Project Title: *Institute Management System (IMS)*

(CodeSphere Institute)

- **Industry**: Education
- **Project Type**: B2C Salesforce CRM Implementation
- **Target Users**: Institute Administrators, Admission Officers, Faculty Members, Students, and Parents

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Problem Statement

An educational institute receives hundreds of student inquiries via its website, offline walk-ins, and social media. However:

- Lead follow-up is slow and inconsistent
- Student records are tracked manually in spreadsheets
- Faculty allocation is done without balancing workloads
- Fee collection and tracking are fragmented
- Management lacks real-time dashboards for admissions, revenue, and faculty performance

 To address these challenges, the institute wants to implement a **Salesforce CRM (IMS)** to:

- Automate lead capture and admission qualification
- Manage student profiles, faculty details, courses, and batches
- Track fee payments and send automated reminders
- Provide real-time dashboards for admissions, faculty utilization, and revenue
- Improve student/parent communication through SMS/Email alerts

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Use Cases

Lead Management

- Automatically capture leads from website forms, social channels, and walk-ins
- Assign leads to admission officers based on course/territory
- Qualify leads using interest scores

Student Management

- Maintain student profiles with academic history, enrolled courses, and status.
- Convert qualified leads into student records.

Faculty Management

- Maintain faculty profiles with specialization and availability
- Assign faculty to courses/batches and track workload.

Course & Batch Scheduling

- Schedule lectures, exams, and institute events
- Send SMS/Email reminders to students and faculty

Fee Management

- Record payments, track pending dues, and generate receipts
- Send automated reminders for pending fees

Reporting

- Dashboards for admissions funnel, monthly revenue, and faculty utilization
- Reports for student trends, counselor performance, and fee collection

Phase 2: Org Setup & Configuration

Step 1: Setup Developer Org

1. Go to https://developer.salesforce.com/signup

2. Create a free Developer Edition org.

3. Verify your email and login.

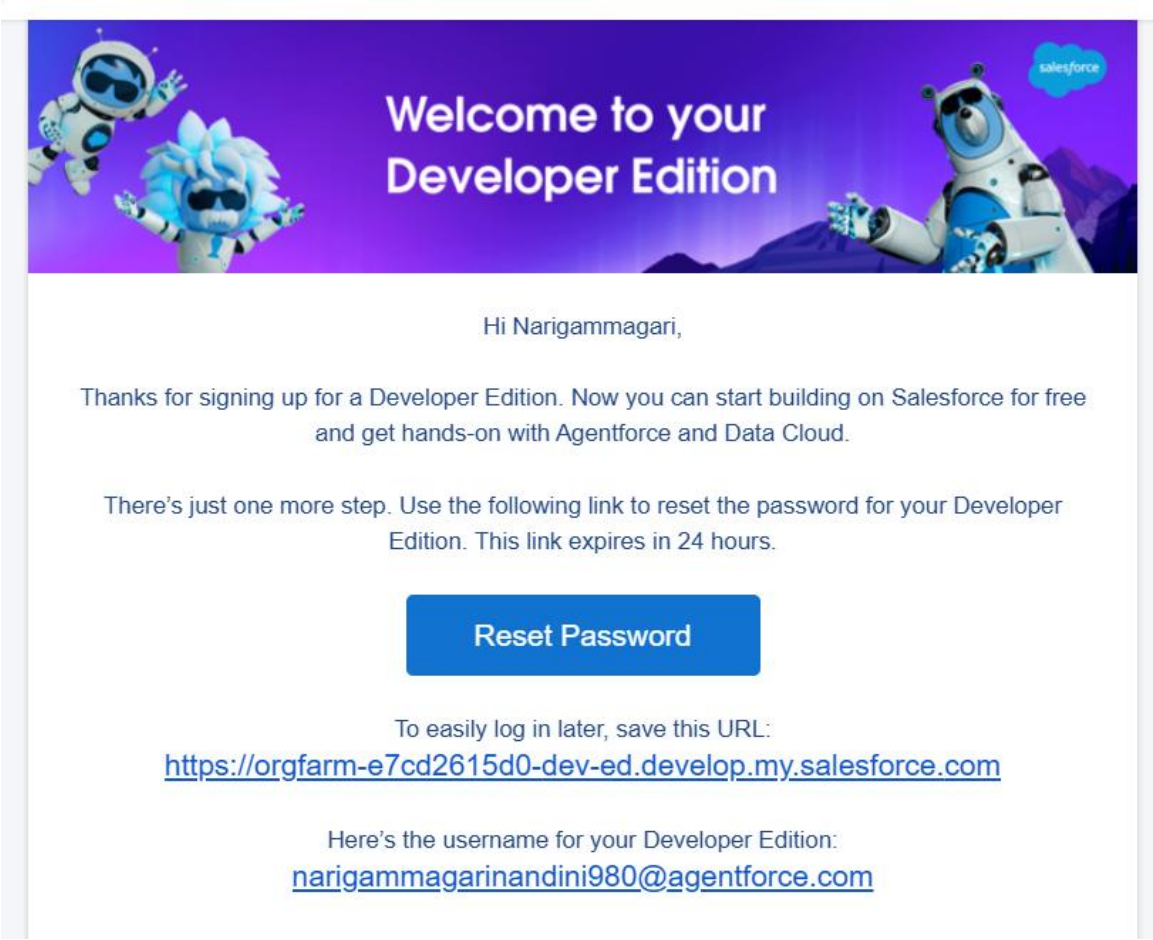


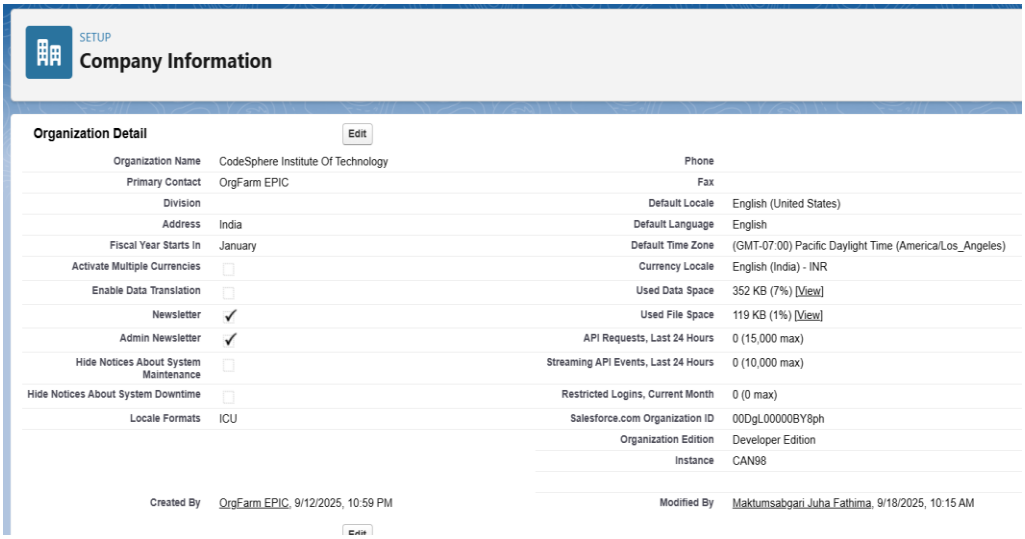
Fig 1: Developer Org

Step 2: Setup Company Profile

1. Navigate: Setup → Company Information.

2. Update:

- Org Name =Codesphere Institute Of Technology
- Currency=English(INR)
- Set Default Time Zone, Fiscal Year.



- Fig 2: Company profile

3. Configure Business Hours:

- Path: Setup → Business Hours.

- Example: Mon–Fri, 9AM – 4 PM.

4. Configure Holidays:

- Example: 26 Jan, 15 Aug (exam blackout dates).

Step 3: Create Custom Profiles

1. Navigate: Setup → Profiles.

2. Clone Standard Profiles into:

- Faculty Profile → for HOD, Teachers.

- Accounts Profile → for Accountant.

- Student Profile → for Students

- Faculty → Manage Courses, Student.

- Accounts → Manage Fee Payments, Reports.

- Students → Read-only access on their own record.

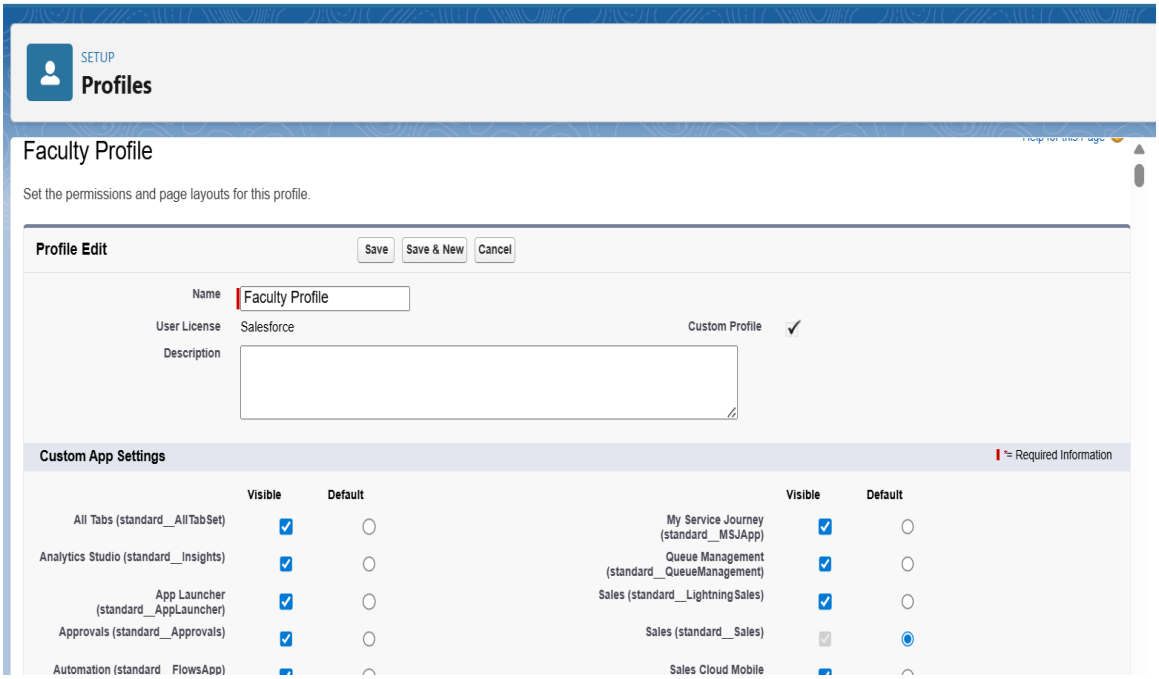


Fig 3: Creation of profiles

Step 4: Define Roles

1. Navigate: Setup → Roles → Set Up Roles → Expand All.

2. Create hierarchy:

- Principal (Top level).
- HOD (reports to Principal).
- Teacher (reports to HOD).
- Accountant (reports to Principal).
- Student(lowest level).

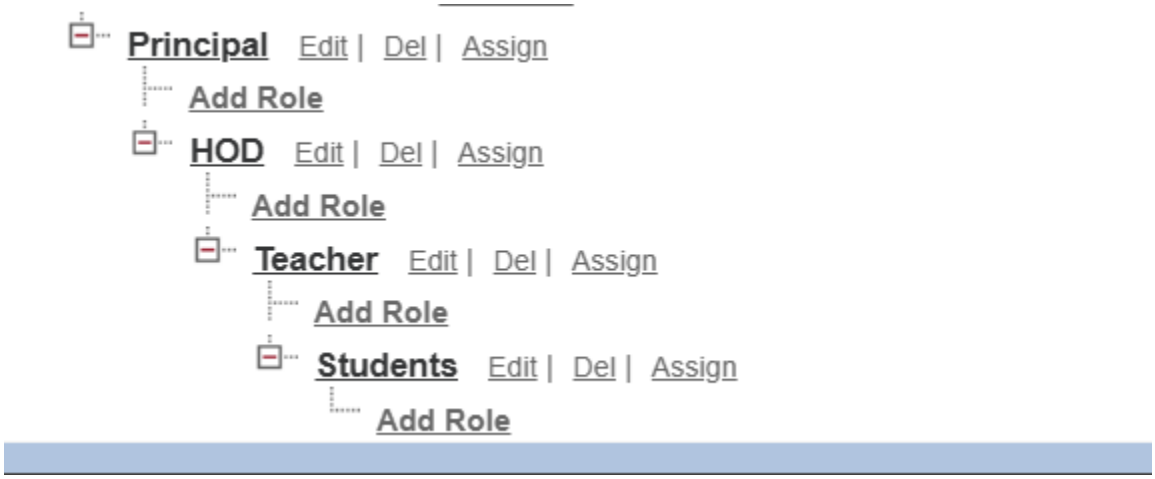


Fig 4: Hierarchy of Roles

Step 5: Create Users

1. Navigate: Setup → Users → New User.

2. Assign details:

   - User License = Salesforce (for staff).

   - Profile = Faculty, Accounts, System Admin, etc.

   - Role = Principal, Teacher, Accountant, Student.

3. Create sample test users: Principal, Teacher.

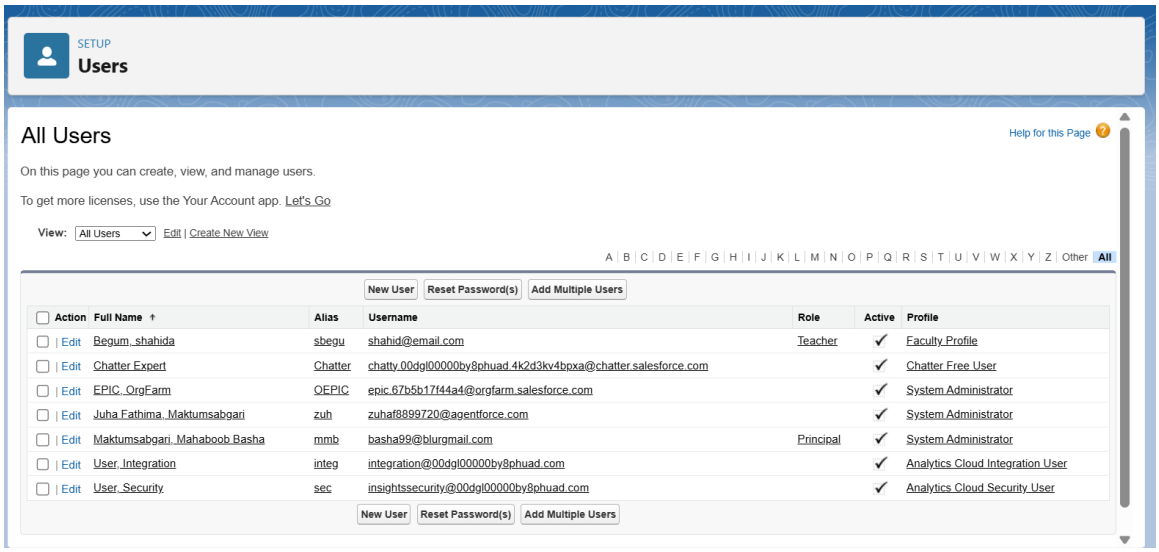


Fig 5: Users List

Step 6: Org-Wide Defaults (OWD) & Sharing

1. Navigate: Setup → Sharing Settings.

2. Set Org-Wide Defaults (OWD):

   - Student Object = Private.

   - Course/Batch = Public Read Only.

With this setup, my Salesforce Educational Org will have:

- Proper institute branding & working hours.

- Clear role hierarchy (Principal → HOD → Teacher → Student).

- Secure sharing model (Students private, Courses public read).

- Profiles tailored for Faculty, Accounts, and Students.

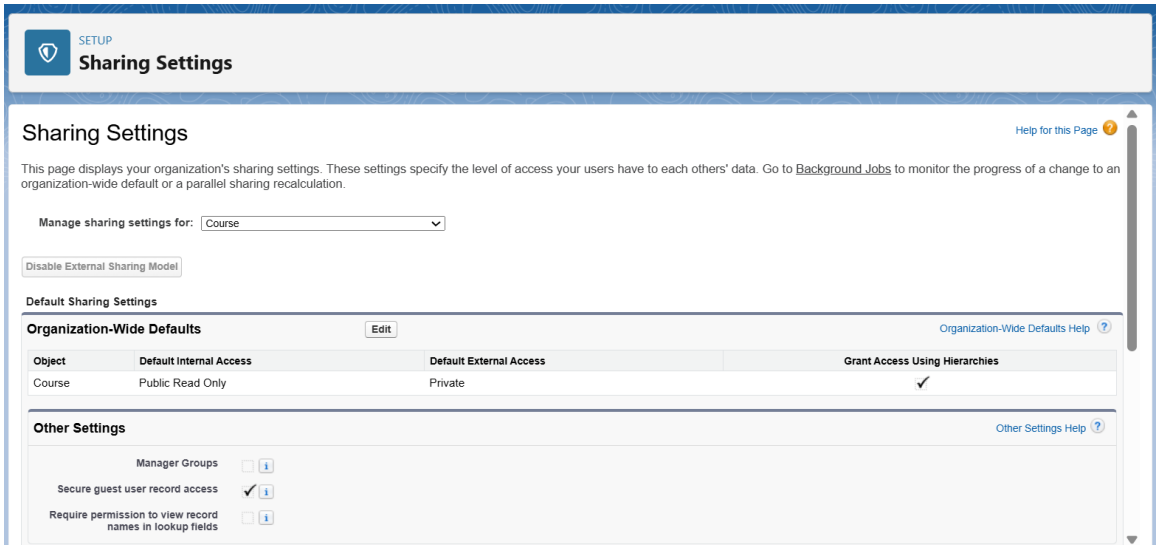


Fig 6: The OWD settings

Phase 3

Salesforce Data Model Implementation

Step 1: Create Custom Objects

Navigate to Setup → Object Manager → Create → Custom Object.

