

TEST APEX TRIGGERS

RestrictContactByName :

```
trigger RestrictContactByName on Contact (before insert, before update) {
```

```
    //check contacts prior to insert or update for invalid data
```

```
    For (Contact c : Trigger.New) {
```

```
        if(c.LastName == 'INVALIDNAME') { //invalidname is invalid
```

```
            c.AddError('The Last Name "' + c.LastName + '" is not allowed for DML');
```

```
        }
```

```
    }
```

```
}
```

TestRestrictContactByName :

@isTest

```
private class TestRestrictContactByName {
```

```
    static testMethod void metodoTest()
```

```
    {
```

```
        List<Contact> listContact= new List<Contact>();
```

```
        Contact c1 = new Contact(FirstName='Francesco', LastName='Riggio' ,  
email='Test@test.com');
```

```
        Contact c2 = new Contact(FirstName='Francesco1', LastName =  
'INVALIDNAME',email='Test@test.com');
```

```
        listContact.add(c1);
```

```
        listContact.add(c2);
```

```
        Test.startTest();
```

```
        try
```

```
        {
```

```
            insert listContact;
```

```
        }
```

```
        catch(Exception ee)
```

```
        {
```

```
        }
```

```
        Test.stopTest();
```

```
}
```

```
}
```

GET STARTED WITH APEX TRIGGERS

```
trigger AccountAddressTrigger on Account (before insert,before update) {
```

```
List<Account> acctlst=new List<Account>();
```

```
for(account a:trigger.new){
```

```
    if(a.Match_Billing_Address__c==true && a.BillingPostalCode!=null){
```

```
        a.ShippingPostalCode=a.BillingPostalCode;
```

```
    }
```

```
}
```

```
}
```

APEX SPECIALIST SUPERBADGE

step2 Automate Record Creation

```
trigger MaintenanceRequest on Case (before update, after update) {
```

```
    if(Trigger.isUpdate && Trigger.isAfter){
```

```
        MaintenanceRequestHelper.updateWorkOrders(Trigger.New, Trigger.OldMap);
```

```
    }
```

```
}
```

MaintainerRequestHelper

```
public with sharing class MaintenanceRequestHelper {
```

```
    public static void updateworkOrders(List<Case> updWorkOrders, Map<Id,Case>  
    nonUpdCaseMap) {
```

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

```
        For (Case c : updWorkOrders){
```

```
            if (nonUpdCaseMap.get(c.Id).Status != 'Closed' && c.Status == 'Closed'){
```

```
                if (c.Type == 'Repair' || c.Type == 'Routine Maintenance'){
```

```
                    validIds.add(c.Id);
```

```
                }
```

```
            }
```

```
        }
```

```
//When an existing maintenance request of type Repair or Routine Maintenance is  
closed,
```

```
    //create a new maintenance request for a future routine checkup.
```

```
    if (!validIds.isEmpty()){
```

```
        Map<Id,Case> closedCases = new Map<Id,Case>([SELECT Id, Vehicle__c,  
Equipment__c,
```

```

Equipment__r.Maintenance_Cycle__c,
                (SELECT Id,Equipment__c,Quantity__c FROM
Equipment_Maintenance_Items__r)
                FROM Case WHERE Id IN :validIds]);
    Map<Id,Decimal> maintenanceCycles = new Map<ID,Decimal>();

    //calculate the maintenance request due dates by using the maintenance cycle
defined on the
related equipment records.
    AggregateResult[] results = [SELECT Maintenance_Request__c,
                MIN(Equipment__r.Maintenance_Cycle__c)cycle
                FROM Equipment_Maintenance_Item__c
                WHERE Maintenance_Request__c IN :ValidIds GROUP BY
Maintenance_Request__c];

    for (AggregateResult ar : results){
        maintenanceCycles.put((Id) ar.get('Maintenance_Request__c'), (Decimal)
ar.get('cycle'));
    }
    List<Case> newCases = new List<Case>();
    for(Case cc : closedCases.values()){
        Case nc = new Case (
            ParentId = cc.Id,
            Status = 'New',
            Subject = 'Routine Maintenance',
            Type = 'Routine Maintenance',
            Vehicle__c = cc.Vehicle__c,
            Equipment__c =cc.Equipment__c,
            Origin = 'Web',
            Date_Reported__c = Date.Today()
        );
        //If multiple pieces of equipment are used in the maintenance request,
        //define the due date by applying the shortest maintenance cycle to today's
date.
        If (maintenanceCycles.containsKey(cc.Id)){
            nc.Date_Due__c = Date.today().addDays((Integer)
maintenanceCycles.get(cc.Id));

```

```

        } else {
            nc.Date_Due__c = Date.today().addDays((Integer)
cc.Equipment__r.maintenance_Cycle__c);
        }

        newCases.add(nc);
    }

    insert newCases;

    List<Equipment_Maintenance_Item__c> clonedList = new
List<Equipment_Maintenance_Item__c>();
    for (Case nc : newCases){
        for (Equipment_Maintenance_Item__c clonedListItem :
closedCases.get(nc.ParentId).Equipment_Maintenance_Items__r){
            Equipment_Maintenance_Item__c item = clonedListItem.clone();
            item.Maintenance_Request__c = nc.Id;
            clonedList.add(item);
        }
    }
    insert clonedList;
}
}

```

Step3 Synchronize Salesforce data with an external system using asynchronous REST callouts

WAREHOUSECALLOUTSERVICE

```

public with sharing class WarehouseCalloutService implements Queueable {
    private static final String WAREHOUSE_URL = 'https://th-
superbadgeapex.herokuapp.com/equipment';

```

//Write a class that makes a REST callout to an external warehouse system to get a list of equipment that needs to be updated.

