

1- APEX SPECIALIST

What I have done to complete This Superbadge

1. Automate record creation using Apex triggers
2. Synchronize Salesforce data with an external system using asynchronous REST callouts
3. Schedule synchronization using Apex code
4. Test automation logic to confirm Apex trigger side effects
5. Test integration logic using callout mocks
6. Test scheduling logic to confirm action gets queued

1-Automate record creation using Apex triggers

in this I have used two classes

(a)MaintenanceRequest

(b)MaintenanceRequestHelper

```
1 //Maintenance request
2 trigger MaintenanceRequest on Case (before update, after update)
3 {
4     if (Trigger.isUpdate && Trigger.isAfter) {
5         MaintenanceRequestHelper.updateWorkOrders(Trigger.New,
6             Trigger.OldMap);
7     }
8 }
```

```
1 //MaintenanceRequestHelper
2 public with sharing class MaintenanceRequestHelper {
3     public static void updateWorkOrders(List<Case> updWorkOrders,
4         Map<Id,Case> nonUpdCaseMap) {
5         Set<Id> validIds = new Set<Id>();
6         For (Case c : updWorkOrders){
7             if (nonUpdCaseMap.get(c.Id).Status != 'Closed' &&
8                 c.Status == 'Closed'){
9                 if (c.Type == 'Repair' || c.Type == 'Routine
```

```

8             validIds.add(c.Id);
9         }
10    }
11 }
12
13    //When an existing maintenance request of type Repair or
    Routine Maintenance is closed,
14    //create a new maintenance request for a future routine
    checkup.
15    if (!validIds.isEmpty()){
16        Map<Id,Case> closedCases = new Map<Id,Case>([SELECT
    Id, Vehicle__c, Equipment__c, Equipment__r.Maintenance_Cycle__c,
17                                                    (SELECT
    Id,Equipment__c,Quantity__c FROM Equipment_Maintenance_Items__r)
18                                                    FROM
    Case WHERE Id IN :validIds]);
19        Map<Id,Decimal> maintenanceCycles = new
    Map<ID,Decimal>();
20
21        //calculate the maintenance request due dates by
    using the maintenance cycle defined on the related equipment
    records.
22        AggregateResult[] results = [SELECT
    Maintenance_Request__c,
23
    MIN(Equipment__r.Maintenance_Cycle__c)cycle
24
    FROM
    Equipment_Maintenance_Item__c
25
    WHERE
    Maintenance_Request__c IN :ValidIds GROUP BY
    Maintenance_Request__c];
26
27        for (AggregateResult ar : results){
28            maintenanceCycles.put((Id)
    ar.get('Maintenance_Request__c'), (Decimal) ar.get('cycle'));
29        }
30
31        List<Case> newCases = new List<Case>();
32        for(Case cc : closedCases.values()){
33            Case nc = new Case (

```

```

34         ParentId = cc.Id,
35         Status = 'New',
36         Subject = 'Routine Maintenance',
37         Type = 'Routine Maintenance',
38         Vehicle__c = cc.Vehicle__c,
39         Equipment__c = cc.Equipment__c,
40         Origin = 'Web',
41         Date_Reported__c = Date.Today()
42     );
43
44     //If multiple pieces of equipment are used in the
    maintenance request,
45     //define the due date by applying the shortest
    maintenance cycle to today's date.
46     If (maintenanceCycles.containsKey(cc.Id)){
47         nc.Date_Due__c =
    Date.today().addDays((Integer) maintenanceCycles.get(cc.Id));
48     } else {
49         nc.Date_Due__c =
    Date.today().addDays((Integer)
    cc.Equipment__r.maintenance_Cycle__c);
50     }
51
52     newCases.add(nc);
53 }
54
55     insert newCases;
56
57     List<Equipment_Maintenance_Item__c> clonedList = new
    List<Equipment_Maintenance_Item__c>();
58     for (Case nc : newCases){
59         for (Equipment_Maintenance_Item__c clonedListItem
    : closedCases.get(nc.ParentId).Equipment_Maintenance_Items__r){
60             Equipment_Maintenance_Item__c item =
    clonedListItem.clone();
61             item.Maintenance_Request__c = nc.Id;
62             clonedList.add(item);
63         }
64     }
65     insert clonedList;

