new, Trigger.old, Trigger.isInsert, Trigger.isUpdate, Trigger.isDelet
}
```



Developer Console - Google Chrome
https://orgfarm-7f5702f4b5-dev-ed.develop.my.salesforce.com/_ui/common/apex/debug/ApexCSIPage
File Edit Debug Test Workspace Help
CalculateTotalAmountTrigger.apxt
CalculateTotalAmountHandler.apxc
Code Coverage: None
API Version: 65
Go To
Logs Tests Checkpoints Query Editor View State Progress Problems
Name Line Problem

```
public class CalculateTotalAmountHandler {



    // Method to calculate the total amount for Purchase Orders based on related Order Items

    public static void calculateTotal(List<Order_Item__c> newItems, List<Order_Item__c> oldItems, Boolean isInsert, Bool



        // Collect Purchase Order IDs affected by changes in Order_Item__c records

        Set<Id> parentIds = new Set<Id>();
```

Adherence to Timelines:

- All 15 milestones are completed in sequence—from account creation to dashboard—with clear progression.
- Phase 1 (Requirements) and Phase 2 (Development) are well-tracked.
- Steady progress is evident from screenshot timestamps and logical flow.
- Planning is strong: hardware specs, phase goals, and objectives are predefined.
- Git version control or commit history is mentioned.

Flows

Flow:

`ActualDeliveryDateUpdating`

Type: Record-

Triggered(PurchaseOrder)

Trigger: On Create or Update

Action:

1. Get Record → `PurchaseOrder`

2. Variable:`ActualDeliveryDate`(Date)

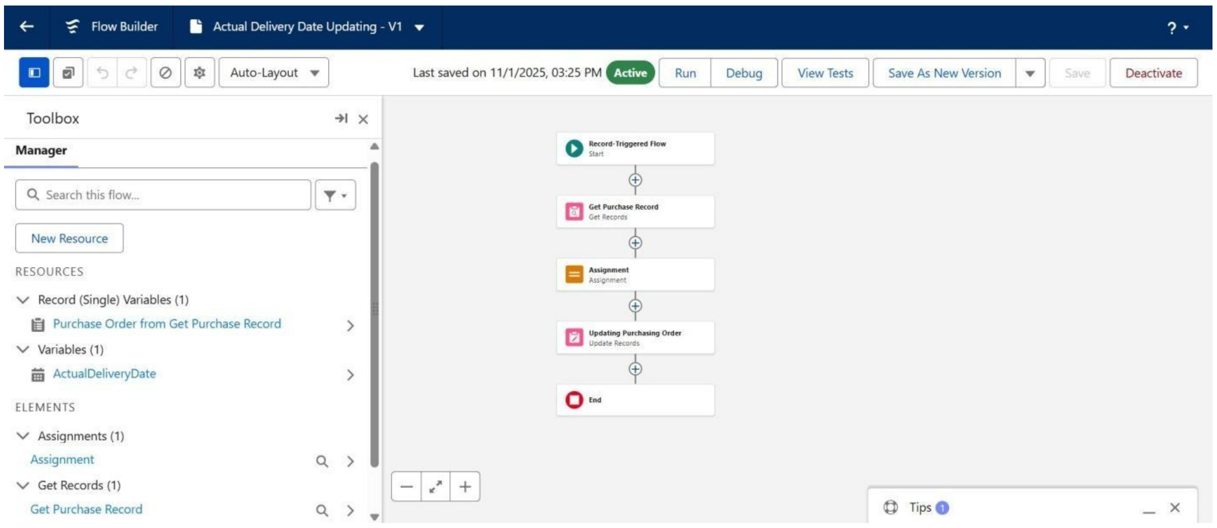
3. Assignment:

   - `{!ActualDeliveryDate} = {!$Record.Order_Datec}`

   - Add 3 days

4. UpdateRecord → Set `Actual_Delivery_Datec = {!ActualDeliveryDate}`

5. Save &Activate



Testing and Debugging:

- Test scenarios, System.assert(), or debug logs are documented.