Create the following custom objects one by one:

- **Student**
  - Record Name: Student ID (Auto-Number)
  - Enable: Reports & Activities
- **Faculty**
  - Record Name: Faculty ID (Auto-Number)
  - Enable: Reports & Activities
-

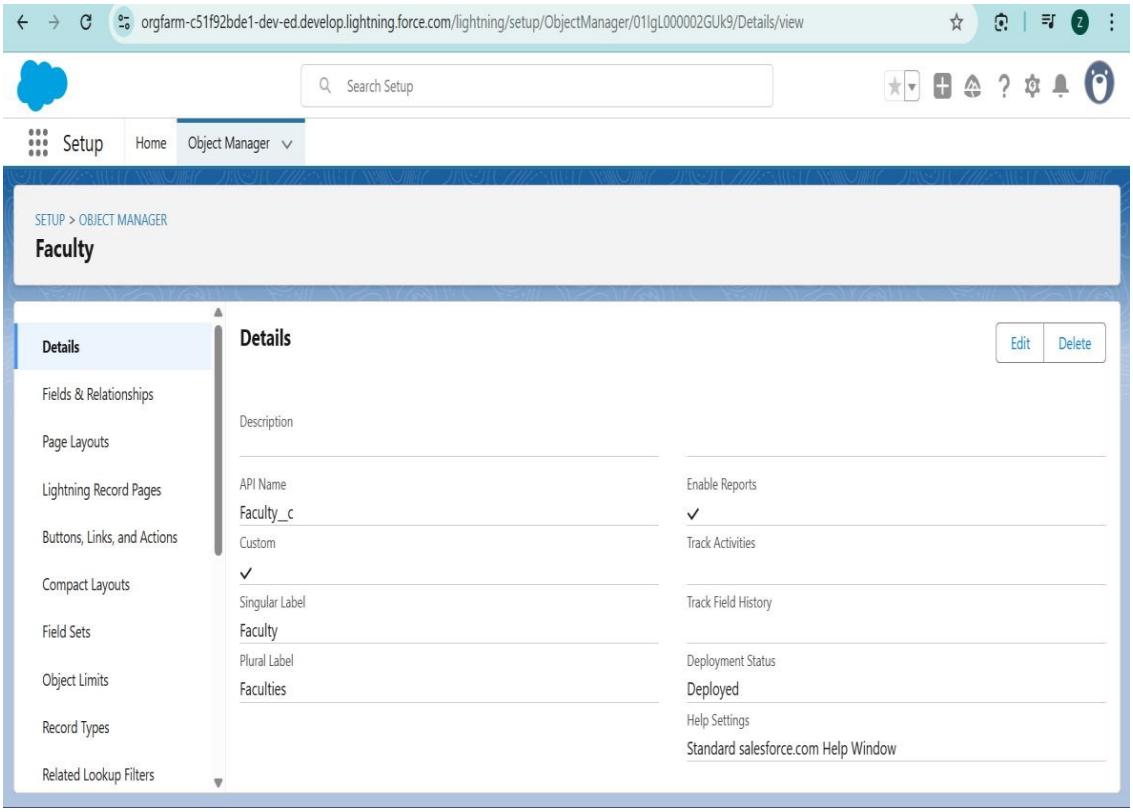


Fig1: Faculty Custom Object

- **Course**
  - Record Name: Course ID (Auto-Number or Text)
  - Enable: Reports & Activities
- **Enrollment**
  - Record Name: Enrollment ID (Auto-Number)
  - Enable: Reports & Activities
- **Fee Payment**
  - Record Name: Payment ID (Auto-Number)
  - Enable: Reports & Activities
-

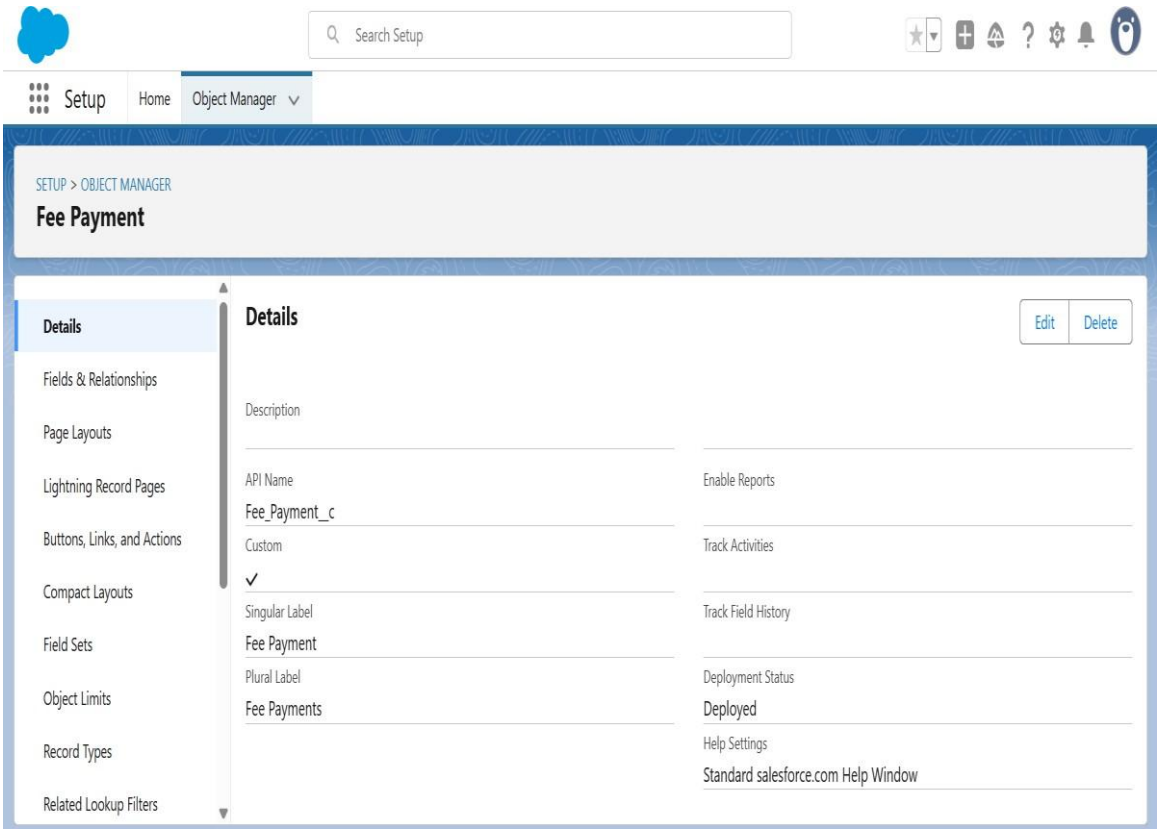


Fig 2:Fee payment custom Object

Step 2: Add Fields to Custom Objects

Student

- Email → Text
- Phone → Phone
- DOB → Date
- Enrollment Status → Picklist (Admitted, Active, Completed, Dropped)
- Course → Lookup (Course)

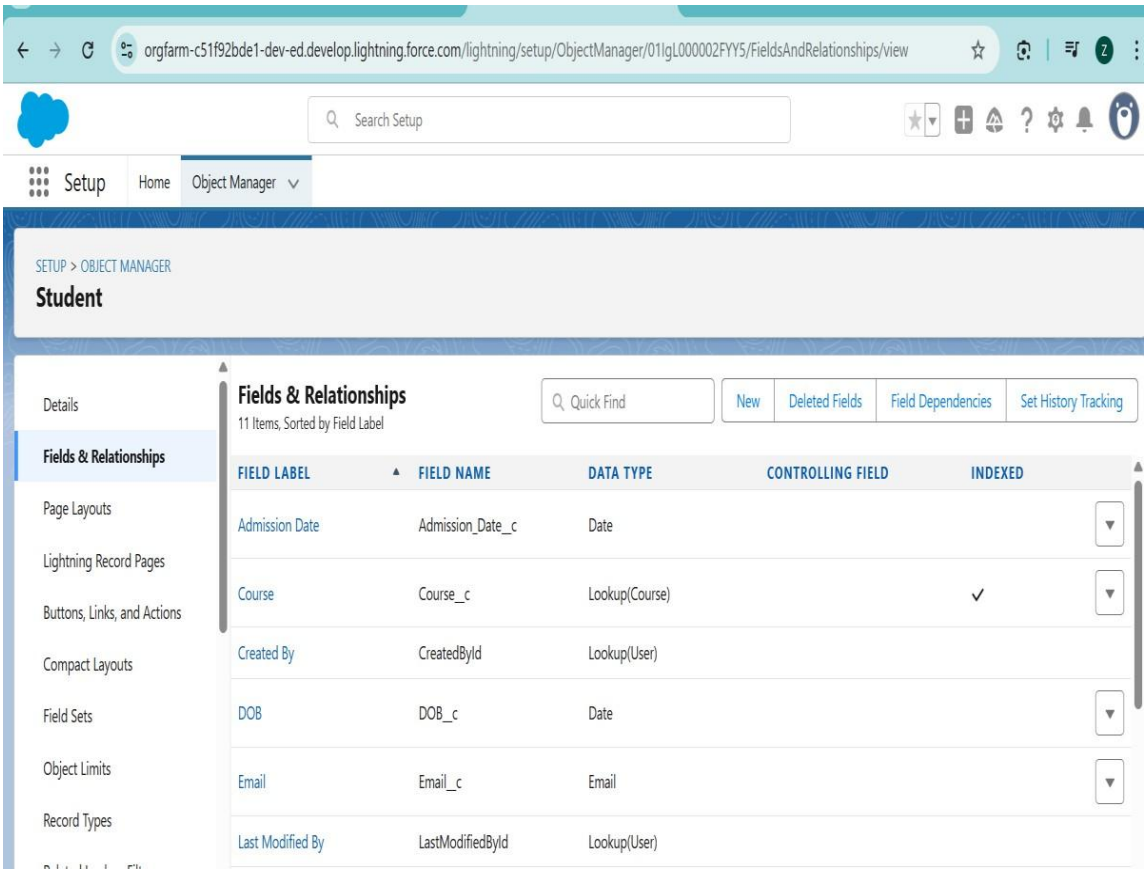


Fig 3:Fields of Student object

Faculty

- Email → Email
- Phone → Phone
- Department → Picklist (CSE,ECE,EEE,CE,MEC,AIML,AIDS)
- Faculty ID → Auto-Number

Course

- Course Name → Text
- Course Code → Text
- Duration → Number (Months)
- Credits → Number
- Fees → Currency
- Faculty → Lookup (Faculty)

Enrollment

- Student → Lookup (Student)
- Course → Lookup (Course)

- Enrollment Date → Date
- Status → Picklist (Active, Completed, Dropped)
- Grade → Picklist (A, B, C, D, F)

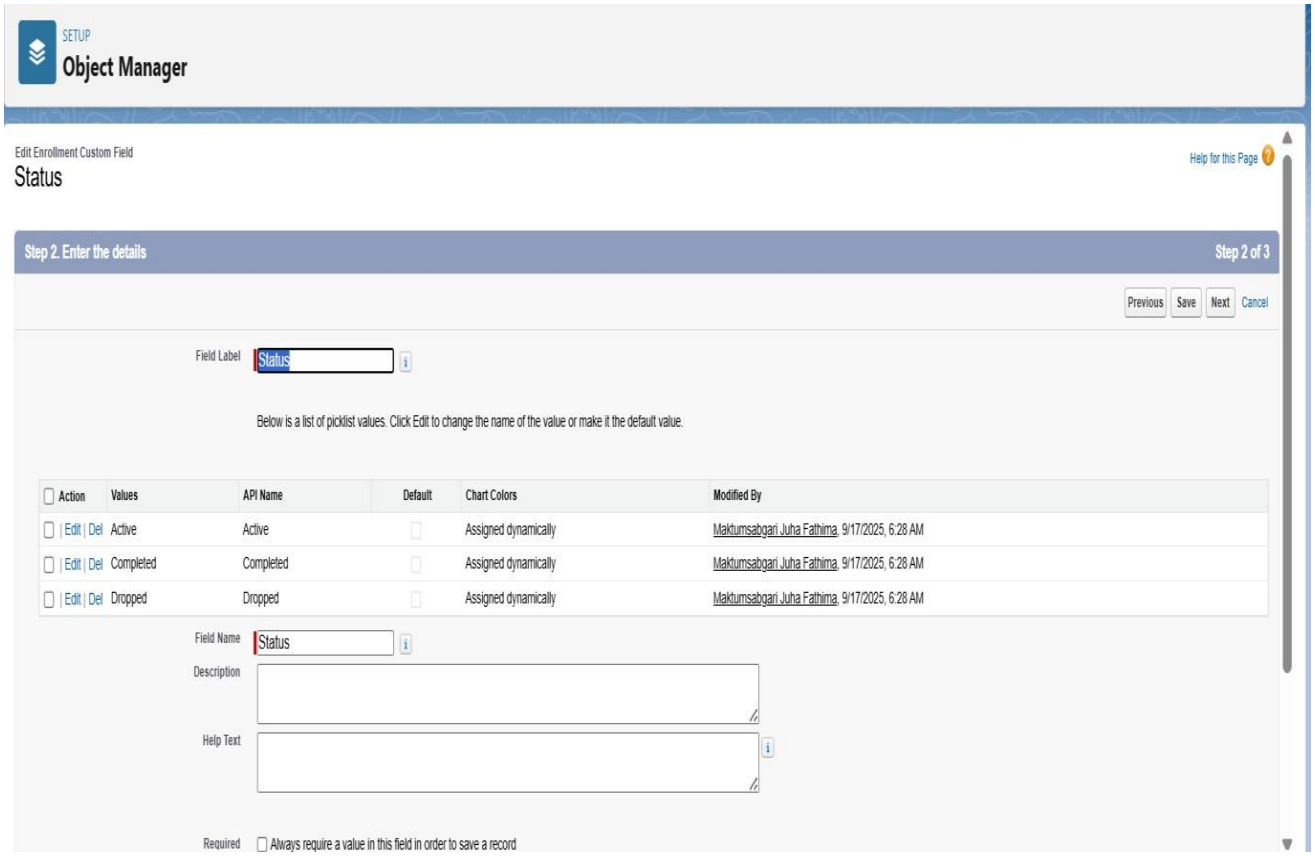


Fig 4: Picklist of Status Field

Fee Payment

- Student → Lookup (Student)
- Payment Date → Date
- Amount → Currency
- Mode of Payment → Picklist (Cash, Card, Online)
- Status → Picklist (Paid, Pending)

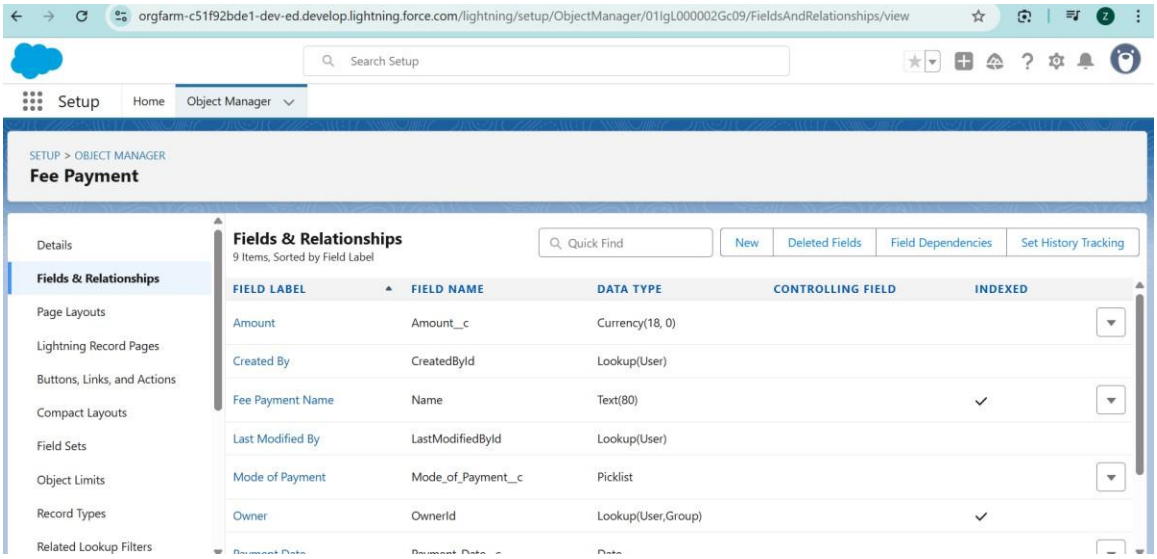


Fig 5: Fields of Fee payment

Step 3: Setup Relationships:

Junction Object → Enrollment:

The Enrollment object enables a many-to-many relationship between Students and Courses.

- Enrollment → Student (Lookup)
- Enrollment → Course (Lookup)

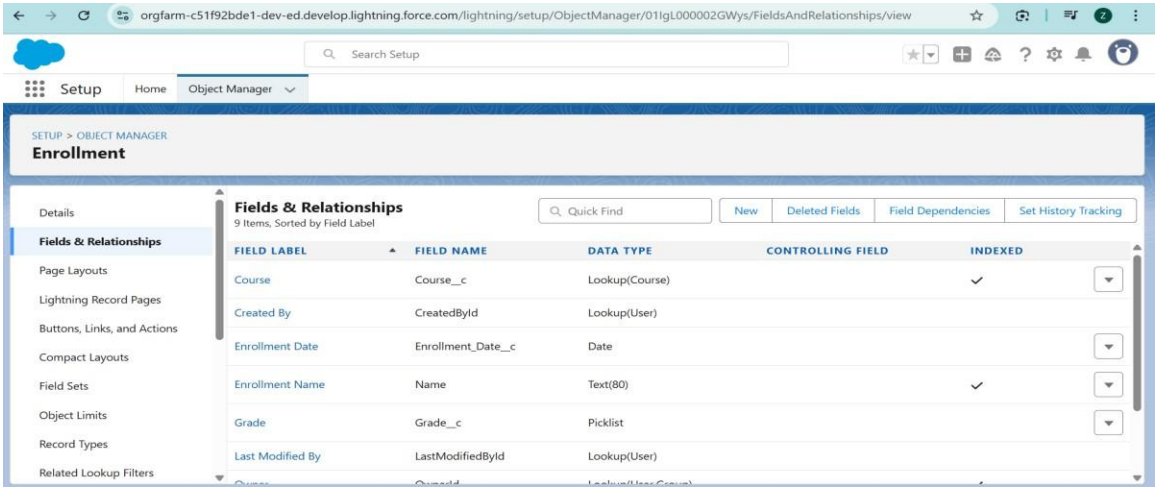


Fig 6:Junction Object

- Course → Faculty (Lookup)
- Fee Payment → Student (Lookup)

This creates the following structure:

- One Student → many Courses (via Enrollment)
- One Course → many Students (via Enrollment)
- One Student → multiple Fee Payments
- One Faculty → many Courses

Step 4: Verify Schema with Schema Builder

1. Go to Setup → Schema Builder
2. Drag & drop objects: Student, Faculty, Course, Enrollment, Fee Payment
3. Confirm relationships visually.