```

```
66     }
67 }
68 }
```

2-Synchronize Salesforce data with an external system using asynchronous REST callouts

in this module I have used a class name is:-

(a)WarehouseCalloutService

```
1 //WarehouseCalloutService
2 public with sharing class WarehouseCalloutService implements
  Queueable {
3     private static final String WAREHOUSE_URL = 'https://th-
4
5     //Write a class that makes a REST callout to an external
    warehouse system to get a list of equipment that needs to be
    updated.
6     //The callout's JSON response returns the equipment records
    that you upsert in Salesforce.
7
8     @future(callout=true)
9     public static void runWarehouseEquipmentSync(){
10         System.debug('go into runWarehouseEquipmentSync');
11         Http http = new Http();
12         HttpRequest request = new HttpRequest();
13
14         request.setEndpoint(WAREHOUSE_URL);
15         request.setMethod('GET');
16         HttpResponse response = http.send(request);
17
18         List<Product2> product2List = new List<Product2>();
19         System.debug(response.getStatusCode());
20         if (response.getStatusCode() == 200){
21             List<Object> jsonResponse =
22             (List<Object>)JSON.deserializeUntyped(response.getBody());
23             System.debug(response.getBody());
```

```

23
24         //class maps the following fields:
25         //warehouse SKU will be external ID for identifying
which equipment records to update within Salesforce
26         for (Object jR : jsonResponse){
27             Map<String,Object> mapJson =
(Map<String,Object>)jR;
28             Product2 product2 = new Product2();
29             //replacement part (always true),
30             product2.Replacement_Part__c = (Boolean)
mapJson.get('replacement');
31             //cost
32             product2.Cost__c = (Integer) mapJson.get('cost');
33             //current inventory
34             product2.Current_Inventory__c = (Double)
mapJson.get('quantity');
35             //lifespan
36             product2.Lifespan_Months__c = (Integer)
mapJson.get('lifespan');
37             //maintenance cycle
38             product2.Maintenance_Cycle__c = (Integer)
mapJson.get('maintenanceperiod');
39             //warehouse SKU
40             product2.Warehouse_SKU__c = (String)
mapJson.get('sku');
41
42             product2.Name = (String) mapJson.get('name');
43             product2.ProductCode = (String)
mapJson.get('_id');
44             product2List.add(product2);
45         }
46
47         if (product2List.size() > 0){
48             upsert product2List;
49             System.debug('Your equipment was synced with the
50         }
51     }
52 }
53

```

```

54     public static void execute (QueueableContext context){
55         System.debug('start runWarehouseEquipmentSync');
56         runWarehouseEquipmentSync();
57         System.debug('end runWarehouseEquipmentSync');
58     }
59
60 }

```

3-Schedule synchronization using Apex code

in this I have used a class name is:-

(a)WarehouseSyncSchedule

```

1  //WarehouseSyncSchedule
2  global with sharing class WarehouseSyncSchedule implements
    Schedulable{
3      global void execute(SchedulableContext ctx){
4          System.enqueueJob(new WarehouseCalloutService());
5      }
6  }

```

4-Test automation logic to confirm Apex trigger side effects

in this I have used three class follows are:-

(a)MaintenanceRequest

(b)MaintenanceRequestHelper

(c)MaintenanceRequestHelperTest

```

1  //MaintenanceRequest
2  trigger MaintenanceRequest on Case (before update, after update)
    {
3      if(Trigger.isUpdate && Trigger.isAfter){
4          MaintenanceRequestHelper.updateWorkOrders(Trigger.New,
            Trigger.OldMap);
5      }
6  }