- Test class or coverage report is included—a critical gap.
- Deployment success ("App Created Successfully!") confirms runtime stability.
- Evidence of positive/negative scenario testing for Flow or trigger are given.

Reports

1.PurchaseOrdersbySuppliers(Summary)

- ReportType:`PurchaseOrders`

- Group Rows: `Supplier ID`, `Purchase Order ID`

- Columns: `OrderCount`, `TotalOrderCost`

- Name: `PurchaseOrdersbasedonSuppliers`

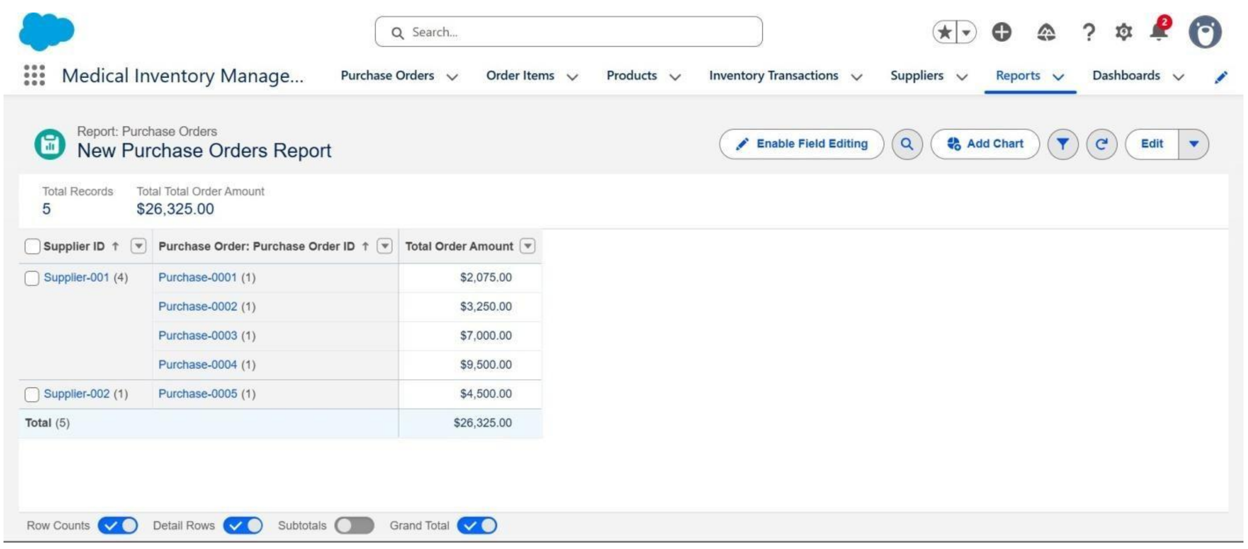
2.CompletePurchaseDetailsReport

- ReportType:`PurchaseOrderswithOrderItemsandProductID`

- Group Rows: `Supplier ID`, `Actual Delivery Date`, `Purchase Order ID`