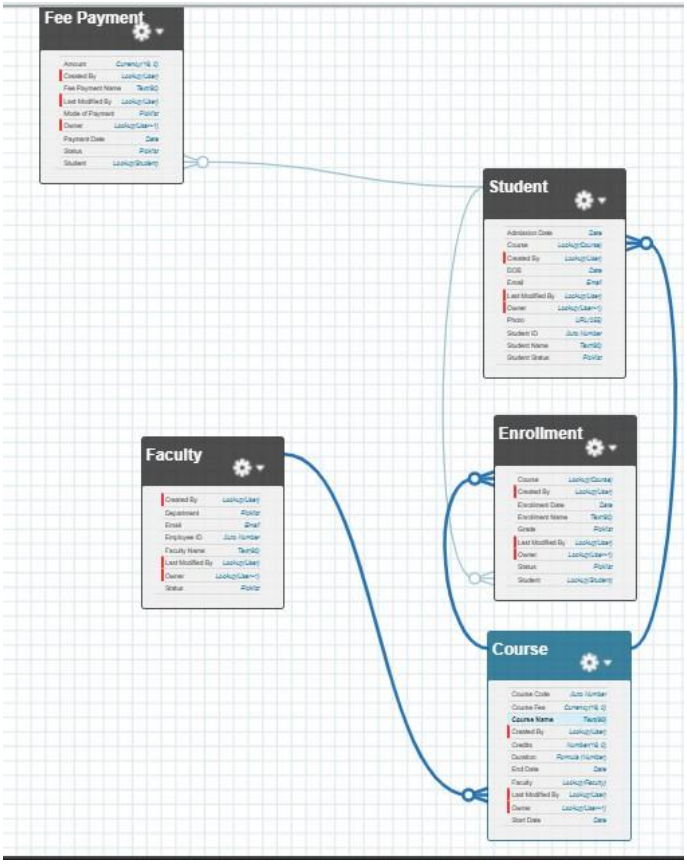


Fig 7 Schema map

Step 5: Test with Sample Records

- Create 1–2 Students.
- Create a Faculty record.
- Create a Course and assign to Faculty.
- Enroll Student in Course (via Enrollment object).

- Add a Fee Payment record for Student.
- Verify relationships in Related Lists of each record.

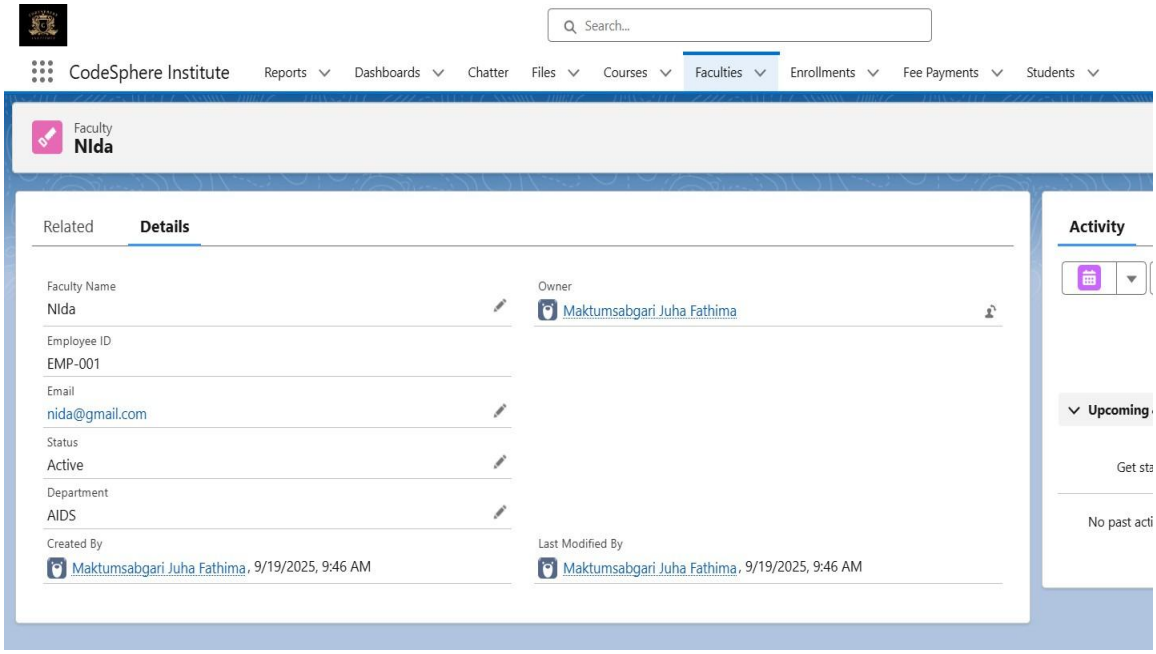


Fig 8: Verification

Phase 4

Business Logic & Automation

Step 1: Creating Tabs for Objects

In this step, I created **custom objects** in Salesforce to represent the key entities of the Codesphere Institute Of Technology. For each object, I also created a **tab** so that users can access and manage records easily from the Salesforce app navigation bar.

- Navigated to **Setup → Object Manager**.
- Created a **new custom object** for each entity (Student, Faculty, Course, Fee Payment, Enrollment).
- For every object, created a **tab** via:

- Setup → Tabs → New Tab
- Selected the object and an icon, then saved.

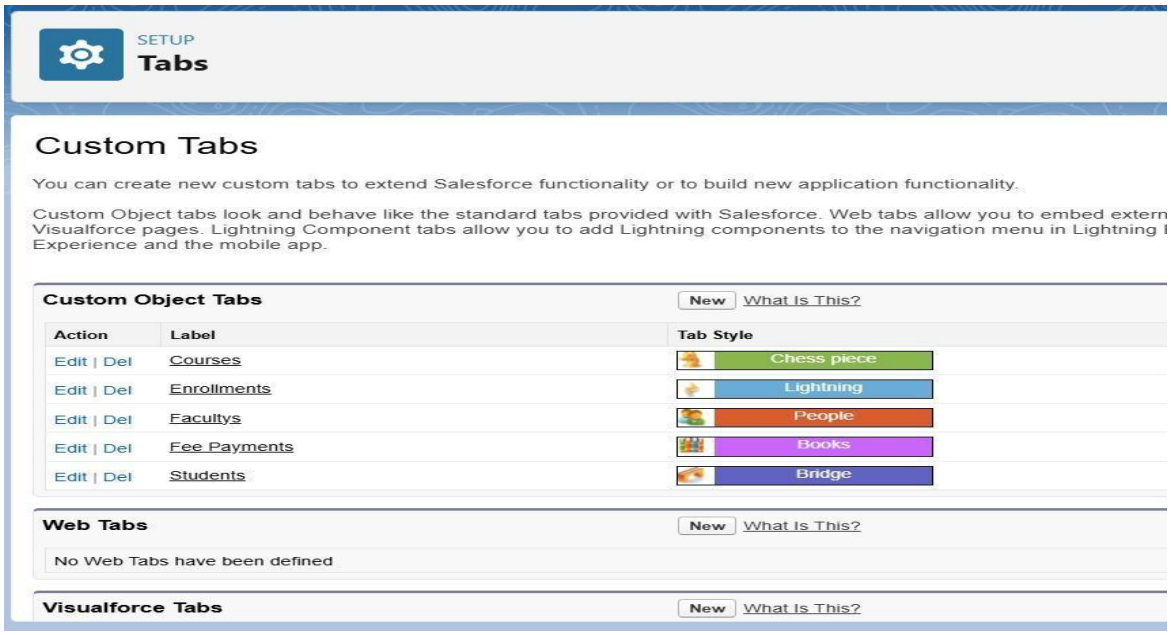


Fig: Creation of Tabs

Step 2: App Creation :

Step 1: Create a New App

- Go to **Setup → App Manager**.
- Click on **New Lightning App**.
- Enter **App Name** (Codesphere Institute).
- Upload an **App Logo** to personalize the app.
- Click **Next** to continue.

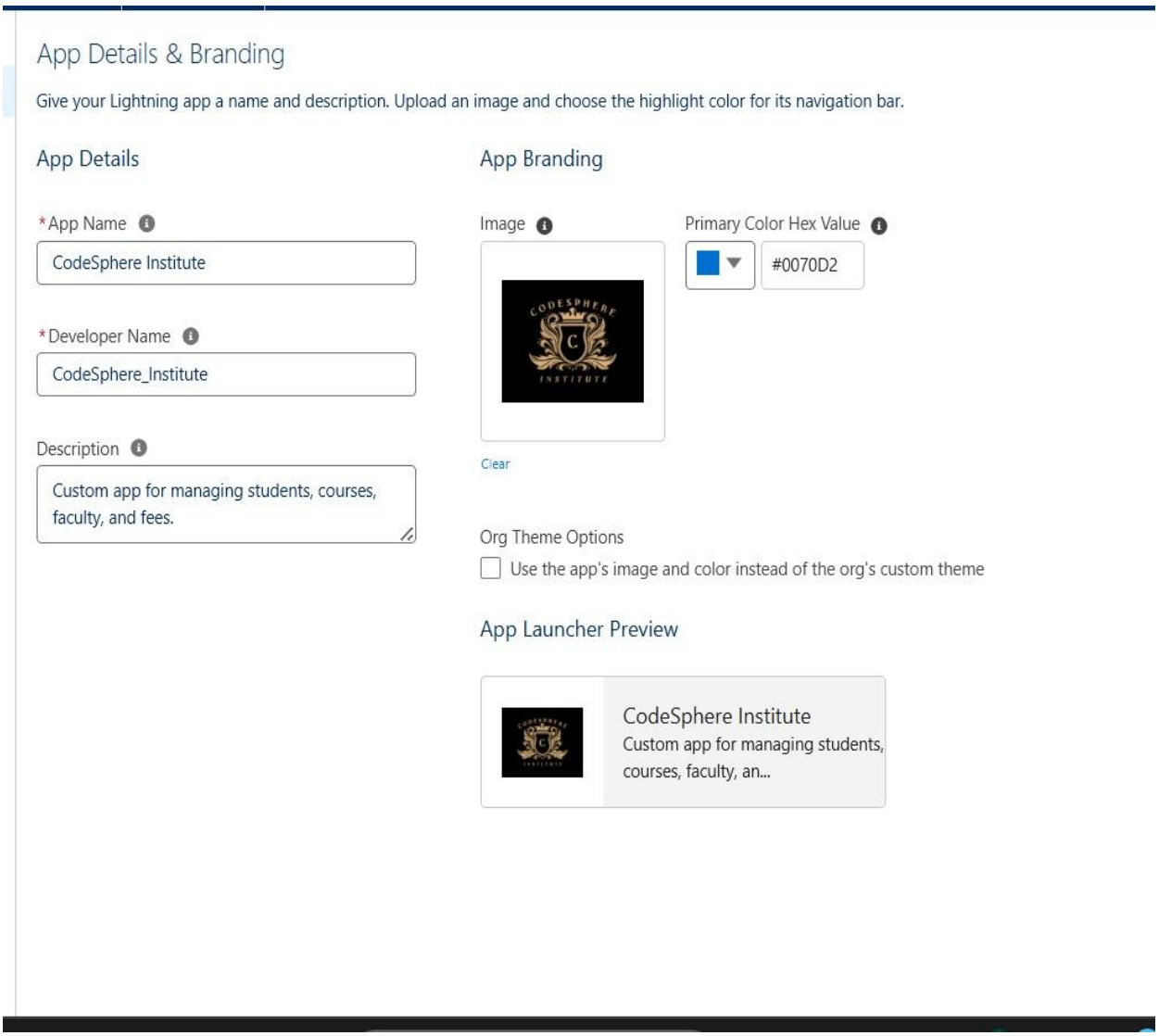


Fig 2:App creation

Step 2: Configure Navigation

- Select **Navigation Style → Standard Navigation**.
- Choose whether the app should be available on **Desktop** or **Desktop & Mobile**.
- Click **Next**.

Step 3: Assign User Profiles

- Select the **profiles** that should access this app.
    - Example: System Administrator, Standard User.
- Click **Save and Finish**.

Step 4: Verify the App

- Open the **App Launcher** (grid icon in top-left).
- Search for your app (Codesphere Institute Of Technology*)*.
- Open it and confirm that all required **tabs** (Students, Faculty, Courses, Fee Payment, Enrollments) are visible.
- Test by creating a sample record in each tab to ensure everything works properly.

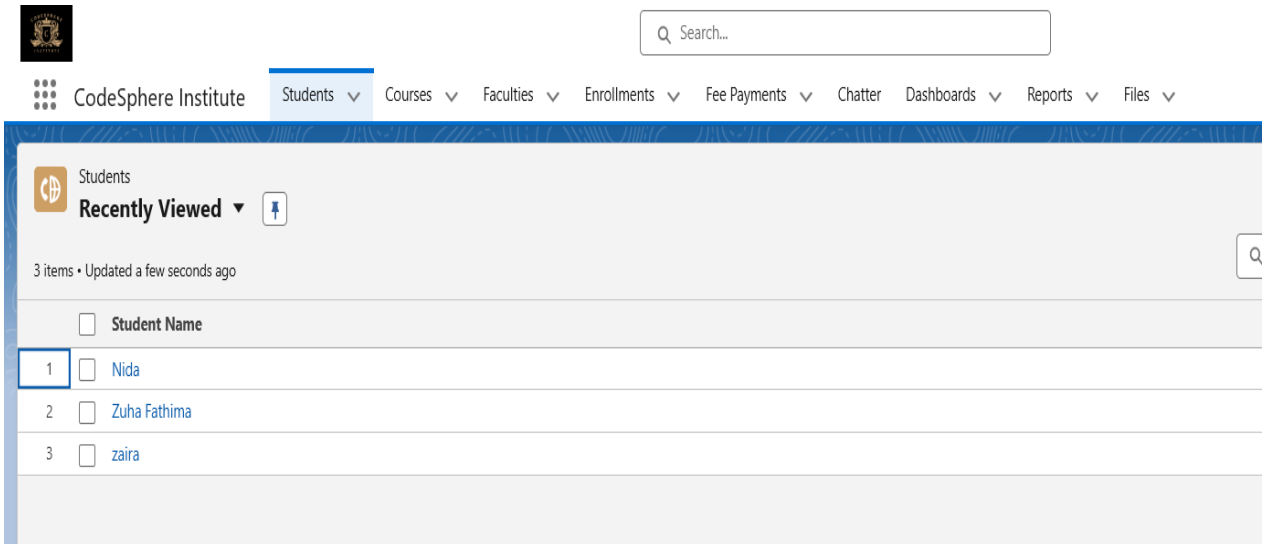


Fig 3:Codesphere app Image

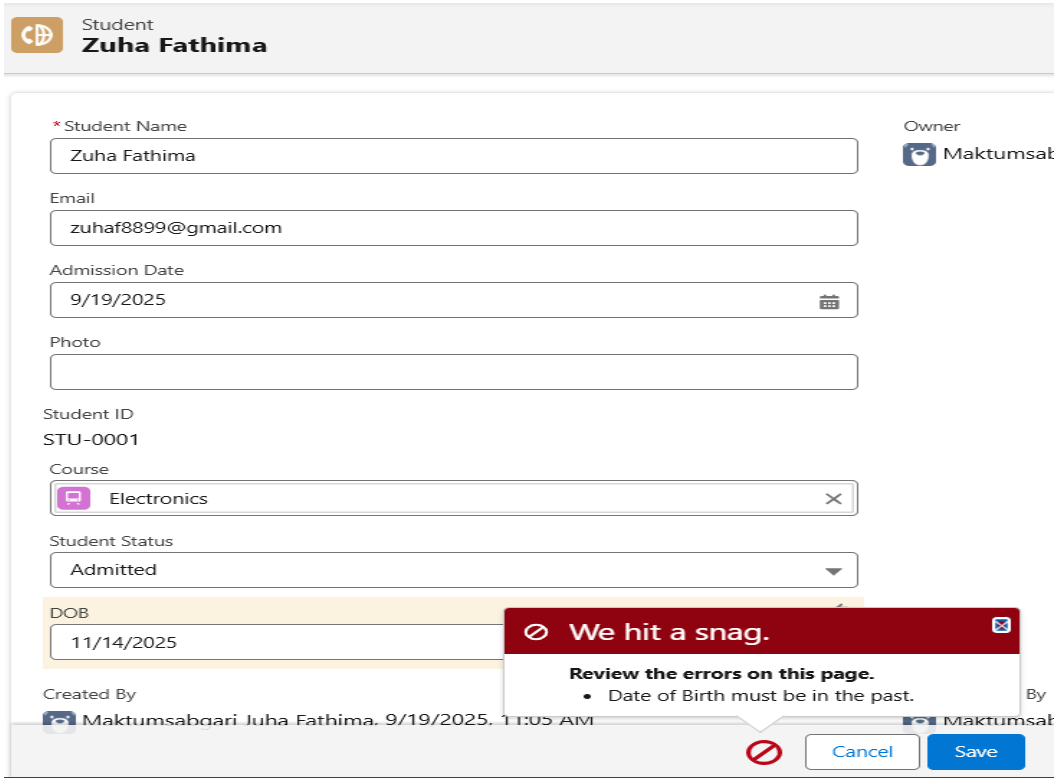
- birth.

Step 3: Create Validation Rules

Validation Rules are designed to maintain data integrity by ensuring that only valid data is entered in Salesforce objects.

Student Object

- **Rule Name:** DOB_Check
- **Formula:** Date_of_Birth__c >= TODAY()
- **Error Message:** “Date of Birth must be in the past.”



Purpose: Prevents users from entering a future date as a student’s date of

Fig 4:Checking Validation rule for DOB

Course Object

- **Rule Name:** StartDate_Check

- **Formula:**
- Start_Date__c < TODAY()
- **Error Message:** “Course Start Date cannot be in the past.”
- **Purpose:** Ensures course start dates are valid and in the future.