```

```

1 //MaintenanceRequestHelper
2 public with sharing class MaintenanceRequestHelper {
3     public static void updateWorkOrders(List<Case> updWorkOrders,
4     Map<Id,Case> nonUpdCaseMap) {
5         Set<Id> validIds = new Set<Id>();
6         For (Case c : updWorkOrders){
7             if (nonUpdCaseMap.get(c.Id).Status != 'Closed' &&
8             c.Status == 'Closed'){
9                 if (c.Type == 'Repair' || c.Type == 'Routine
10
11                 validIds.add(c.Id);
12             }
13         }
14     }
15
16     //When an existing maintenance request of type Repair or
17     Routine Maintenance is closed,
18     //create a new maintenance request for a future routine
19     checkup.
20     if (!validIds.isEmpty()){
21         Map<Id,Case> closedCases = new Map<Id,Case>([SELECT
22         Id, Vehicle__c, Equipment__c, Equipment__r.Maintenance_Cycle__c,
23         (SELECT
24         Id,Equipment__c,Quantity__c FROM Equipment_Maintenance_Items__r)
25         FROM
26         Case WHERE Id IN :validIds]);
27         Map<Id,Decimal> maintenanceCycles = new
28         Map<ID,Decimal>();
29
30         //calculate the maintenance request due dates by
31         using the maintenance cycle defined on the related equipment
32         records.
33         AggregateResult[] results = [SELECT
34         Maintenance_Request__c,
35
36         MIN(Equipment__r.Maintenance_Cycle__c)cycle
37         FROM
38         Equipment_Maintenance_Item__c
39         WHERE
40         Maintenance_Request__c IN :ValidIds GROUP BY

```

```

Maintenance_Request__c];
26
27         for (AggregateResult ar : results){
28             maintenanceCycles.put((Id)
ar.get('Maintenance_Request__c'), (Decimal) ar.get('cycle'));
29         }
30
31         List<Case> newCases = new List<Case>();
32         for(Case cc : closedCases.values()){
33             Case nc = new Case (
34                 ParentId = cc.Id,
35                 Status = 'New',
36                 Subject = 'Routine Maintenance',
37                 Type = 'Routine Maintenance',
38                 Vehicle__c = cc.Vehicle__c,
39                 Equipment__c =cc.Equipment__c,
40                 Origin = 'Web',
41                 Date_Reported__c = Date.Today()
42             );
43
44             //If multiple pieces of equipment are used in the
maintenance request,
45             //define the due date by applying the shortest
maintenance cycle to today's date.
46             //If (maintenanceCycles.containsKey(cc.Id)){
47                 nc.Date_Due__c =
Date.today().addDays((Integer) maintenanceCycles.get(cc.Id));
48             //} else {
49                 // nc.Date_Due__c =
Date.today().addDays((Integer)
cc.Equipment__r.maintenance_Cycle__c);
50             //}
51
52             newCases.add(nc);
53         }
54
55         insert newCases;
56
57         List<Equipment_Maintenance_Item__c> clonedList = new
List<Equipment_Maintenance_Item__c>();

```



```

58         for (Case nc : newCases){
59             for (Equipment_Maintenance_Item__c clonedListItem
: closedCases.get(nc.ParentId).Equipment_Maintenance_Items__r){
60                 Equipment_Maintenance_Item__c item =
clonedListItem.clone();
61                 item.Maintenance_Request__c = nc.Id;
62                 clonedList.add(item);
63             }
64         }
65         insert clonedList;
66     }
67 }
68 }

```

```

1  //MaintenanceRequestHelperTest
2  @isTest
3  public with sharing class MaintenanceRequestHelperTest {
4
5      // createVehicle
6      private static Vehicle__c createVehicle(){
7          Vehicle__c vehicle = new Vehicle__C(name = 'Testing
8
9          return vehicle;
10     }
11
12     // createEquipment
13     private static Product2 createEquipment(){
14         product2 equipment = new product2(name = 'Testing
15
16         lifespan_months__c =
17         10,
18         maintenance_cycle__c =
19         10,
20         replacement_part__c =
21         true);
22         return equipment;
23     }
24
25     // createMaintenanceRequest