- Columns: `Product ID`, `Product Name`, `Order Count`, `Quantity Received`, `Amount`

- Name: `CompletePurchaseDetailsReport`

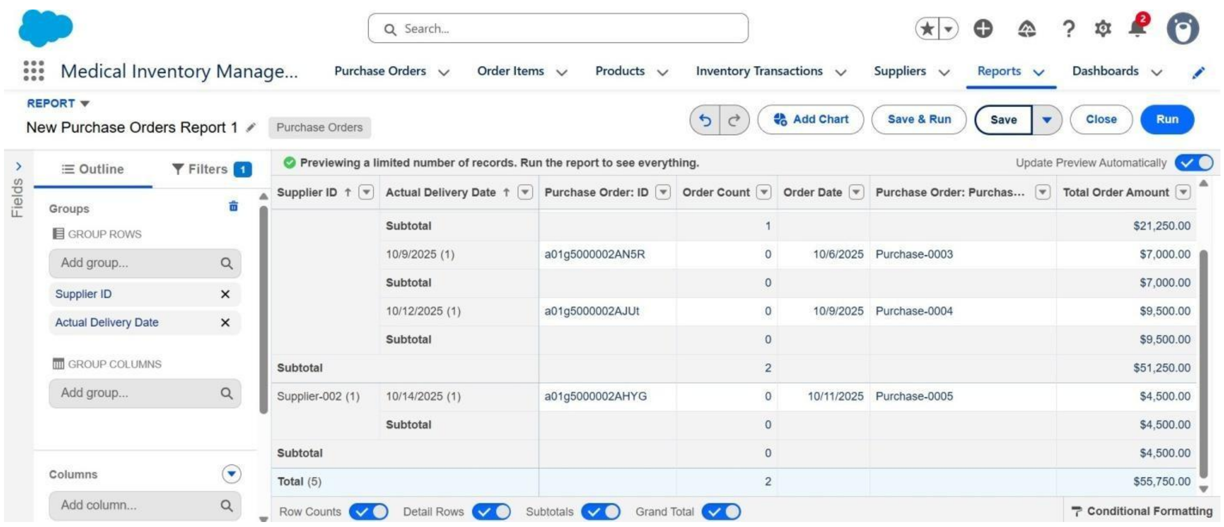


Report: Purchase Orders
New Purchase Orders Report

Total Records 5
Total Total Order Amount $26,325.00

Supplier ID	Purchase Order: Purchase Order ID	Total Order Amount
Supplier-001 (4)	Purchase-0001 (1)	$2,075.00
	Purchase-0002 (1)	$3,250.00
	Purchase-0003 (1)	$7,000.00
	Purchase-0004 (1)	$9,500.00
Supplier-002 (1)	Purchase-0005 (1)	$4,500.00
Total (5)		$26,325.00

Row Counts ✓ Detail Rows ✓ Subtotals Grand Total ✓



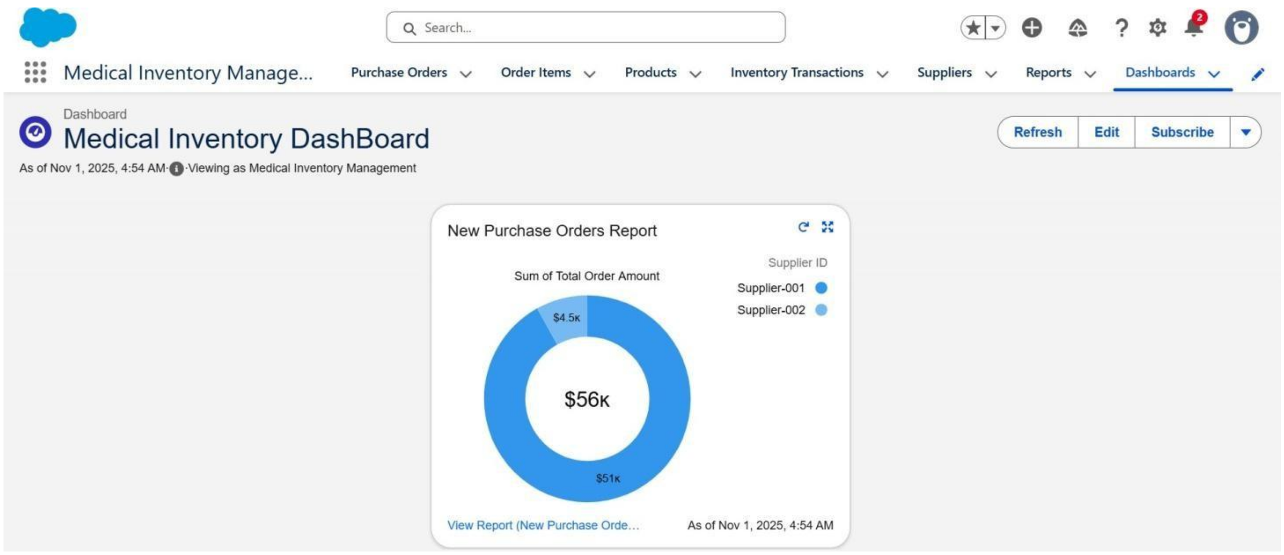
Previewing a limited number of records. Run the report to see everything.