Fee Payment Object

- **Rule Name:** Amount_Check
- **Formula:**
- Paid_Amount__c <= 100
- **Error Message:** “Payment amount must be greater than hundread.”
- **Purpose:** Prevents entry of invalid payment amount

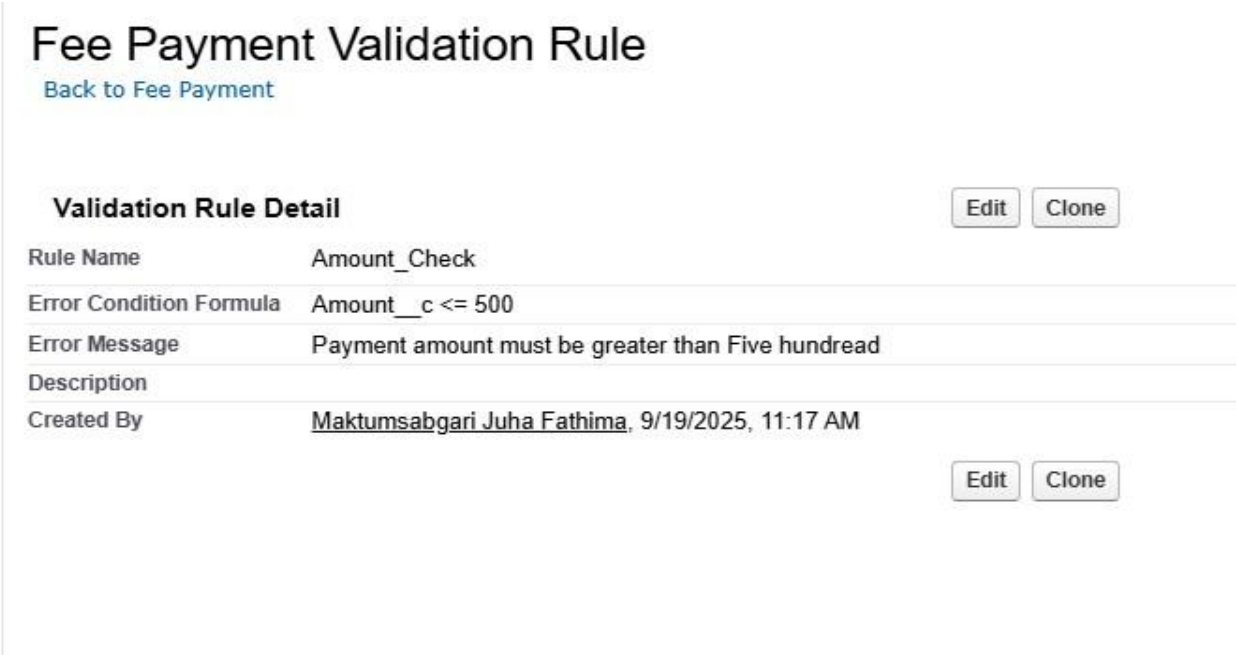


Fig 5: Validation rule Formula

Step 4: Flow 1 – Admission Process (Auto-create Enrollment + Fee Payment)

Purpose:

Automatically create Enrollment and Fee Payment records when a Student is admitted.

Configuration Steps:

- **Navigate to Flows:**
  - Setup → Flows → New Flow
- **Select Flow Type:**
  - Record-Triggered Flow
- **Object:**
  - Student__c
- **Trigger:**
  - When a record is **created**
- **Entry Condition:**
  - Status__c = "Admitted"
- **Add Elements:**

  a. Create Enrollment Record

  - Object: Enrollment__c
  - Set Fields:
    1. Student__c = {!$Record.Id}
    2. Course__c = {!$Record.Course__c}

  b. Create Fee Payment Record

  - Object: Fee_Payment__c
  - Set Fields:
    1. Student__c = {!$Record.Id}
    2. Status__c = "Pending"
- **Click On Save** **Label =** Admission Process
- **And Activate** the flow

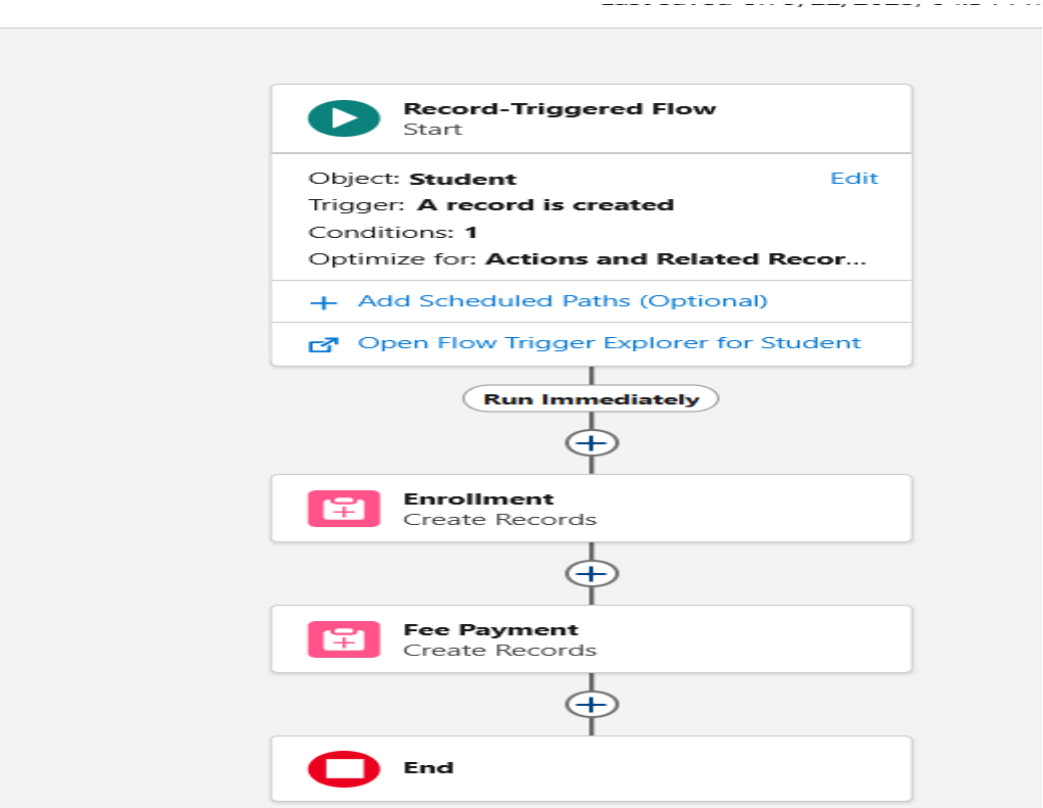


Fig 6: Flow of Admission Process

Outcome:

When a Student record is created with Enrollment_Status_c = "Admitted", corresponding Enrollment and Fee Payment records are automatically generated, reducing manual data entry and ensuring process consistency.

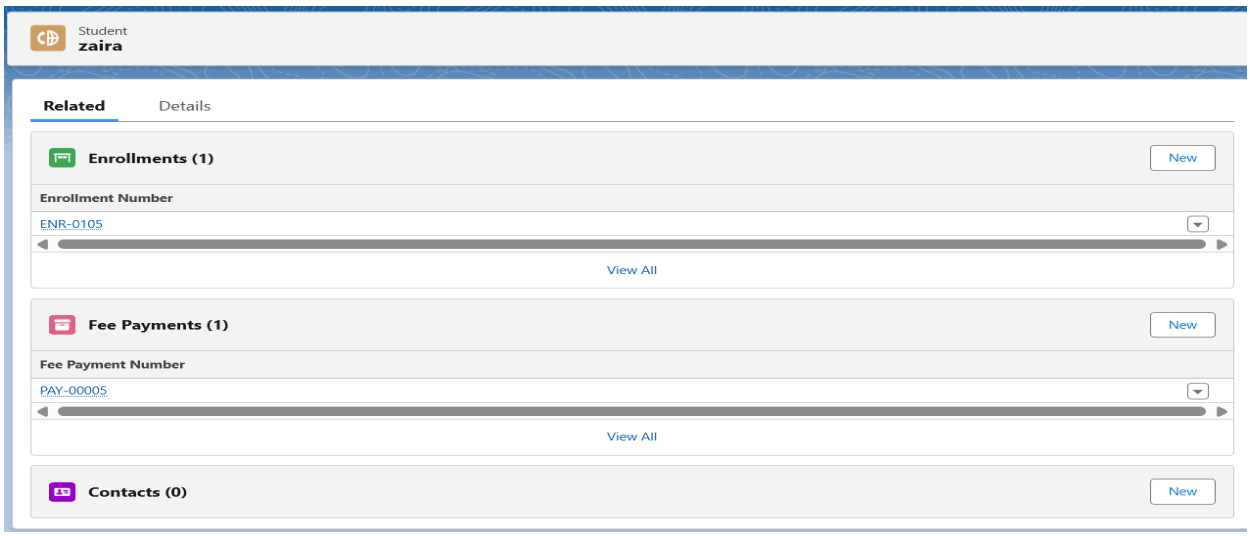


Fig 7:Output

Step 5: Scheduled Flow – Daily Fee Reminders

Purpose:

Send daily reminders to students for pending fee payments.

Configuration Steps:

- **Navigate to Flows:**
  - Setup → Flows → New Flow
- **Select Flow Type:**
  - Scheduled-Triggered Flow
- **Set Schedule:**
  - Frequency: Daily
  - Start Time: 4.30 PM
- **Object / Records to Process:**
  - Fee_Payment__c
  - Condition: Status__c = "Pending"
- **Add Elements:**
  - Action → **Send Email Alert**
  - Recipient: Student__c.Email
- **Save & Activate**
- **Click On Save Label =** Fee remainder flow
- **And Activate** the flow

Outcome:

All students with pending fees receive automated daily reminders, ensuring timely payments.

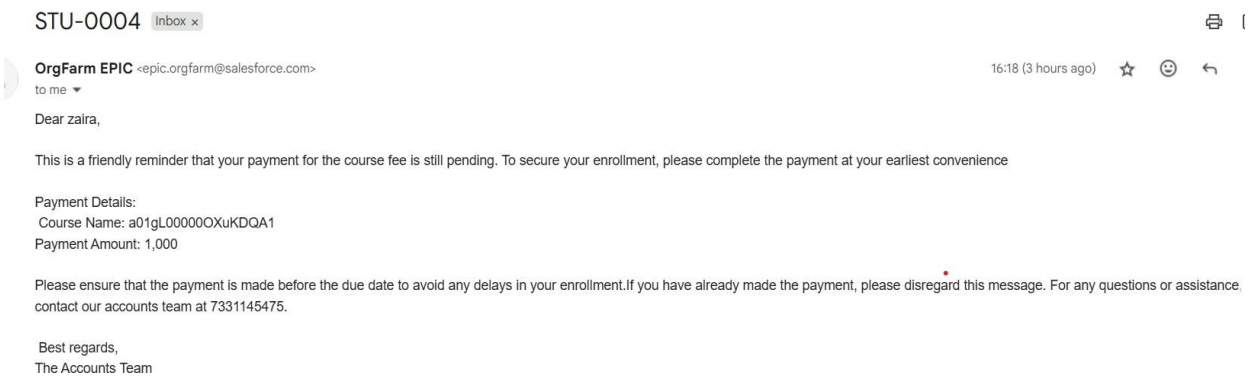


Fig 8:Email Alert

Step 6: Record-Triggered Flows

Enrollment Status Update When Grade Is Entered

Purpose: Automatically update Enrollment status to “Completed” once a grade is entered.

- **Configuration Steps:**
- Setup → Flow → New Flow → Record-Triggered Flow
- Object: Enrollment__c
- Trigger: When a record is **created or updated**
- Condition Requirements:
  - Grade__c **Is Changed**
  - Grade__c **Is Not Null**
- Optimize the Flow for: **Actions and Related Records**
- Add Element → **Update Records**
  - Update the same Enrollment record
  - Set Enrollment_Status__c = "Completed"
- **Click On Save □Label =** Status completed
- **And Activate** the flow

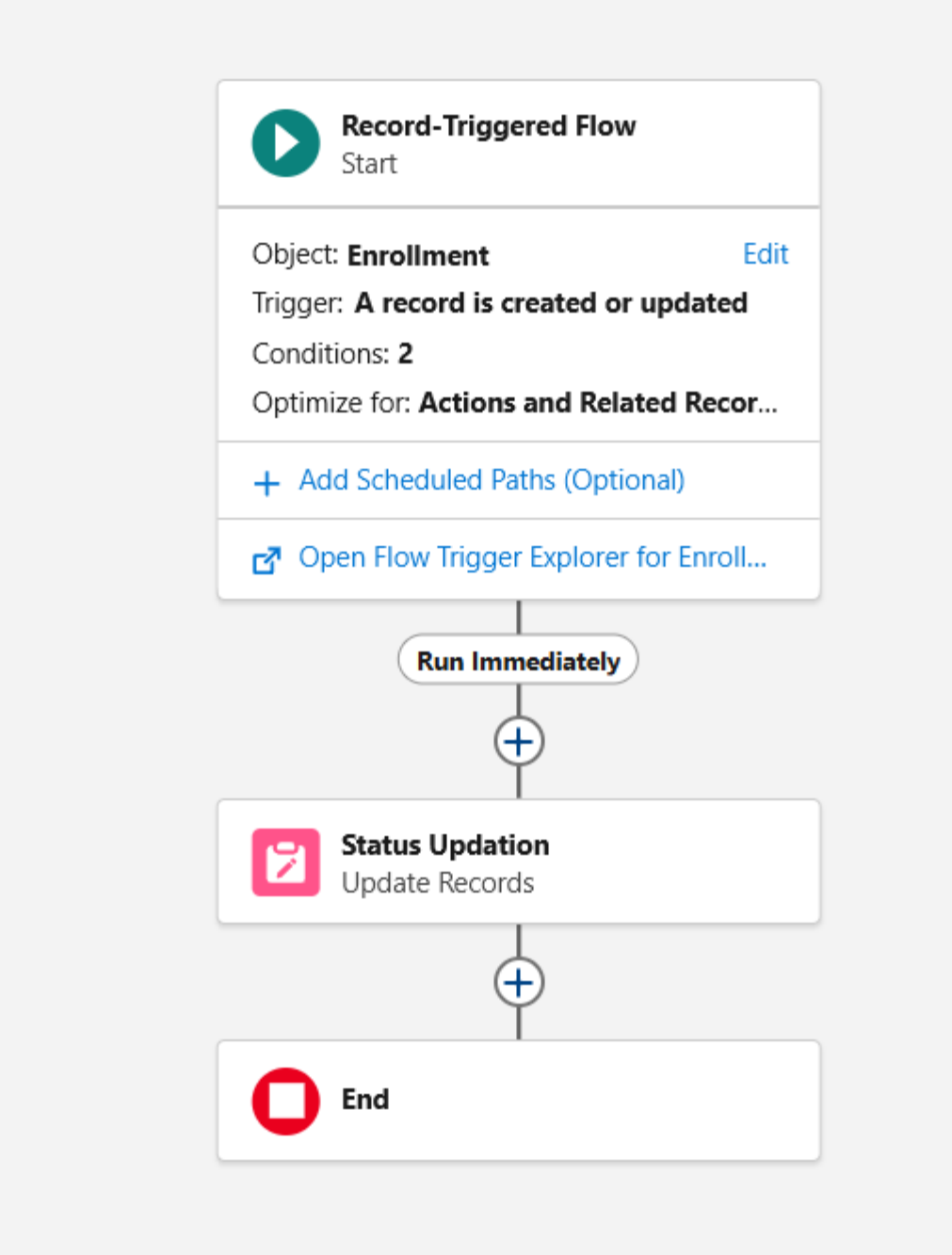


Fig 9:Flow construction

Outcome: Enrollment records are automatically updated to “Completed” when a grade is recorded.

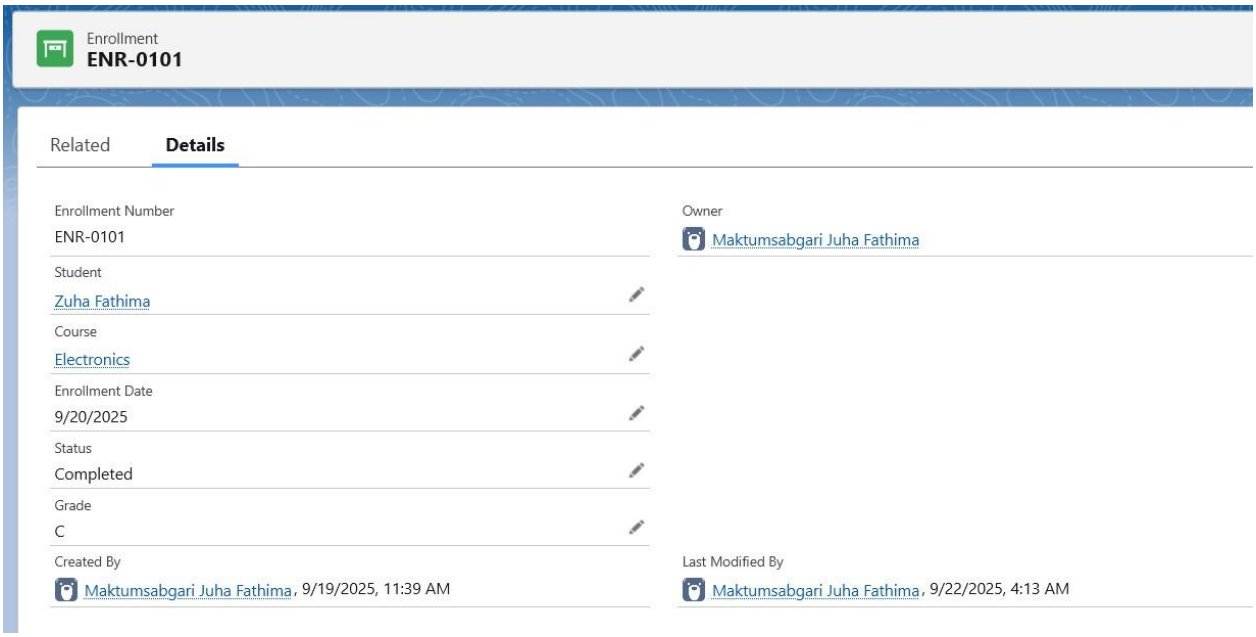


Fig 10:Status automatically changed

Fee Payment Status Update When Amount Received

Purpose: Automatically update Fee Payment status to “Paid” when a payment is received.

Configuration Steps:

- Setup → Flow → New Flow → Record-Triggered Flow
- Object: Fee_Payment__c
- Trigger: When a record is **created or updated**
- Condition Requirements:
  - Amount _ c = 0
- Add Element → **Update Records**
  - Update the same Fee Payment record
  - Set Status__c = "Paid"
- Add **Email Alert** → Notify Student of payment received
- **Click On Save Label =** Fee status Updated
- **And Activate** the flow

Outcome: Fee Payment records are automatically updated, and students are notified, ensuring accurate financial tracking.

Fig 11:Email for clearing of fees

Step 6: Email Alert:

Purpose:

Automatically notify students via email when their enrollment status becomes **Active**, ensuring timely communication about their successful enrollment in the institute.