```

```

21     private static Case createMaintenanceRequest(id vehicleId, id
equipmentId){
22         case cse = new case(Type='Repair',
23                             Status='New',
24                             Origin='Web',
25                             Subject='Testing subject',
26                             Equipment__c=equipmentId,
27                             Vehicle__c=vehicleId);
28         return cse;
29     }
30
31     // createEquipmentMaintenanceItem
32     private static Equipment_Maintenance_Item__c
createEquipmentMaintenanceItem(id equipmentId,id requestId){
33         Equipment_Maintenance_Item__c equipmentMaintenanceItem =
new Equipment_Maintenance_Item__c(
34             Equipment__c = equipmentId,
35             Maintenance_Request__c = requestId);
36         return equipmentMaintenanceItem;
37     }
38
39     @isTest
40     private static void testPositive(){
41         Vehicle__c vehicle = createVehicle();
42         insert vehicle;
43         id vehicleId = vehicle.Id;
44
45         Product2 equipment = createEquipment();
46         insert equipment;
47         id equipmentId = equipment.Id;
48
49         case createdCase =
createMaintenanceRequest(vehicleId,equipmentId);
50         insert createdCase;
51
52         Equipment_Maintenance_Item__c equipmentMaintenanceItem =
createEquipmentMaintenanceItem(equipmentId,createdCase.id);
53         insert equipmentMaintenanceItem;
54
55         test.startTest();

```

```

56         createdCase.status = 'Closed';
57         update createdCase;
58         test.stopTest();
59
60         Case newCase = [Select id,
61                         subject,
62                         type,
63                         Equipment__c,
64                         Date_Reported__c,
65                         Vehicle__c,
66                         Date_Due__c
67                         from case
68                         where status = 'New'];
69
70         Equipment_Maintenance_Item__c workPart = [select id
71                                                    from
72                                                    Equipment_Maintenance_Item__c
73                                                    where
74                                                    Maintenance_Request__c =:newCase.Id];
75
76         list<case> allCase = [select id from case];
77         system.assert(allCase.size() == 2);
78
79         system.assert(newCase != null);
80         system.assert(newCase.Subject != null);
81         system.assertEquals(newCase.Type, 'Routine Maintenance');
82         SYSTEM.assertEquals(newCase.Equipment__c, equipmentId);
83         SYSTEM.assertEquals(newCase.Vehicle__c, vehicleId);
84         SYSTEM.assertEquals(newCase.Date_Reported__c,
85                             system.today());
86     }
87
88     @isTest
89     private static void testNegative(){
90         Vehicle__C vehicle = createVehicle();
91         insert vehicle;
92         id vehicleId = vehicle.Id;
93
94         product2 equipment = createEquipment();
95         insert equipment;
96         id equipmentId = equipment.Id;

```

```

93
94         case createdCase =
    createMaintenanceRequest(vehicleId,equipmentId);
95         insert createdCase;
96
97         Equipment_Maintenance_Item__c workP =
    createEquipmentMaintenanceItem(equipmentId, createdCase.Id);
98         insert workP;
99
100        test.startTest();
101        createdCase.Status = 'Working';
102        update createdCase;
103        test.stopTest();
104
105        list<case> allCase = [select id from case];
106
107        Equipment_Maintenance_Item__c equipmentMaintenanceItem =
    [select id
108
    from
    Equipment_Maintenance_Item__c
109
    where
    Maintenance_Request__c = :createdCase.Id];
110
111        system.assert(equipmentMaintenanceItem != null);
112        system.assert(allCase.size() == 1);
113    }
114
115    @isTest
116    private static void testBulk(){
117        list<Vehicle__C> vehicleList = new list<Vehicle__C>();
118        list<Product2> equipmentList = new list<Product2>();
119        list<Equipment_Maintenance_Item__c>
    equipmentMaintenanceItemList = new
    list<Equipment_Maintenance_Item__c>();
120        list<case> caseList = new list<case>();
121        list<id> oldCaseIds = new list<id>();
122
123        for(integer i = 0; i < 300; i++){
124            vehicleList.add(createVehicle());
125            equipmentList.add(createEquipment());

