

University School Management— Phase 5: Apex Programming

Goal: Add server-side automation and validations that cannot be done by declarative tools. Implement custom Apex classes, triggers, test classes, and a batch job to enforce **student registration rules** and send **daily orientation reminders**.

Classes & Objects

Created an Apex utility class **StudentService**:

- **Inner Comparator:** OrientationDateTimeComparator sorts students by Orientation_Date_Time__c.
- **Static Method:** preventOverlap(List<Student__c> incoming, Map<Id,Student__c> oldMap) checks new/updated student registration against existing orientation sessions and throws addError() if overlaps are found.

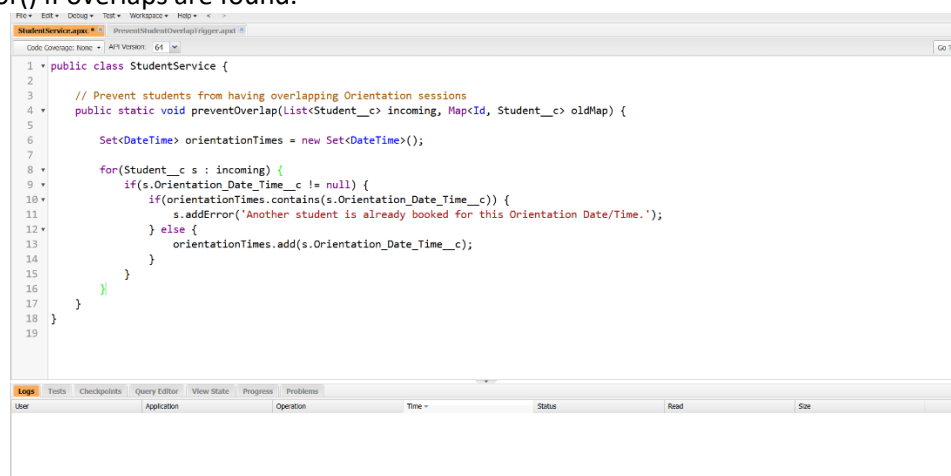


Fig.1 StudentService

Apex Triggers

Trigger StudentTrigger on Student__c:

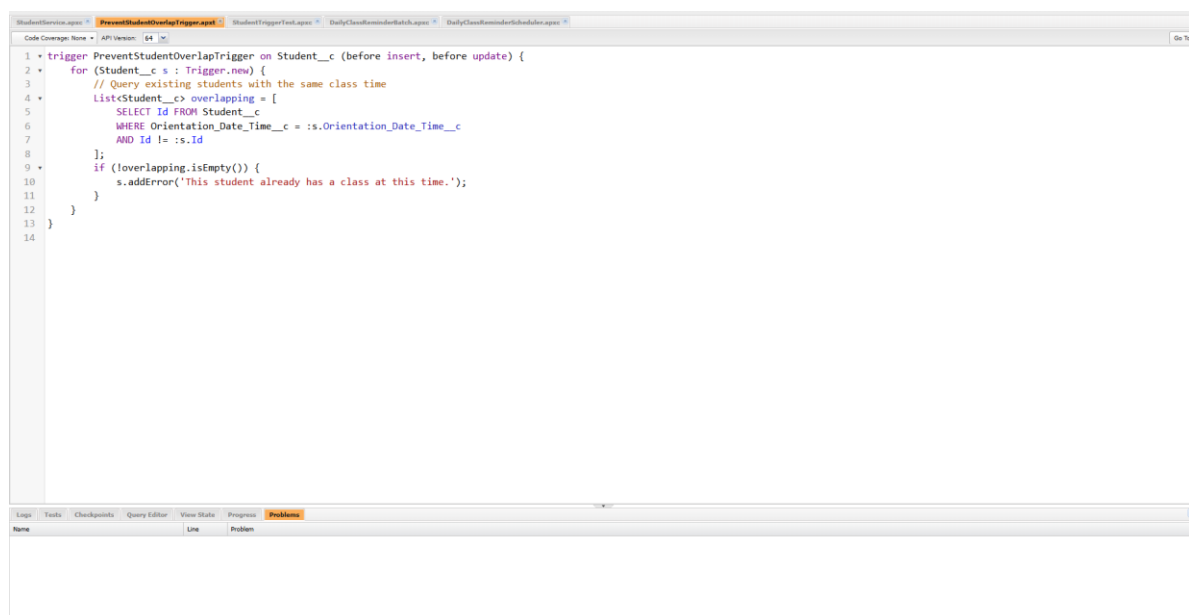


Fig.2 StudentTrigger

Trigger Design Pattern

- **Business Logic:** All logic is kept inside the **StudentService** class; the **StudentTrigger** simply calls the method.
- **Purpose:** Ensures a clean separation of concerns — trigger handles events, while the service class enforces rules and validations.