Configuration Steps:

- Setup → Flow → New Flow → Record-Triggered Flow
- Object: Enrollment__c
- Trigger: When a record is **created or updated**
- Condition Requirements:
  - Status__c = "Active"
- Add **Email Alert** → Notify Student who are enrolled in institute
- **Click On Save Label = Enroll students**
- **And Activate** the flow

Outcome:

When an enrollment record is created or updated with Status__c = "Active", the

student automatically receives an enrollment confirmation email, improving communication and reducing manual follow-ups.

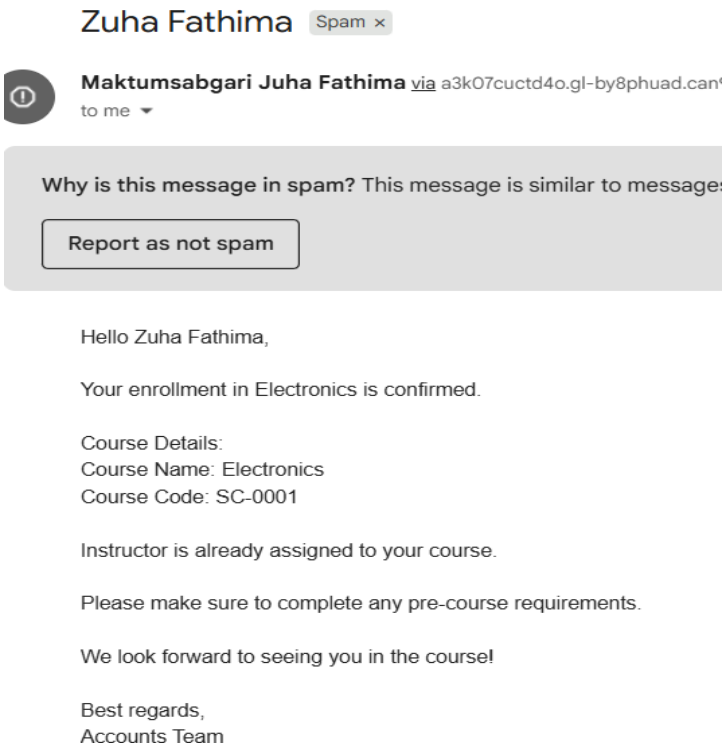


Fig 12:Enrollment Email

Phase 5
Apex Programming (Developer)

1. Objective

Implement Apex logic to:

- Prevent deletion of paid fee payments.
- Calculate outstanding fees for a student.
- Ensure code is tested and achieves ≥75% coverage.

Deliverables:

- Apex Trigger

- Apex Classes

- Apex Test Class

- Screenshot of test results and coverage

2. Apex Trigger

Step1: Open Developer Console in a new tab

Step2:Click on new→Apex Trigger

Name: FeePaymentTrigger
Object: Fee_Payment__c

Step3:Click on “OK”
Purpose: Prevent deletion of Fee Payment if status = 'Paid'.

Trigger Code

```
trigger FeePaymentPreventDelete on Fee_Payment__c (before delete) {
    for (Fee_Payment__c fp : Trigger.old) {
        // Check if Status = 'Paid'
        if (fp.Status__c != null &&
String.valueOf(fp.Status__c).trim().equalsIgnoreCase('Paid')) {
            fp.addError('Paid Fee Payments cannot be deleted.');
        }
    }
}
```

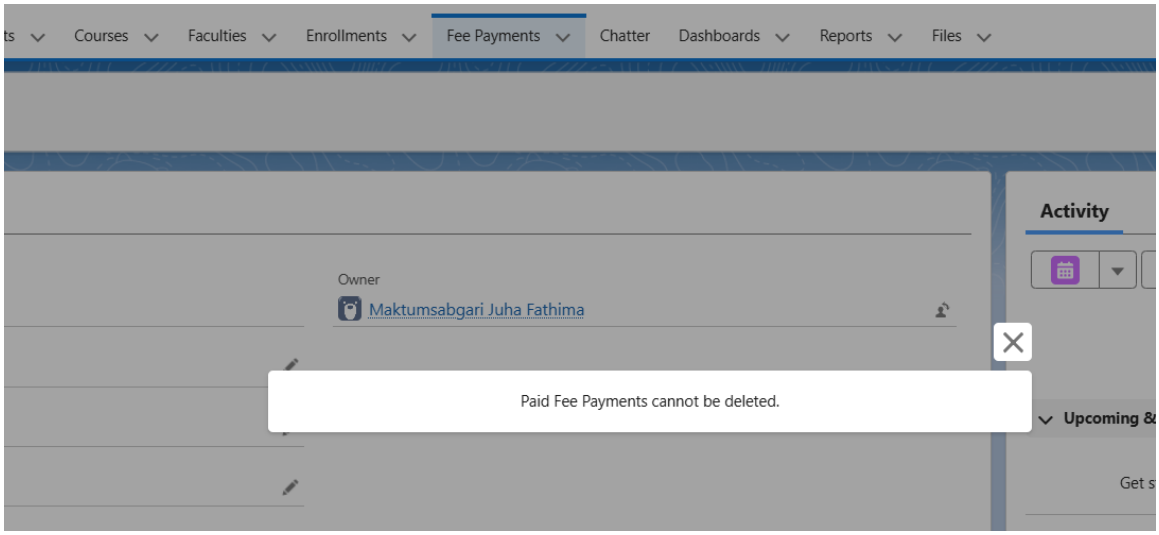


Fig1:Fee payment record detection

FeeCalculator

Step1: Open Developer Console in a new tab

Step2:Click on new→Apex Class

Name: FeeCalculator

Step3:Click on “OK”

Purpose: Calculate outstanding fees for a student.

FeeCalculator Code of Apex class:

```
public class FeeCalculator {

    // Update balance and status for a Fee Payment
    public static void updateFeePayment(Fee_Payment__c fp) {
        if(fp.Course__c == null) {
            throw new AuraHandledException('Course not linked for this Fee Payment.');
        }

        // Fetch course fee
        Course__c course = [SELECT Course_Fee__c FROM Course__c WHERE Id =
:fp.Course__c LIMIT 1];

        // Calculate balance
        Decimal balance = course.Course_Fee__c - fp.Paid_Amount__c;

        // Update Amount field (balance)
        fp.Amount__c = balance;

        // Update Status
        if(balance == 0) {
            fp.Status__c = 'Paid';
        } else {
            fp.Status__c = 'Pending)';
        }

        update fp; // Save changes
    }

    // Method to get outstanding fees for a student
    public static Decimal getOutstandingFees(Id studentId) {
        Decimal totalOutstanding = 0;

        // Fetch all fee payments of the student
        List<Fee_Payment__c> payments = [
            SELECT Amount__c
            FROM Fee_Payment__c
            WHERE Student__c = :studentId
        ];

        for(Fee_Payment__c fp : payments){
```

```
            totalOutstanding += fp.Amount__c; // Amount__c is balance
        }

        return totalOutstanding;
    }
}
```

FeeCalculator Code of Apex Trigger:

Step1: Open Developer Console in a new tab

Step2:Click on new→Apex Trigger

Name: FeePaymentTrigger
Object: Fee_Payment__c

Step3:Click on “OK”

```
trigger FeePaymentTrigger on Fee_Payment__c (before insert, before update) {

    for (Fee_Payment__c fp : Trigger.new) {
        if (fp.Course__c != null) {

            // Fetch course fee
            Course__c course = [
                SELECT Course_Fee__c
                FROM Course__c
                WHERE Id = :fp.Course__c
```

```
            LIMIT 1
        ];

        // If Paid_Amount__c is provided
        if (fp.Paid_Amount__c != null) {
            // Calculate remaining balance
            Decimal balance = course.Course_Fee__c - fp.Paid_Amount__c;
            fp.Amount__c = balance;

            // Update status
            if (balance == 0) {
                fp.Status__c = 'Paid';
            } else {
                fp.Status__c = 'Pending)';
            }

            // Auto-fill today's date
            fp.Payment_Date__c = Date.today();

        } else {
            // If no Paid Amount entered
            fp.Amount__c = course.Course_Fee__c;
            fp.Status__c = 'None';
            fp.Payment_Date__c = null;
        }
    }
  }
}
```

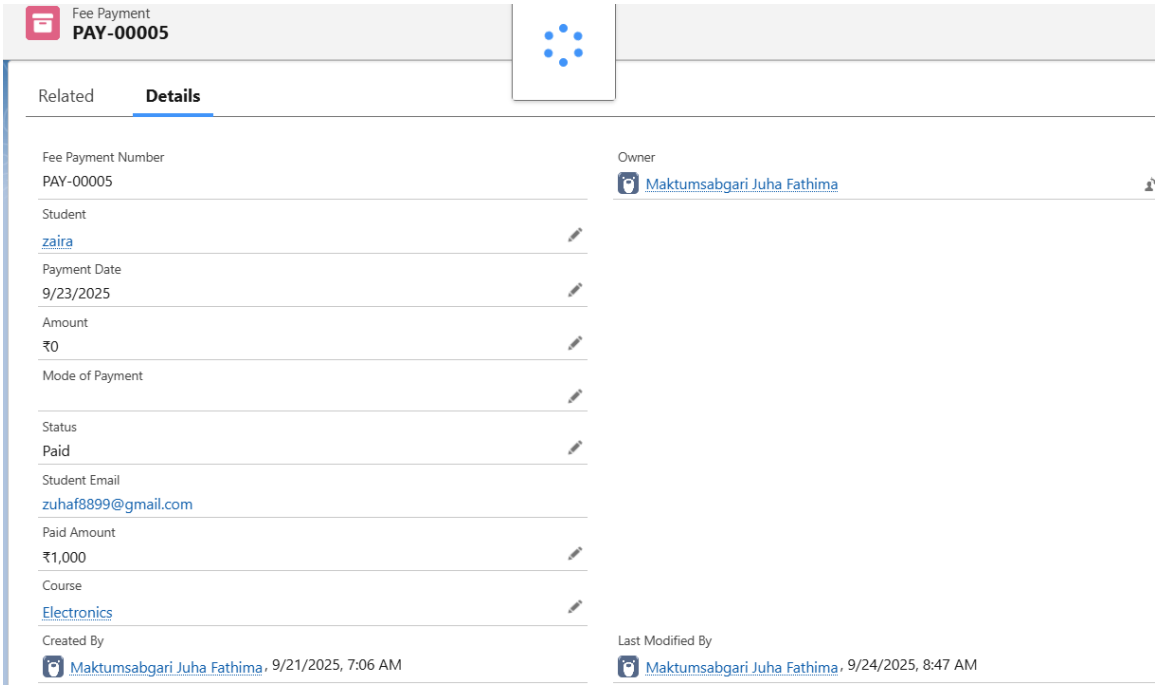


Fig2:Calcuate amount by code

4. Test Class

Step1: Open Developer Console in a new tab

Step2:Click on new→Apex Class

Name: FeeCalculatorTest

Step3:Click on "OK"

Purpose:Validate trigger and class logic; achieve ≥75% code coverage.

Test Class Code

```
@isTest
public class FeeModuleTest {

  @testSetup
  static void createData() {

    // Create Course
    Course__c course = new Course__c(
      Name = 'Test Course',
```

```
        Course_Fee__c = 1000
    );
    insert course;

    // Create Student
    Student__c stu = new Student__c(
        Name = 'Test Student'
    );
    insert stu;

    // Create Paid Fee Payment
    Fee_Payment__c fee1 = new Fee_Payment__c(
        Student__c = stu.Id,
        Course__c = course.Id,
        Paid_Amount__c = 400,
        Status__c = 'Paid'
    );
    insert fee1;

    // Create Pending Fee Payment
    Fee_Payment__c fee2 = new Fee_Payment__c(
        Student__c = stu.Id,
        Course__c = course.Id,
        Paid_Amount__c = 200,
        Status__c = 'Pending)'
    );
    insert fee2;

    // Update Amount__c using FeeCalculator
    FeeCalculator.updateFeePayment(fee1);
    FeeCalculator.updateFeePayment(fee2);
}

// Test 1: Outstanding Fee Calculation
@isTest
static void testOutstandingFees() {
    Student__c stu = [SELECT Id FROM Student__c LIMIT 1];
    Decimal outstanding = FeeCalculator.getOutstandingFees(stu.Id);

    // Assuming each Fee Payment has its own balance stored in Amount__c
    // Fee1: 1000 - 400 = 600, Fee2: 1000 - 200 = 800 → total = 1400
    System.assertEquals(1400, outstanding, 'Outstanding Fee should be 1400');
}

// Test 2: Prevent Deletion of Paid Fee (Trigger)
@isTest
static void testTriggerPreventDeletePaid() {
    Fee_Payment__c paidFee = [SELECT Id FROM Fee_Payment__c WHERE Status__c = 'Paid'
```

```
LIMIT 1];

      try {
         delete paidFee;
         System.assert(false, 'Deletion should not be allowed for Paid fee');
      } catch (DmlException e) {
         System.assert(e.getMessage().contains('cannot be deleted'),
            'Expected error message not found');
      }
   }

   // Test 3: UpdateFeePayment Method
   @isTest
   static void testUpdateFeePayment() {
      Fee_Payment__c pendingFee = [SELECT Id, Amount__c FROM Fee_Payment__c WHERE
Status__c = 'Pending)' LIMIT 1];

      // Call update method again to ensure it updates Amount__c correctly
      FeeCalculator.updateFeePayment(pendingFee);

      Fee_Payment__c updatedFee = [SELECT Amount__c FROM Fee_Payment__c WHERE Id =
:pendingFee.Id];
      System.assertEquals(800, updatedFee.Amount__c, 'Pending Fee Amount__c should be
updated correctly');
   }
}
```

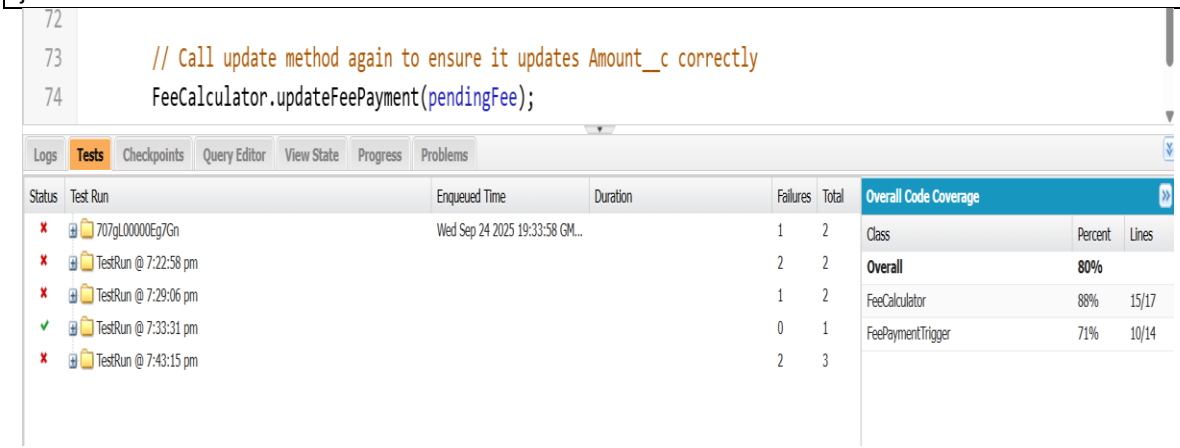


Fig 3:Test class

5. Summary

Component	Purpose
Apex Trigger	Prevent deletion of paid fee payments
FeeHandler	Centralized logic for trigger

| FeeCalculator | Calculate outstanding fees for a student |
| Test Class | Validate logic, test triggers, ensure ≥75% coverage |

Deliverables:
- Apex Trigger code (FeePaymentTrigger)
- Apex Classes (FeeHandler, FeeCalculator)
- Apex Test Class (FeeCalculatorTest)
- Screenshot of test results showing code coverage

Phase 6

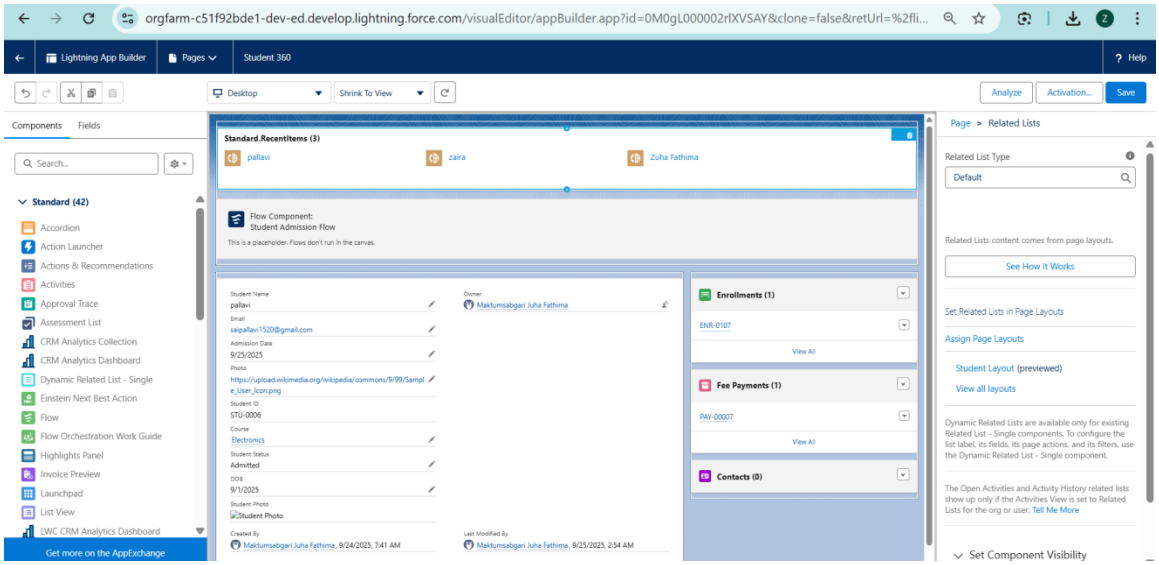
User Interface Development

Goal

Provide a user-friendly interface for managing students, enrollments, and fee payments in Salesforce.

Lightning Record Page for Student (Student 360 Page)

- Navigate to Setup → Object Manager → Student → Lightning Record Pages.
- Create a new App Page or Record Page.
- Add components:
  • Highlights Panel → Student's Name, Email, Status.
  • Related Lists: Enrollments, Fee Payments.
  • Tabs → Info | Related | Fee Calculator (if LWC is added).
- Deliverable → Screenshot of Student 360 Page showing student details + related lists.