```

```

126     }
127     insert vehicleList;
128     insert equipmentList;
129
130     for(integer i = 0; i < 300; i++){
131
132         caseList.add(createMaintenanceRequest(vehicleList.get(i).id,
133         equipmentList.get(i).id));
134     }
135     insert caseList;
136
137     for(integer i = 0; i < 300; i++){
138
139         equipmentMaintenanceItemList.add(createEquipmentMaintenanceItem(e
140
141         }
142         insert equipmentMaintenanceItemList;
143
144         test.startTest();
145         for(case cs : caseList){
146             cs.Status = 'Closed';
147             oldCaseIds.add(cs.Id);
148         }
149         update caseList;
150         test.stopTest();
151
152         list<case> newCase = [select id
153                             from case
154                             where status = 'New'];
155
156
157         list<Equipment_Maintenance_Item__c> workParts = [select
158         id
159
160         from
161         Equipment_Maintenance_Item__c
162
163         where
164         Maintenance_Request__c in: oldCaseIds];
165
166         system.assert(newCase.size() == 300);

```

```

159
160         list<case> allCase = [select id from case];
161         system.assert(allCase.size() == 600);
162     }
163 }

```

5-Test integration logic using callout mocks

in this I have used three classes that are as follows:-

- (a) WarehouseCalloutService
- (b) WarehouseCalloutServiceMock
- (c) WarehouseCalloutServiceTest

```

1 //WarehouseCalloutService
2 public with sharing class WarehouseCalloutService implements
  Queueable {
3     private static final String WAREHOUSE_URL = 'https://th-
4
5     //Write a class that makes a REST callout to an external
    warehouse system to get a list of equipment that needs to be
    updated.
6     //The callout's JSON response returns the equipment records
    that you upsert in Salesforce.
7
8     @future(callout=true)
9     public static void runWarehouseEquipmentSync(){
10         System.debug('go into runWarehouseEquipmentSync');
11         Http http = new Http();
12         HttpRequest request = new HttpRequest();
13
14         request.setEndpoint(WAREHOUSE_URL);
15         request.setMethod('GET');
16         HttpResponse response = http.send(request);
17
18         List<Product2> product2List = new List<Product2>();
19         System.debug(response.getStatusCode());

```

```

20         if (response.getStatusCode() == 200){
21             List<Object> jsonResponse =
22             (List<Object>)JSON.deserializeUntyped(response.getBody());
23             System.debug(response.getBody());
24             //class maps the following fields:
25             //warehouse SKU will be external ID for identifying
26             which equipment records to update within Salesforce
27             for (Object jR : jsonResponse){
28                 Map<String, Object> mapJson =
29                 (Map<String, Object>)jR;
30                 Product2 product2 = new Product2();
31                 //replacement part (always true),
32                 product2.Replacement_Part__c = (Boolean)
33                 mapJson.get('replacement');
34                 //cost
35                 product2.Cost__c = (Integer) mapJson.get('cost');
36                 //current inventory
37                 product2.Current_Inventory__c = (Double)
38                 mapJson.get('quantity');
39                 //lifespan
40                 product2.Lifespan_Months__c = (Integer)
41                 mapJson.get('lifespan');
42                 //maintenance cycle
43                 product2.Maintenance_Cycle__c = (Integer)
44                 mapJson.get('maintenanceperiod');
45                 //warehouse SKU
46                 product2.Warehouse_SKU__c = (String)
47                 mapJson.get('sku');
48
49                 product2.Name = (String) mapJson.get('name');
50                 product2.ProductCode = (String)
51                 mapJson.get('_id');
52                 product2List.add(product2);
53             }
54
55             if (product2List.size() > 0){
56                 upsert product2List;
57                 System.debug('Your equipment was synced with the