SOQL & Collections

Inside preventDuplicate:

- **SOQL Query:** Retrieves existing students with the same Email or Phone Number to check for duplicates.
- **Collections:**
 - **Set<String>** used to track unique emails and phone numbers.
 - **Map<String, Id>** used to quickly detect conflicts between incoming and existing student records.
- **Validation:** If a duplicate is found, **addError()** is applied to block the DML operation.

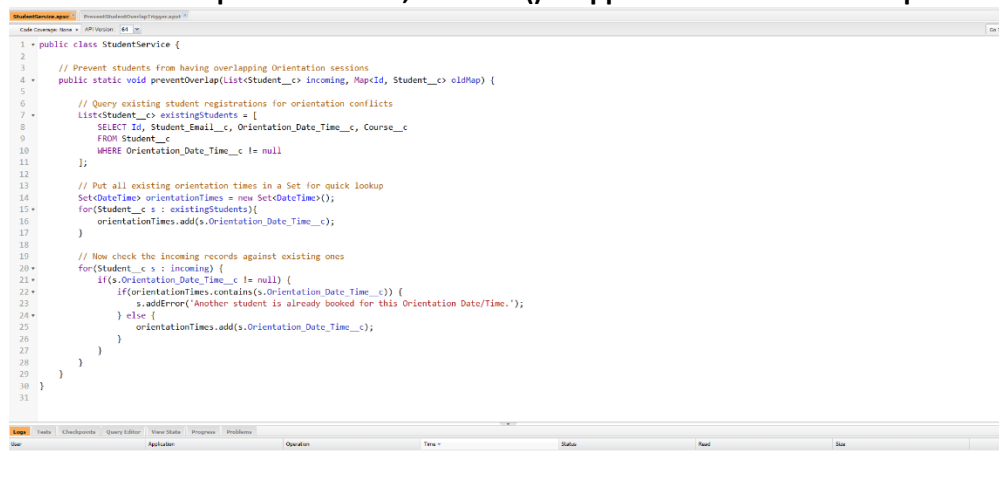


Fig.3 SOQL_Collections

Control Statements

for loops, if conditions and **addError()** to prevent overlaps.

Test Classes

A test class **AppointmentTriggerTest** was created to:

- Insert a valid appointment (no overlap) and verify it saves successfully.
- Attempt to insert an overlapping appointment and verify a **DmlException** with “overlaps” in the message is thrown.