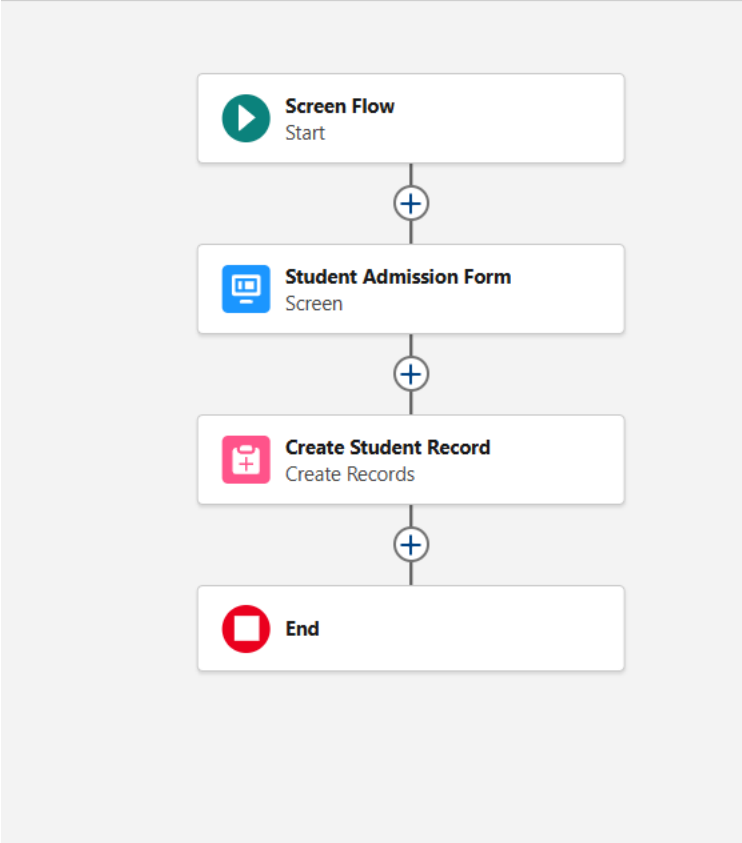


Screen Flow – Student Admission Form

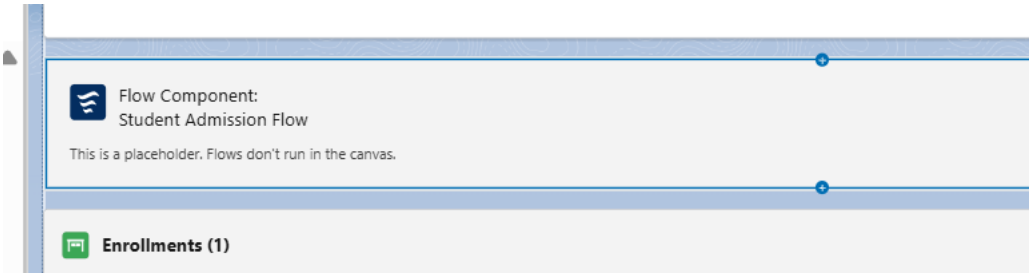
Purpose: Let admins create a new student easily via a guided form.

Steps:

1. Go to Setup → Flow → New Flow → Screen Flow.
2. Screen Element: Add fields for student details (Name, Email, Address, Course selection).
3. Create Records Element:
   - Object = Student
   - Map input fields to Student fields.
4. Connect elements → Save → Activate the Flow.



5. Add Flow to Student App Page using Flow Component.



Result: Admin can admit students using a simple UI form.

Lightning Web Component – Fee Calculator

Purpose: Allow quick calculation of fees (e.g., Course Fee – Paid Amount = Outstanding Fee).

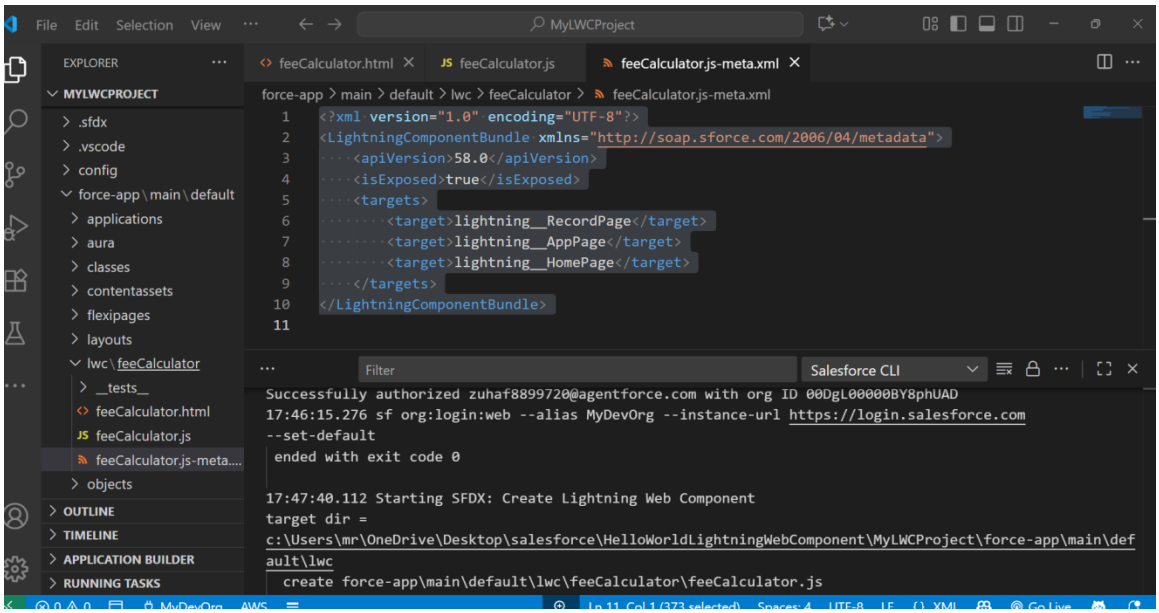
LWC Development Steps:

1. Create Project (in VS Code Command Palette):
   SFDX: Create Project with Manifest
2. Create LWC:
   SFDX: Create Lightning Web Component
   Name → feeCalculator

3. Edit Files:
- feeCalculator.html → Create form (inputs for Course Fee & Paid Fee).

Code:

```
<template>
  <lightning-card title="Fee Calculator">
    <div class="slds-m-around_medium">
      <lightning-input
        label="Course Fee"
        type="number"
        value={courseFee}
        onchange={handleCourseFeeChange}>
      </lightning-input>

      <lightning-input
        label="Paid Amount"
        type="number"
        value={paidAmount}
        onchange={handlePaidAmountChange}>
      </lightning-input>

      <lightning-button
        label="Calculate"
        onclick={calculateOutstanding}
        class="slds-m-top_small">
      </lightning-button>

      <template if:true={outstandingFee}>
        <p class="slds-m-top_medium">
          <b>Outstanding Fee:</b> {outstandingFee}
        </p>
      </template>
    </div>
  </lightning-card>
</template>
```



- feeCalculator.js → Logic to calculate outstanding fee.

Code:

```
import { LightningElement } from 'lwc';

export default class FeeCalculator extends LightningElement {
    courseFee = 0;
    paidAmount = 0;
    outstandingFee;

    handleCourseFeeChange(event) {
        this.courseFee = parseFloat(event.target.value) || 0;
    }

    handlePaidAmountChange(event) {
        this.paidAmount = parseFloat(event.target.value) || 0;
    }

    calculateOutstanding() {
        this.outstandingFee = this.courseFee - this.paidAmount;
    }
}
```

- feeCalculator.js-meta.xml → Expose component to Record Page.

Code:

```
<?xml version="1.0" encoding="UTF-8"?>
<LightningComponentBundle xmlns="http://soap.sforce.com/2006/04/metadata">
   <apiVersion>58.0</apiVersion>
   <isExposed>true</isExposed>
   <targets>
      <target>lightning__RecordPage</target>
      <target>lightning__AppPage</target>
      <target>lightning__HomePage</target>
   </targets>
</LightningComponentBundle>
```

4. Deploy Component:

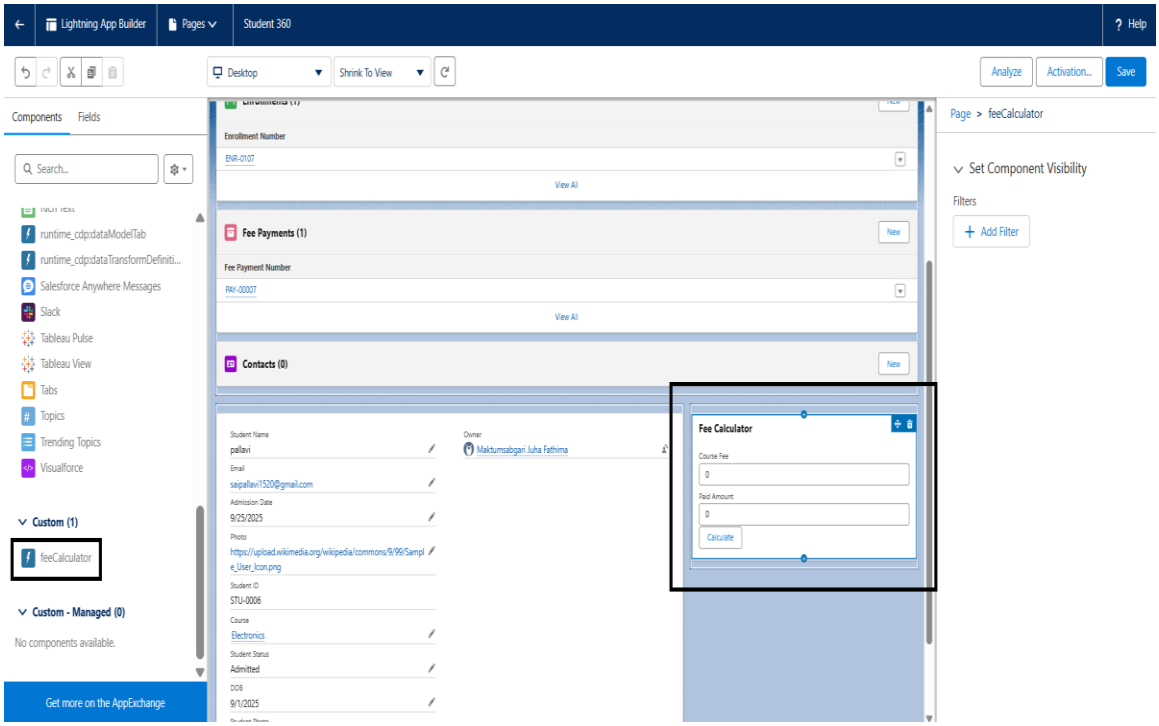
sf project deploy start --metadata LightningComponentBundle:feeCalculator -o

```
17:47:40.212 Finished SFDX: Create Lightning Web Component
17:50:27.412 Starting SFDX: Deploy This Source to Org

=== Deployed Source
STATE    FULL NAME      TYPE                      PROJECT
PATH
_______  _____________  ________________________
_____________________________________________________________________

Created  feeCalculator  LightningComponentBundle
force-app\main\default\lwc\feeCalculator\feeCalculator.html
Created  feeCalculator  LightningComponentBundle
force-app\main\default\lwc\feeCalculator\feeCalculator.js
Created  feeCalculator  LightningComponentBundle
force-app\main\default\lwc\feeCalculator\feeCalculator.js-meta.xml

17:50:30.877 Ended SFDX: Deploy This Source to Org
```

MyDevOrg

5. Add to Lightning Page:

- Go to Lightning App Builder → Drag feeCalculator onto Student Page.



Result: Admins can instantly calculate and display outstanding fees inside the Student 360 page.

Results

- **Student 360 Page:** Displays student info and related records in a tabbed layout.
- **Screen Flow:** Enables guided student admission.
- **Fee Calculator LWC:** Interactive tool for fee management.
- **Overall Outcome:** Clean, intuitive, and functional UI for managing student-related data in Salesforce.

Phase 7

Integration and external access

Goal: Connect the Institute Management System with external systems (payment gateways, university systems, library DBs, analytics) in a secure, maintainable way. Below are step-by-step instructions, configuration clicks, and small code examples you can copy into your org.

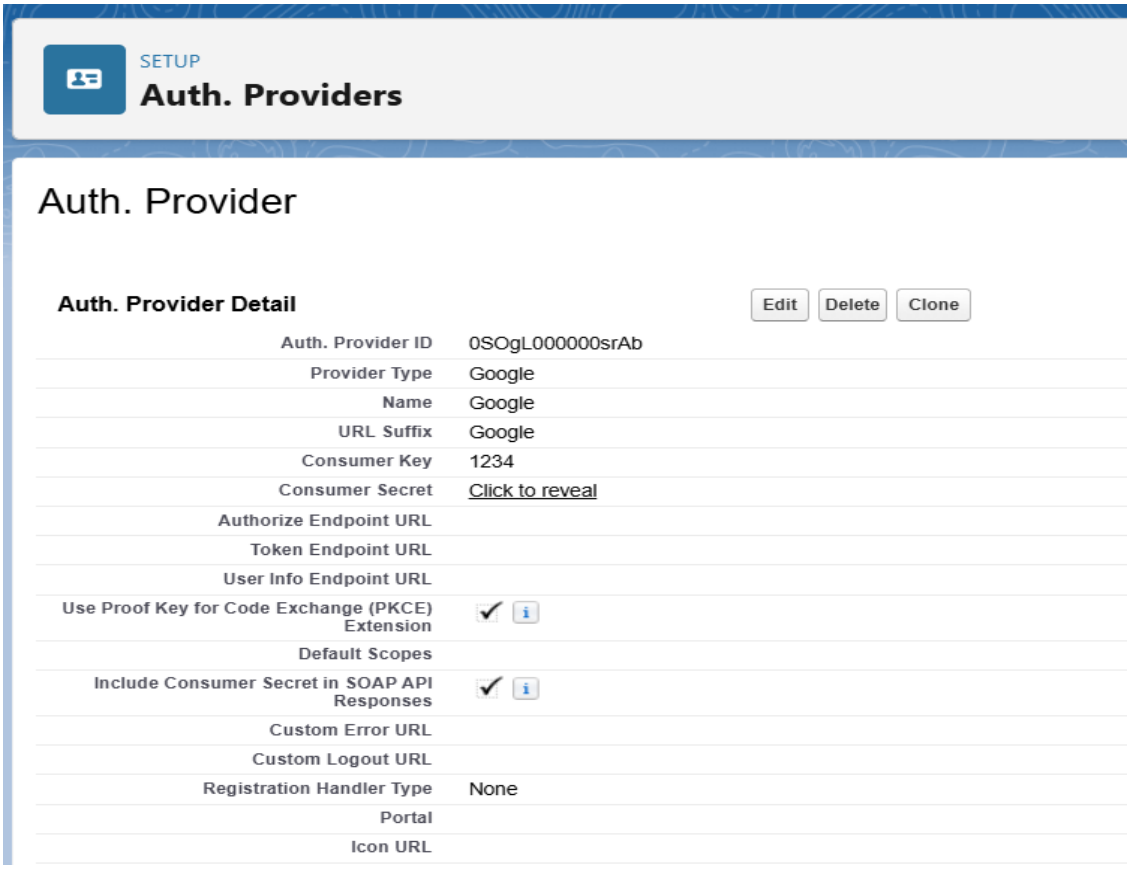
---

1) Named Credential — store external API credentials securely

Why: avoid hard-coding endpoints/credentials; simplifies callouts and OAuth.

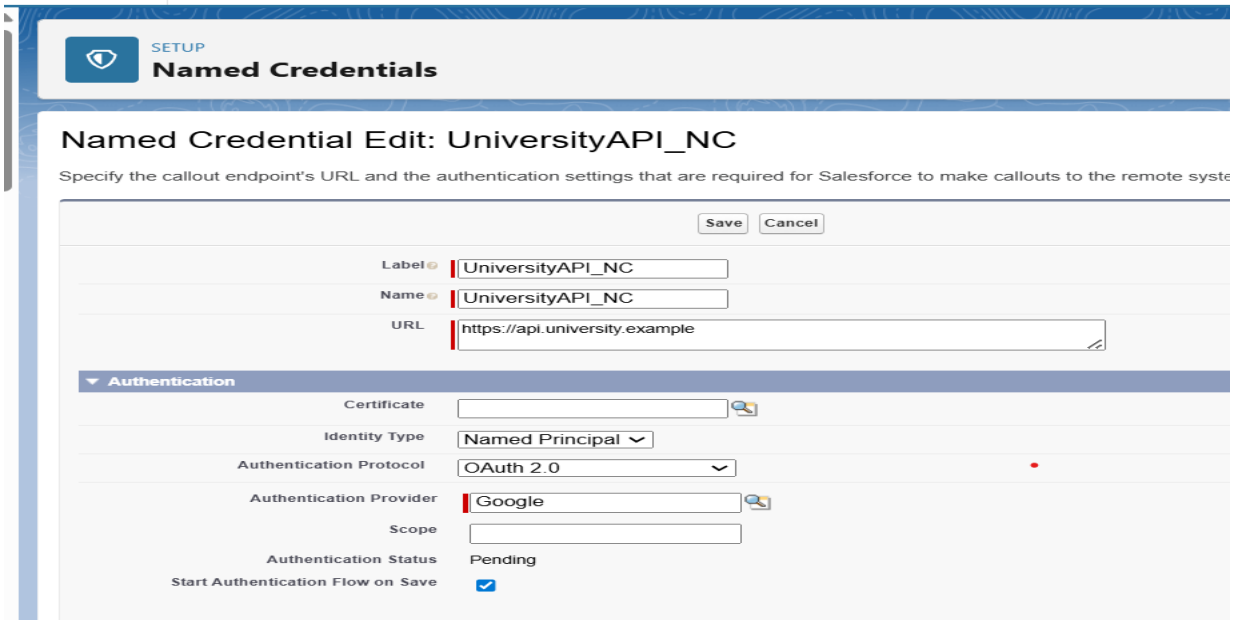
Steps

1. If using OAuth: create an Auth. Provider first
    - Setup → Auth. Providers → New → choose provider (Google, OpenID Connect, etc.) → fill client id/secret → Save.



2. Setup → Named Credentials → New Named Credential.
    - Label / Name: UniversityAPI_NC
    - URL: https://api.university.example (base)
    - Identity Type: *Named Principal* (or *Per User* if required)
    - Authentication Protocol: *OAuth 2.0* (pick Auth. Provider) or *Password Authentication*
    - Save.