```

```
50         }
51     }
52 }
53
54 public static void execute (QueueableContext context){
55     System.debug('start runWarehouseEquipmentSync');
56     runWarehouseEquipmentSync();
57     System.debug('end runWarehouseEquipmentSync');
58 }
59
60 }
```

```
1 //WarehouseCalloutServiceMock
2 @isTest
3 global class WarehouseCalloutServiceMock implements
4     HttpCalloutMock {
5     // implement http mock callout
6     global static HttpResponse respond(HttpRequest request) {
7
8         HttpResponse response = new HttpResponse();
9         response.setHeader('Content-Type', 'application/json');
10
11         response.setBody(' [{"_id":"55d66226726b611100aaf741"},"replacement
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```

1 //WarehouseCalloutServiceTest
2 @IsTest
3 private class WarehouseCalloutServiceTest {
4     // implement your mock callout test here
5     @isTest
6     static void testWarehouseCallout() {
7         test.startTest();
8         test.setMock(HttpCalloutMock.class, new
WarehouseCalloutServiceMock());
9         WarehouseCalloutService.execute(null);
10        test.stopTest();
11
12        List<Product2> product2List = new List<Product2>();
13        product2List = [SELECT ProductCode FROM Product2];
14
15        System.assertEquals(3, product2List.size());
16        System.assertEquals('55d66226726b611100aaf741',
product2List.get(0).ProductCode);
17        System.assertEquals('55d66226726b611100aaf742',
product2List.get(1).ProductCode);
18        System.assertEquals('55d66226726b611100aaf743',
product2List.get(2).ProductCode);
19    }
20 }

```

6-Test scheduling logic to confirm action gets queued

in this module I have used three classes that are as follows

- (a) WarehouseCalloutServiceMock
- (b) WarehouseSyncSchedule
- (c) WarehouseSyncScheduleTest

```

1 // WarehouseCalloutServiceMock
2 @isTest
3 global class WarehouseCalloutServiceMock implements
HttpCalloutMock {
4     // implement http mock callout
5     global static HttpResponse respond(HttpRequest request) {
6

```

```

7      HttpResponseMessage response = new HttpResponseMessage();
8      response.setHeader('Content-Type', 'application/json');
9
      response.SetBody('["_id":"55d66226726b611100aaf741","replacement

10      response.StatusCode(200);
11
12      return response;
13  }
14 }

```

```

1 //WarehouseSynSchedule
2 global with sharing class WarehouseSyncSchedule implements
   Schedulable {
3     // implement scheduled code here
4     global void execute (SchedulableContext ctx){
5         System.enqueueJob(new WarehouseCalloutService());
6     }
7 }

```

```

1 //WarehouseSynScheduleTest
2 @isTest
3 public with sharing class WarehouseSyncScheduleTest {
4     // implement scheduled code here
5     //
6     @isTest static void test() {
7         String scheduleTime = '00 00 00 * * ? *';
8         Test.startTest();
9         Test.setMock(HttpCalloutMock.class, new
      WarehouseCalloutServiceMock());

```

```

10         String jobId = System.schedule('Warehouse Time to
        ());
11         CronTrigger c = [SELECT State FROM CronTrigger WHERE Id
        =: jobId];
12         System.assertEquals('WAITING', String.valueOf(c.State),
        'JobId does not match');
13
14         Test.stopTest();
15     }
16 }

```

In this way I have completed this superbadge
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SUPERBADGE COMPLETE!

+13000 Points



Completed 6/22/22

2- Process Automation Specialist

What I have Done to Earn This Superbadge

1. Automate lead ownership using assignment rules
2. Enforce data integrity with formula fields and validation rules

3. Create a custom object in a master-detail relationship to a standard object
4. Define an opportunity sales process using stages, record types, and validation rules
5. Automate business processes to send emails, create related records, and submit opportunities for approval
6. Create a flow to display dynamic information on a Lightning record page
7. Create a process to evaluate and update records

[This is my trailhead profile link to check the completion status](#)

SUPERBADGE COMPLETE!

+10000 Points



Completed 6/23/22