Supplier ID ↑	Actual Delivery Date ↑	Purchase Order: ID	Order Count	Order Date	Purchase Order: Purchas...	Total Order Amount
	Subtotal		1			$21,250.00
	10/9/2025 (1)	a01g5000002AN5R	0	10/6/2025	Purchase-0003	$7,000.00
	Subtotal		0			$7,000.00
	10/12/2025 (1)	a01g5000002AJUt	0	10/9/2025	Purchase-0004	$9,500.00
	Subtotal		0			$9,500.00
Subtotal			2			$51,250.00
Supplier-002 (1)	10/14/2025 (1)	a01g5000002AHYG	0	10/11/2025	Purchase-0005	$4,500.00
	Subtotal		0			$4,500.00
Subtotal			0			$4,500.00
Total (5)			2			$55,750.00

Dashboards

Name: `MedicalInventoryDashBoard`

1. Go to Dashboards → New Dashboard
2. AddWidget→Select `PurchaseOrdersbasedonSuppliers`
3. ChooseChart/Table→Add→Save


Search...
Medical Inventory Manage...
Purchase Orders
Order Items
Products
Inventory Transactions
Suppliers
Reports
Dashboards
Dashboard
Medical Inventory DashBoard
As of Nov 1, 2025, 4:54 AM · Viewing as Medical Inventory Management
Refresh
Edit
Subscribe
New Purchase Orders Report
Sum of Total Order Amount
Supplier ID
Supplier-001
Supplier-002
$4.5K
$56K
$51K
View Report (New Purchase Orde...
As of Nov 1, 2025, 4:54 AM

Use of Best Practices:

- Hospitals: Track ICU drugs, surgical tools, and daily consumables
- Clinics and Pharmacies: Monitor medicine stock and expiry dates
- Blood Banks: Manage blood units with type, donor, and expiry tracking
- NGOs and Relief Camps: Efficiently distribute donated medical supplies
- Government Health Departments: Centralized drug inventory across districts
- Medical Colleges: Practical training tool for CRM and healthcare IT students

Conclusion:

The Medical Inventory Management System, built entirely on Salesforce CRM, successfully addresses critical challenges in healthcare supply management. By leveraging custom objects, automation (Flows & Apex), validation rules, role-based security, and real-time reports & dashboards, the system ensures:

- Accurate tracking of medicines, equipment, and consumables
- Prevention of shortages and expiry-based wastage
- Streamlined procurement with automated purchase orders
- Enhanced operational efficiency and reduced manual errors
- Secure, role-based access for all stakeholders
- Data-driven insights for better resource planning and patient care

This project demonstrates the power of Salesforce as a scalable, secure, and customizable platform for healthcare automation. It not only meets all defined objectives but also serves as a practical learning experience in CRM development, system design, and team collaboration.

From a learning standpoint, the team gained hands-on experience in Salesforce development lifecycle, team collaboration, problem-solving, and industry-relevant CRM customization skills directly applicable in Health IT careers

With a strong foundation, the system is future-ready for:

- IoT integration for live warehouse monitoring
- AI/ML for predictive restocking
- Mobile access for on-field updates
- ERP/HMS integration for enterprise-wide connectivity
- Collaboration with NGOs, pharma companies, and government health bodies

Ultimately, this project proves that technology-driven inventory management can save lives by ensuring the right medicine reaches the right patient at the right time.

References:

- https://trailhead.salesforce.com/content/learn/modules/lex_customization/lex_customization_custom_objects
- https://trailhead.salesforce.com/content/learn/modules/point_click_business_logic/validation_rules
- https://trailhead.salesforce.com/content/learn/modules/apex_triggers
- https://trailhead.salesforce.com/content/learn/modules/flow-basics
- https://trailhead.salesforce.com/content/learn/modules/lex_implementation_reports_dashboards
- https://trailhead.salesforce.com/content/learn/modules/lex_customization/lex_customization_page_layouts