Usage: Apex callouts use callout:UniversityAPI_NC/endpoint/path.



---

2) External Services — connect OpenAPI (no code flows)

Why: expose external REST endpoints as Actions in Flow/Process Builder without hand-coding.

Steps

1. Get an OpenAPI (Swagger) JSON/YAML for the external API.
2. Setup → External Services → New External Service.
    - Provide Named Credential (created above) and upload the OpenAPI spec.
3. Once registered, the External Service actions appear in Flow as Apex Actions — you can drag them into a Flow and call external operations.

---

3) Web Services (REST/SOAP) callouts from Apex

Why: verify insurance, call payment gateway, sync student data.

Steps

1. Create Named Credential (preferred) or Remote Site Setting.
2. Write Apex that uses HttpRequest + Http and points to callout:Named_Credential/....

Apex example (REST using Named Credential):

```
public with sharing class ExternalIntegration {
  @future(callout=true)
  public static void notifyEnrollment(Id enrollmentId) {
    Enrollment__c e = [SELECT Id, Student__r.Email__c, Course__r.Course_Name__c, Enrollment_Status__c
                       FROM Enrollment__c WHERE Id = :enrollmentId LIMIT 1];
    HttpRequest req = new HttpRequest();
    req.setEndpoint('callout:UniversityAPI_NC/v1/enrollments'); // Named Credential
    req.setMethod('POST');
    req.setHeader('Content-Type','application/json');
    req.setBody(JSON.serialize(new Map<String, Object>{
      'enrollmentId' => e.Id,
      'studentEmail' => e.Student__r.Email__c,
      'course' => e.Course__r.Course_Name__c,
      'status' => e.Enrollment_Status__c
    }));
    Http http = new Http();
    HttpResponse res = http.send(req);
    // handle res.getStatusCode() / body
  }
}
```

Testing: implement HttpCalloutMock and use Test.setMock(...) in test classes.

---

4) Callouts triggered when records change

Why: notify external systems immediately when relevant IMS records change.

Steps

1. Create a trigger on the Salesforce object (e.g., Enrollment__c AFTER insert/after update).
2. In trigger handler, decide when to notify (e.g., status changed).
3. Enqueue an async job that performs callout (@future(callout=true) or Queueable implementing Database.AllowsCallouts).

I've already implemented that in **Phase 3–4** with your **Fee Payment Trigger + Enrollment Trigger** calling the async Apex (@future) methods.

Why it's sufficient:

- The triggers detect **insert/update events**.
- They only call the external system when the **status changes** (Enrollment_Status__c or Status__c = 'Paid').
- The async Apex (@future(callout=true) or Queueable) handles the actual REST call.

☑ No extra steps are needed for this, because the logic is already **event-driven** and **bulk-safe**, fulfilling the requirement of callouts triggered by record changes.

5.Creation of Platform events

Step 1: Create the Platform Event

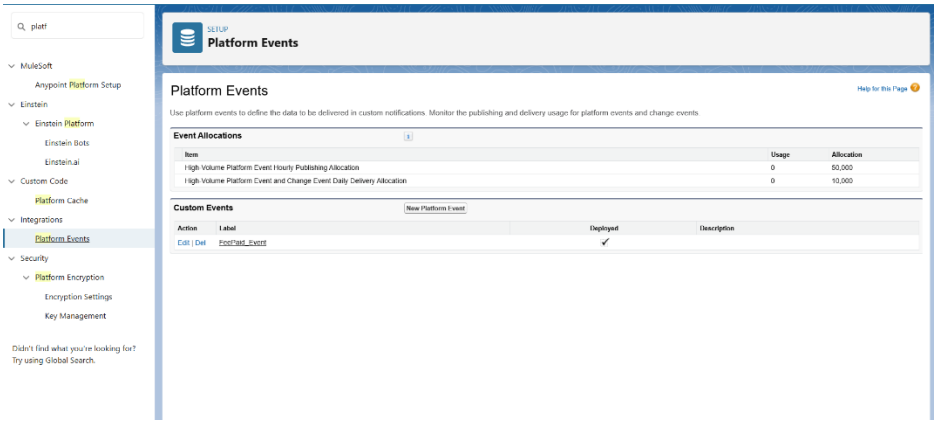
1. Go to **Setup → Platform Events → New Platform Event**.
2. Fill in the details:
    - **Label**: FeePaid_Event
    - **Plural Label**: FeePaid_Events
    - **API Name**: FeePaid_Event__e
    - **Publish Behavior**: Publish Immediately (so events are available as soon as saved)
3. Click **Save**.

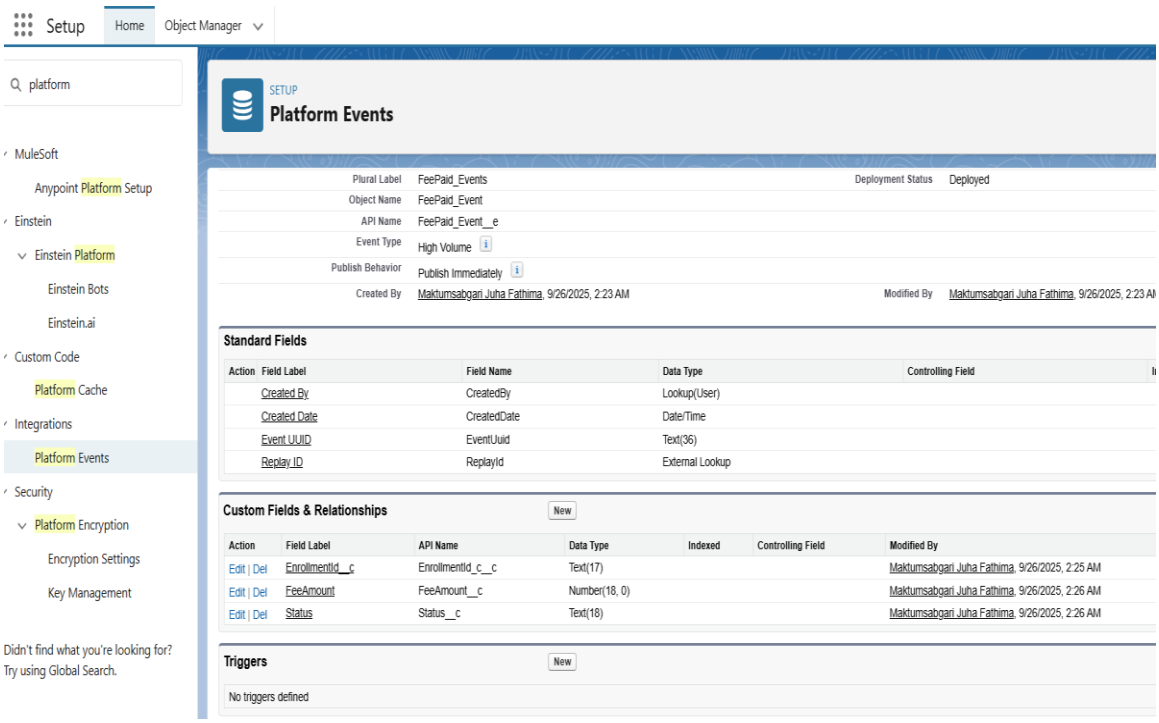
Step 2: Add Fields to the Platform Event

Create fields to capture the information you want to send:

1. **EnrollmentId__c → Text** (18)
2. **StudentEmail__c → Email**
3. **FeeAmount__c → Number**
4. **Status__c → Text**

Click **Save** after adding all fields.





6) Change Data Capture (CDC)

- **Reason:** Overhead unless you have **large-scale external data sync** (like nightly export of *every change* to a data warehouse).
- IMS is usually transactional → Platform Events are enough.

7) Salesforce Connect

- **Reason:** Only needed if **major data (like student master data or course catalog)** lives in an external DB (e.g., Oracle, SAP, university ERP).
- If IMS data is **all inside Salesforce**, ❌ no need.

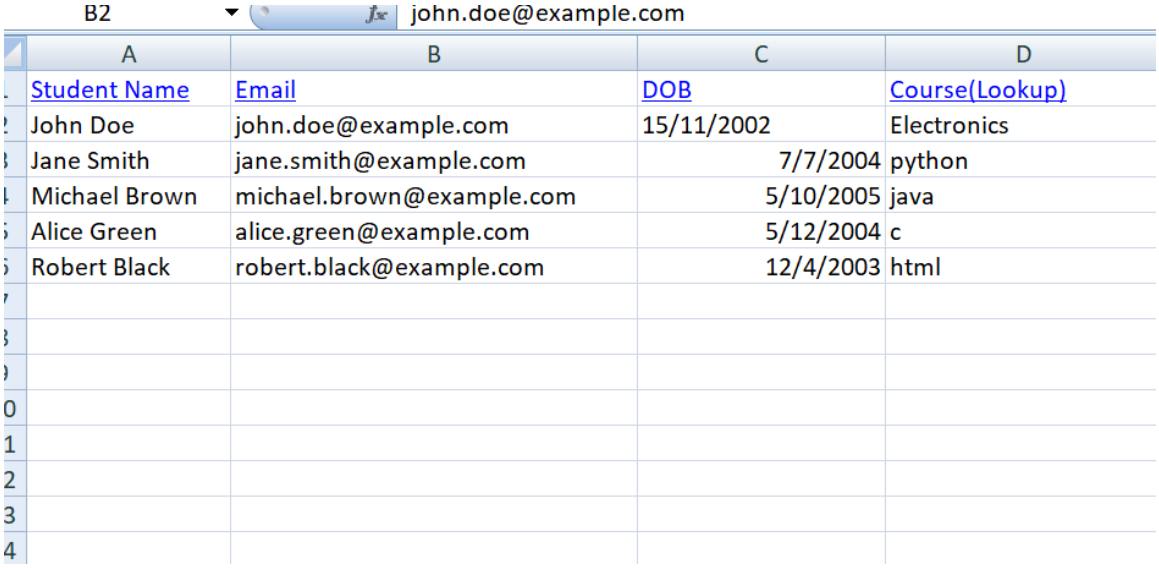
Phase 8
Data Management & Deployment

Goal

To efficiently manage, migrate, and secure student data and metadata across Salesforce environments using native tools, packages, and modern deployment methods.

1. Data Import Wizard

- Go to Setup → Data Import Wizard in Salesforce.
- Select the object (Student, Faculty, Course).
- Upload the CSV file containing sample data.
- Map CSV columns to Salesforce fields.
- Click Start Import.
- Verify import success via list views and reports.



	A	B	C	D
1	Student Name	Email	DOB	Course(Lookup)
2	John Doe	john.doe@example.com	15/11/2002	Electronics
3	Jane Smith	jane.smith@example.com	7/7/2004	python
4	Michael Brown	michael.brown@example.com	5/10/2005	java
5	Alice Green	alice.green@example.com	5/12/2004	c
6	Robert Black	robert.black@example.com	12/4/2003	html
7				
8				
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14				

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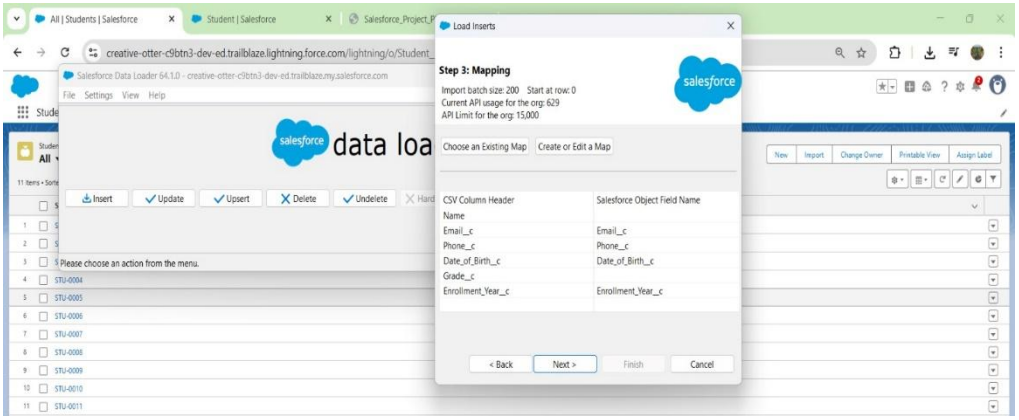
	A	B	C	D	E
1	Id	Success	Created	Error	
2	a01gL000(	TRUE	TRUE		
3	a01gL000(	TRUE	TRUE		
4	a01gL000(	TRUE	TRUE		
5	a01gL000(	TRUE	TRUE		
6	a01gL000(	TRUE	TRUE		
7					
8					
9					
10					

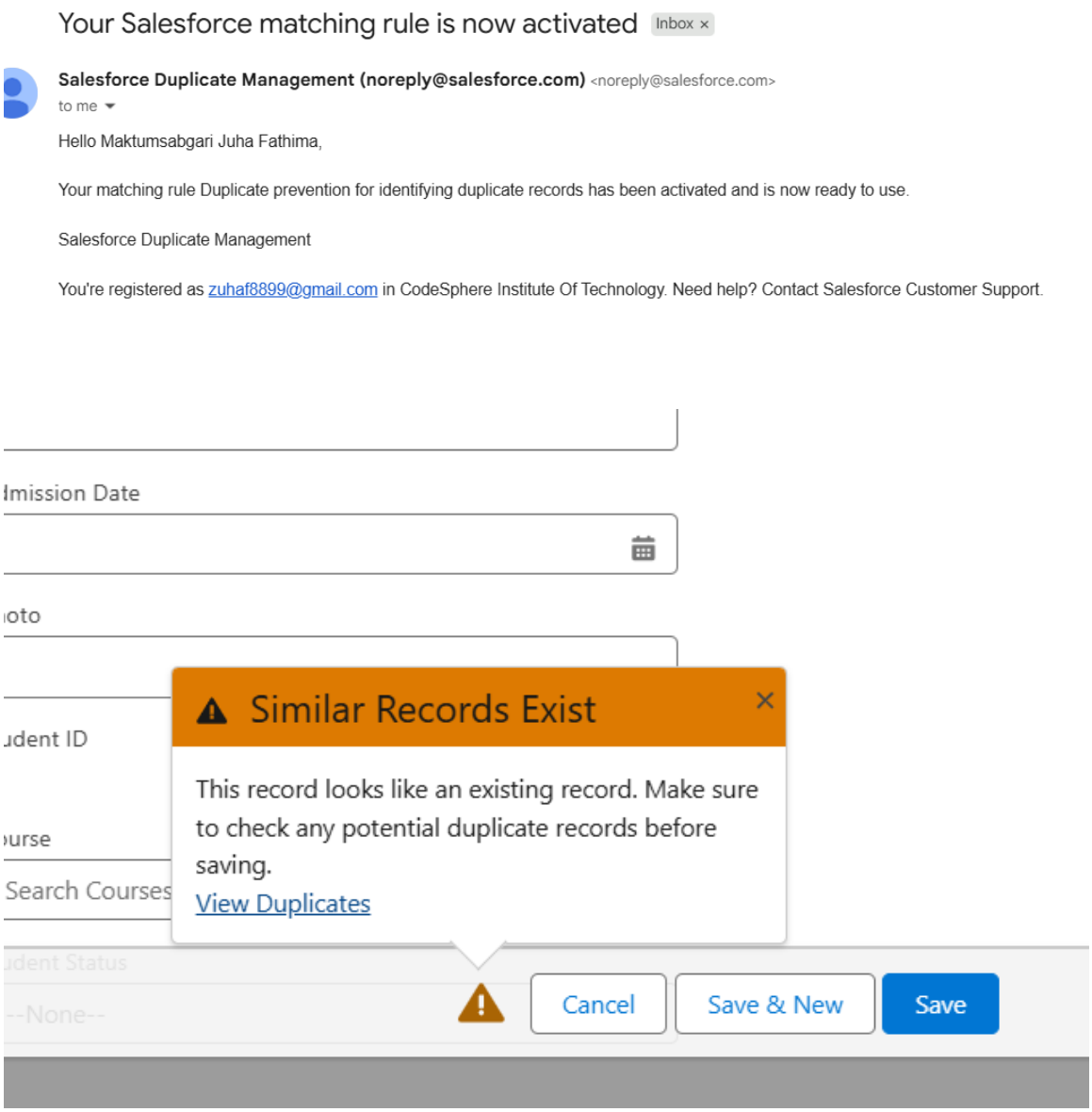
2. Data Loader (Optional for Bulk Operations)

- Download and install Data Loader.
- Open Data Loader → Insert → Log in to Salesforce.
- Choose the object (Student, Faculty, Course).
- Browse and select the CSV file.
- Map CSV columns to Salesforce fields.
- Click Next → Finish → OK.
- Review success and error CSVs for audit.