This test indirectly executes the logic in **AppointmentService.preventOverlap** and gives code coverage for both the trigger and the service class.

```

1 // Batch Apex
2 // Create a batch Apex class to insert student records
3 // This class is used to insert student records
4 // The class is used to insert student records
5 // The class is used to insert student records
6 // The class is used to insert student records
7 // The class is used to insert student records
8 // The class is used to insert student records
9 // The class is used to insert student records
10 // The class is used to insert student records
11 // The class is used to insert student records
12 // The class is used to insert student records
13 // The class is used to insert student records
14 // The class is used to insert student records
15 // The class is used to insert student records
16 // The class is used to insert student records
17 // The class is used to insert student records
18 // The class is used to insert student records
19 // The class is used to insert student records
20 // The class is used to insert student records
21 // The class is used to insert student records
22 // The class is used to insert student records
23 // The class is used to insert student records
24 // The class is used to insert student records
25 // The class is used to insert student records
26 // The class is used to insert student records
27 // The class is used to insert student records
28 // The class is used to insert student records
29 // The class is used to insert student records
30 // The class is used to insert student records
31 // The class is used to insert student records
32 // The class is used to insert student records
33 // The class is used to insert student records
34 // The class is used to insert student records
35 // The class is used to insert student records
36 // The class is used to insert student records
37 // The class is used to insert student records
38 // The class is used to insert student records
39 // The class is used to insert student records
40 // The class is used to insert student records
41 // The class is used to insert student records
42 // The class is used to insert student records
43 // The class is used to insert student records
44 // The class is used to insert student records
45 // The class is used to insert student records
46 // The class is used to insert student records
47 // The class is used to insert student records
48 // The class is used to insert student records
49 // The class is used to insert student records
50 // The class is used to insert student records
51 // The class is used to insert student records
52 // The class is used to insert student records
53 // The class is used to insert student records
54 // The class is used to insert student records
55 // The class is used to insert student records
56 // The class is used to insert student records
57 // The class is used to insert student records
58 // The class is used to insert student records
59 // The class is used to insert student records
60 // The class is used to insert student records
61 // The class is used to insert student records
62 // The class is used to insert student records
63 // The class is used to insert student records
64 // The class is used to insert student records
65 // The class is used to insert student records
66 // The class is used to insert student records
67 // The class is used to insert student records
68 // The class is used to insert student records
69 // The class is used to insert student records
70 // The class is used to insert student records
71 // The class is used to insert student records
72 // The class is used to insert student records
73 // The class is used to insert student records
74 // The class is used to insert student records
75 // The class is used to insert student records
76 // The class is used to insert student records
77 // The class is used to insert student records
78 // The class is used to insert student records
79 // The class is used to insert student records
80 // The class is used to insert student records
81 // The class is used to insert student records
82 // The class is used to insert student records
83 // The class is used to insert student records
84 // The class is used to insert student records
85 // The class is used to insert student records
86 // The class is used to insert student records
87 // The class is used to insert student records
88 // The class is used to insert student records
89 // The class is used to insert student records
90 // The class is used to insert student records
91 // The class is used to insert student records
92 // The class is used to insert student records
93 // The class is used to insert student records
94 // The class is used to insert student records
95 // The class is used to insert student records
96 // The class is used to insert student records
97 // The class is used to insert student records
98 // The class is used to insert student records
99 // The class is used to insert student records
100 // The class is used to insert student records

```

Fig 4: StudentTriggerTest

Batch Apex and Scheduled Jobs

A Batch Apex class **DailyClassReminderBatch** was created to query students who have classes scheduled for the day and send reminder emails to them.

To automate this, the batch was scheduled using **Schedule Apex** in Salesforce Setup. The job **Daily Class Reminder** runs the batch every day at **9:00 AM**.

The screenshot shows the 'Schedule Apex' configuration page in Salesforce Setup. The 'Job Name' is 'Daily Class Reminder' and the 'Apex Class' is 'AppointmentSummaryBatch'. The 'Frequency' is set to 'Weekly', and the 'Recurs every week on' days are Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday. The 'Start' date is 21-09-2025 and the 'End' date is 21-09-2025. The 'Preferred Start Time' is 9:00 am.

Fig.5 Schedule Apex

Exception Handling

Used addError() on Student__c records to prevent overlapping class entries, displaying a user-friendly error message to the user.

Skipped / Not Implemented

Queueable Apex, Future Methods, and additional asynchronous processing beyond the daily class reminder batch were not implemented in this phase.

Testing & Results

- Overlapping class entries throw an error and cannot be saved.
- Non-overlapping class entries save successfully.
- Daily batch job runs at 9:00 AM and sends reminder emails to students with classes scheduled for the day.

The screenshot displays a web-based form for student registration. The form includes fields for Last Name (Wonder), Student Email (kvnssmanas2005@gmail.com), Student Phone (9524742208), Department (Search Departments...), Enrollment Date (02/09/2025), Date Of Birth (15/09/2005), Course (Computer Science), Orientation Date Time (Date: 25/09/2025, Time: 10:00 am), Location, Registration Confirmation Sent (checkbox), Status (--None--), and Registration Stage (--None--). A red error message box is overlaid on the form, stating "We hit a snag." and "Review the errors on this page." with a bullet point: "This student already has a class at this time." The form has buttons for Cancel, Save & New, and Save.

Fig.6 Appointment Overlapping Result