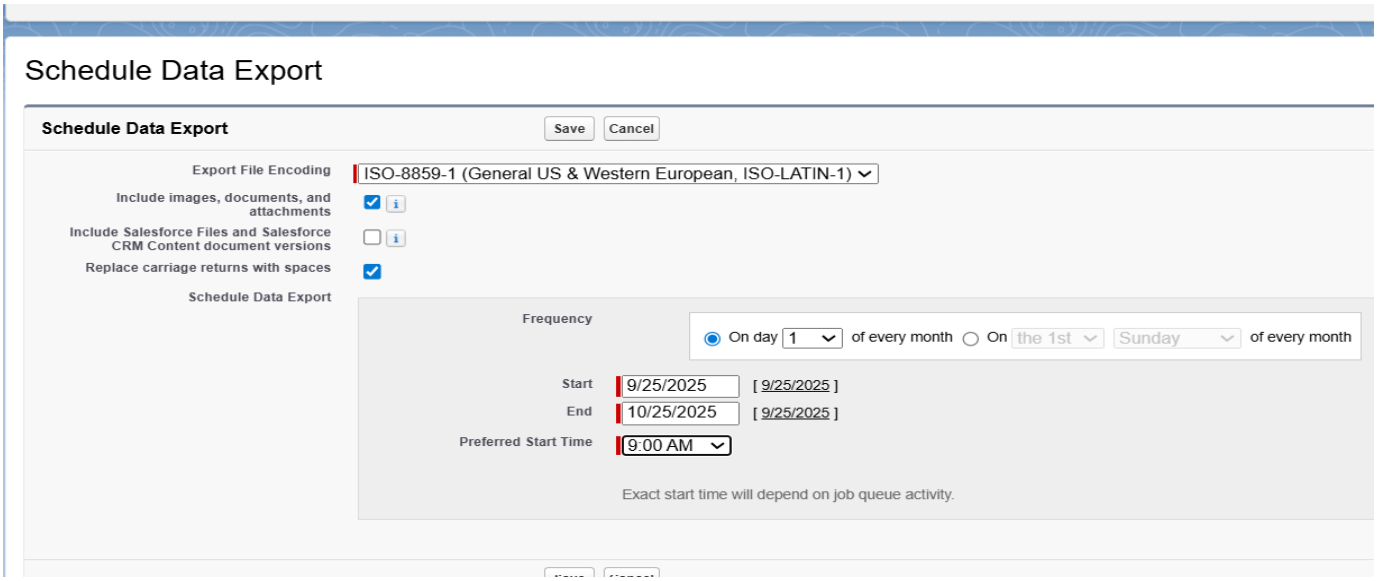
3. Duplicate Rules

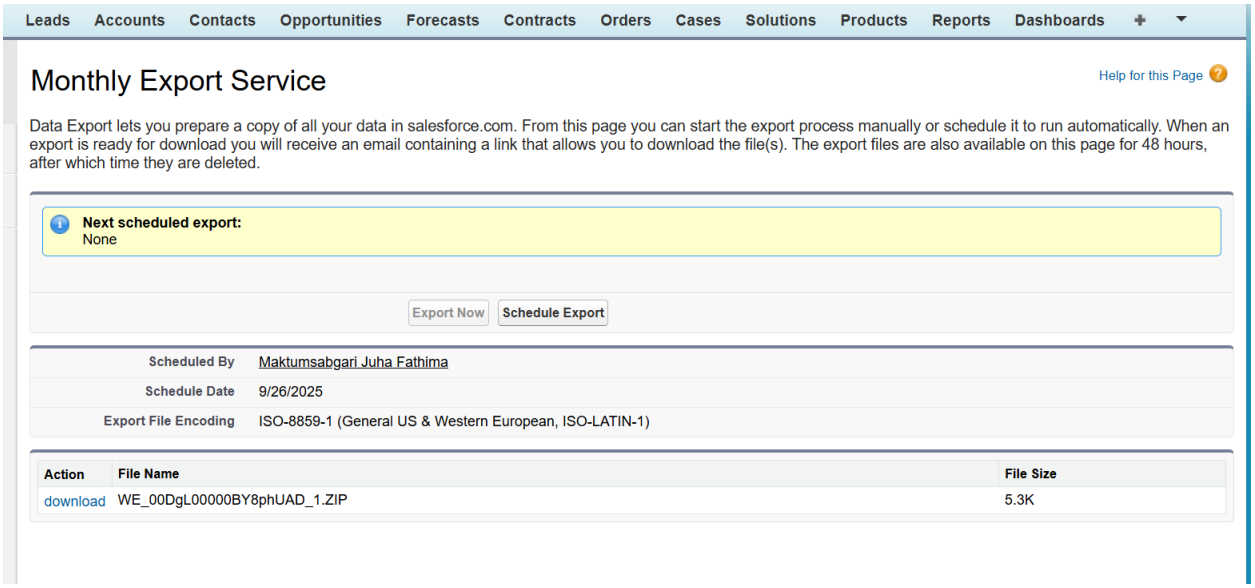
- Go to Setup → Duplicate Management → Matching Rules.
- Create rules to detect duplicate student records.
- Configure Duplicate Rules to block or alert duplicates.
- Test with sample data to ensure data quality.



4. Data Export & Backup

- Go to Setup → Data Export.
- Schedule weekly export of critical objects (Students, Courses, Enrollments).
- Download CSVs and store securely for rollback.





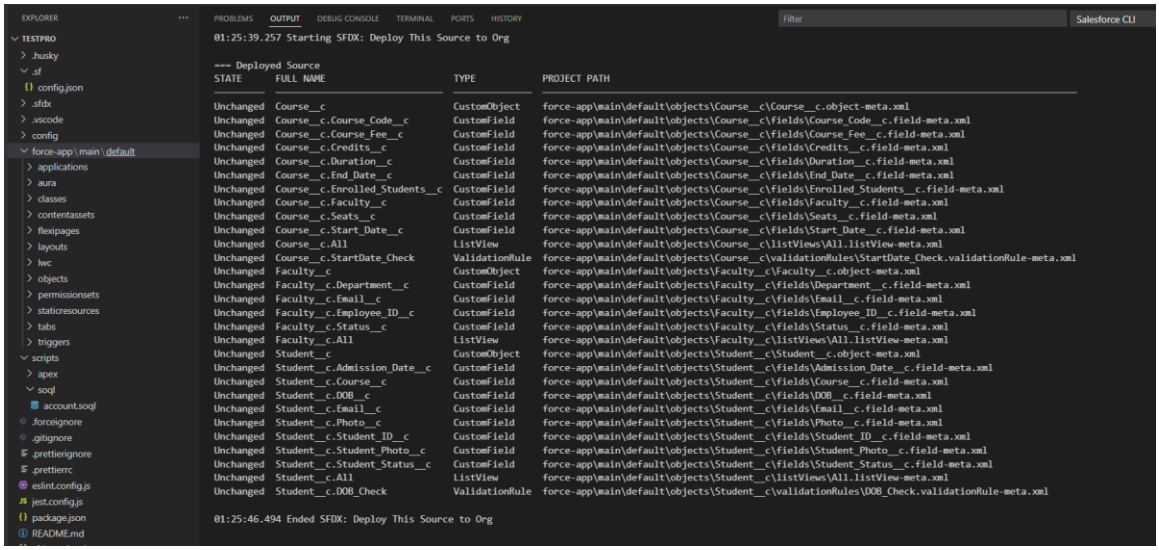
5. Deploy Metadata

Option A: VS Code & Salesforce CLI

- Move your project to a local folder (avoid OneDrive).
- Open VS Code and authorize org:

sf org login web --alias SourceOrg --set-default
- Retrieve metadata (Student, Course, Faculty objects):
sf project retrieve start --metadata CustomObject:Student__c --metadata CustomObject:Course__c --metadata CustomObject:Faculty__c
- Verify retrieved files in force-app/main/default/objects/.
- Deploy to target org:
sf project deploy start --source-dir force-app/main/default
- Confirm success in terminal or VS Code output.

Option B: Change Sets
- In Source Org → Setup → Outbound Change Set → New.
- Add components (objects, fields, Apex classes).
- Upload to target org → Inbound Change Set → Deploy → Validate.



6. ANT Migration Tool

- Configure build.xml and package.xml.
- Retrieve custom object and Apex class metadata from source org.
- Deploy changes to target org.
- Validate success logs.

7. Notes & Best Practices

- Always retrieve metadata to a local folder, not OneDrive, to avoid empty folders.
- Verify all fields, list views, and validation rules are retrieved.
- Keep backups of CSV files and metadata.
- Use CLI commands with correct syntax in new Salesforce CLI (sf).

Phase 9

Reports & Dashboards

This document provides the step-by-step instructions to create Reports and Dashboards in Salesforce as part of Phase 9 implementation, including report types and dashboard types.

1. Reports

Salesforce offers different types of reports depending on the analysis needed.

Report Types

- Tabular Reports: Simple lists of data; ideal for exporting or quick views. Example: Student List, Attendance List.
- Summary Reports: Grouped data with subtotals; useful for summaries. Example: Class-wise Student Count, Attendance Percentage by Class.
- Matrix Reports: Data grouped by rows and columns; ideal for cross-tab analysis. Example: Attendance Matrix (Classes vs Months), Grades Matrix (Subjects vs Terms).
- Joined Reports: Combine multiple report types into one view; good for holistic performance. Example: Student + Attendance + Grades, Course Enrollment + Completion Rate.

Steps to Create Reports

- Go to the App Launcher (9 dots) and search for 'Reports'.
- Click on 'New Report'.
- Choose the appropriate report type (Tabular, Summary, Matrix, Joined) based on your data needs.
- Click 'Continue'.
- Add required filters (e.g., filter by 'Status = Active' for Students).
- Drag and drop fields into the report outline (such as Name, Program, Semester, Fee Paid).
- Group data if required (Summary/Matrix reports).
- Click 'Run' to preview the data.
- Save the report with a suitable name and folder (e.g., 'Student Reports').

Report: Enrollments with Course

New Enrollments with Course Report

Total Records

6

	Enrollment: Enrollment Number	Course: Course Name
1	ENR-0107	Electronics
2	ENR-0106	Electronics
3	ENR-0105	Electronics
4	ENR-0104	Electronics
5	ENR-0101	Electronics
6	ENR-0108	Python

Reports

Recent

6 items

Search recent reports...

REPORTS

- Recent
- Created by Me
- Private Reports
- Public Reports
- All Reports

FOLDERS

- All Folders
- Created by Me

Report Name	Description	Folder	Created By	Created On	Subsc
New Enrollments with Course Report		Private Reports	Maktumsabgari Juha Fathima	9/25/2025, 3:26 PM	
New Faculties Report		Private Reports	Maktumsabgari Juha Fathima	9/25/2025, 3:29 PM	
New Students with Course Report		Private Reports	Maktumsabgari Juha Fathima	9/25/2025, 3:21 PM	
Lead conversion rate	What percentage of leads have been converted?	Channel Sales	Automated Process	9/25/2025, 8:18 AM	
Exercise Completion Status by Section	Analyze an exercise's completion status based on program sections.	Enablement Dashboard Reports Summer '24	Automated Process	9/12/2025, 10:59 PM	
Sample Flow Report: Screen Flows	Which flows run, what's the status of each interview, and how long do users take to complete the screens?	Public Reports	Automated Process	9/12/2025, 10:59 PM	

2. Dashboards

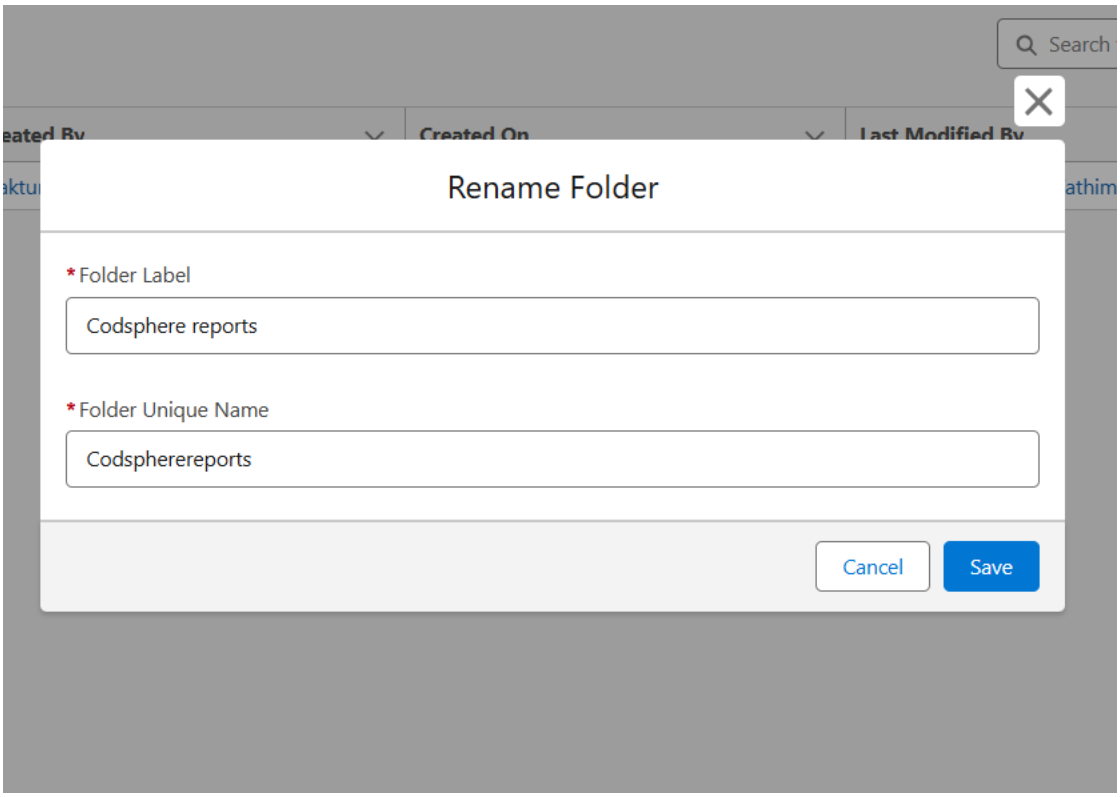
Dashboards allow visual representation of reports. Each dashboard can contain multiple components based on report charts.

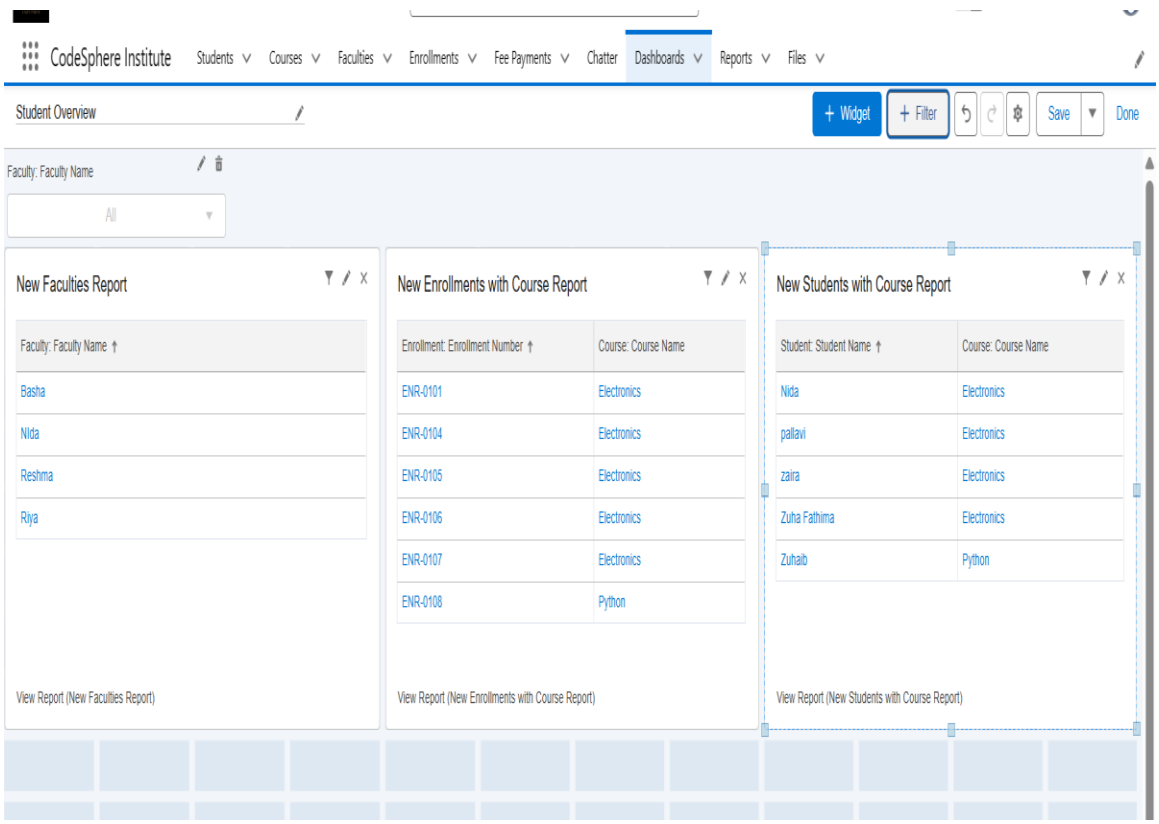
Dashboard Types

- Chart Component: Visual charts like bar, line, pie, or donut charts.
- Gauge Component: Shows a single metric in a gauge style, useful for targets.
- Metric Component: Displays a single number or KPI metric.
- Table Component: Displays tabular data from reports.
- Visualforce Component: Embeds Visualforce pages or custom content in dashboard.

Steps to Create Dashboards

- Go to the App Launcher and search for 'Dashboards'.
- Click on 'New Dashboard'.
- Enter the Dashboard Name (e.g., Student & Fee Insights) and select a folder.
- Click 'Create'.
- Click '+ Component' to add a chart or table.
- Select the source report (e.g., 'Fee Payment by Semester').
- Choose the display type (bar chart, pie chart, line chart, gauge, metric, table, etc.).
- Adjust chart settings like labels, legends, and filters.
- Click 'Add' and repeat to add more components.
- Save the dashboard and click 'Done'.
- View the dashboard to monitor reports visually.

- 
Search
Created On
Last Modified By
Rename Folder
*Folder Label
Codsphere reports
*Folder Unique Name
Codspherereports
Cancel
Save


CodeSphere Institute
Students
Courses
Faculties
Enrollments
Fee Payments
Chatter
Dashboards
Reports
Files
Student Overview
+ Widget
+ Filter
Save
Done
Faculty: Faculty Name
All
New Faculties Report
Faculty: Faculty Name
Basha
Nida
Reshma
Riya
View Report (New Faculties Report)
New Enrollments with Course Report
Enrollment: Enrollment Number
Course: Course Name
ENR-0101
Electronics
ENR-0104
Electronics
ENR-0105
Electronics
ENR-0106
Electronics
ENR-0107
Electronics
ENR-0108
Python
View Report (New Enrollments with Course Report)
New Students with Course Report
Student: Student Name
Course: Course Name
Nida
Electronics
pallavi
Electronics
zaira
Electronics
Zuha Fathima
Electronics
Zuhaib
Python
View Report (New Students with Course Report)

Phase 10

Integration & Automation

1. Integration

- **Email Integration**:
  - Configure Salesforce Email-to-Case or Email Alerts for key events (e.g., admission confirmation, fee reminders).
- **Calendar Integration**:
  - Sync academic schedules and exam timetables with Salesforce Calendar or Google Calendar integration.
- **Payment Gateway Integration**:
  - Connect fee collection system with external payment services (e.g., Razorpay, PayPal, Stripe).
- **External Systems**:
  - If the institute uses ERP/Library/Attendance software, integrate via **APIs or middleware (MuleSoft/REST API)**.

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2. Automation

- **Process Builder / Flows**:
  - Automate student admission approvals.
  - Send automatic reminders for pending fees.
  - Auto-assign faculty to newly created course batches.
- **Scheduled Jobs**:
  - Monthly fee due reports.
  - Automatic grade publishing notifications.
- **Approval Processes**:
  - Multi-level approvals for scholarships, leave requests, or refunds.

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3. Benefits

- Reduced manual workload.
- Timely communication with students and faculty.
- Centralized system connecting academics, finance, and administration.
- Higher efficiency and accuracy in institute operations.