//The callout's JSON response returns the equipment records that you upsert in Salesforce.

```

@future(callout=true)
public static void runWarehouseEquipmentSync(){

```

```

System.debug('go into runWarehouseEquipmentSync');
Http http = new Http();
HttpRequest request = new HttpRequest();

request.setEndpoint(WAREHOUSE_URL);
request.setMethod('GET');
HttpResponse response = http.send(request);

List<Product2> product2List = new List<Product2>();
System.debug(response.getStatusCode());
if (response.getStatusCode() == 200){
    List<Object> jsonResponse =
(List<Object>)JSON.deserializeUntyped(response.getBody());
    System.debug(response.getBody());

    //class maps the following fields:
    //warehouse SKU will be external ID for identifying which equipment records to
update within
Salesforce
    for (Object jR : jsonResponse){
        Map<String,Object> mapJson = (Map<String,Object>)jR;
        Product2 product2 = new Product2();
        //replacement part (always true),
        product2.Replacement_Part__c = (Boolean) mapJson.get('replacement');
        //cost
        product2.Cost__c = (Integer) mapJson.get('cost');
        //current inventory
        product2.Current_Inventory__c = (Double) mapJson.get('quantity');
        //lifespan
        product2.Lifespan_Months__c = (Integer) mapJson.get('lifespan');
        //maintenance cycle
        product2.Maintenance_Cycle__c = (Integer)
mapJson.get('maintenanceperiod');
        //warehouse SKU
        product2.Warehouse_SKU__c = (String) mapJson.get('sku');

        product2.Name = (String) mapJson.get('name');

```

```

        product2.ProductCode = (String) mapJson.get('_id');
        product2List.add(product2);
    }

    if (product2List.size() > 0){
        upsert product2List;
        System.debug('Your equipment was synced with the warehouse one');
    }
}
}

```

```

public static void execute (QueueableContext context){
    System.debug('start runWarehouseEquipmentSync');
    runWarehouseEquipmentSync();
    System.debug('end runWarehouseEquipmentSync');
}
}

```

STEP4Schedule synchronization using Apex code

WAREHOUSESYNCSCHEDULE

```

global with sharing class WarehouseSyncSchedule implements Schedulable{
    global void execute(SchedulableContext ctx){
        System.enqueueJob(new WarehouseCalloutService());
    }
}

```

STEP 5Test automation logic to confirm Apex trigger side effects

@isTest

public with sharing class MaintenanceRequestHelperTest {

// createVehicle

```

private static Vehicle__c createVehicle(){
    Vehicle__c vehicle = new Vehicle__C(name = 'Testing Vehicle');
    return vehicle;
}

```

// createEquipment

```

private static Product2 createEquipment(){
    product2 equipment = new product2(name = 'Testing equipment',
        lifespan_months__c = 10,

```

```

        maintenance_cycle__c = 10,
        replacement_part__c = true);
    return equipment;
}
// createMaintenanceRequest
private static Case createMaintenanceRequest(id vehicleId, id
equipmentId){
    case cse = new case(Type='Repair',
        Status='New',
        Origin='Web',
        Subject='Testing subject',
        Equipment__c=equipmentId,
        Vehicle__c=vehicleId);
    return cse;
}
// createEquipmentMaintenanceItem
private static Equipment_Maintenance_Item__c
createEquipmentMaintenanceItem(id equipmentId,id requestId){
    Equipment_Maintenance_Item__c equipmentMaintenanceItem =
new Equipment_Maintenance_Item__c(
    Equipment__c = equipmentId,
    Maintenance_Request__c = requestId);
    return equipmentMaintenanceItem;
}
@Test
private static void testPositive(){
    Vehicle__c vehicle = createVehicle();
    insert vehicle;
    id vehicleId = vehicle.Id;

    Product2 equipment = createEquipment();
    insert equipment;
    id equipmentId = equipment.Id;

    case createdCase =
createMaintenanceRequest(vehicleId,equipmentId);
    insert createdCase;

```

```
Equipment_Maintenance_Item__c equipmentMaintenanceItem =  
createEquipmentMaintenanceItem(equipmentId,createdCase.id);  
insert equipmentMaintenanceItem;
```

```
test.startTest();  
createdCase.status = 'Closed';  
update createdCase;  
test.stopTest();
```

```
Case newCase = [Select id,  
                subject,  
                type,  
                Equipment__c,  
                Date_Reported__c,  
                Vehicle__c,  
                Date_Due__c  
                from case  
                where status ='New'];
```

```
Equipment_Maintenance_Item__c workPart = [select id  
                                           from Equipment_Maintenance_Item__c  
                                           where Maintenance_Request__c  
=:newCase.Id];  
list<case> allCase = [select id from case];  
system.assert(allCase.size() == 2);
```

```
system.assert(newCase != null);  
system.assert(newCase.Subject != null);  
system.assertEquals(newCase.Type, 'Routine Maintenance');  
SYSTEM.assertEquals(newCase.Equipment__c, equipmentId);  
SYSTEM.assertEquals(newCase.Vehicle__c, vehicleId);  
SYSTEM.assertEquals(newCase.Date_Reported__c,  
system.today());  
}
```

```
@isTest  
private static void testNegative(){  
    Vehicle__C vehicle = createVehicle();
```



```

insert vehicle;
id vehicleId = vehicle.Id;

product2 equipment = createEquipment();
insert equipment;
id equipmentId = equipment.Id;

case createdCase =
createMaintenanceRequest(vehicleId,equipmentId);
insert createdCase;

Equipment_Maintenance_Item__c workP =
createEquipmentMaintenanceItem(equipmentId, createdCase.Id);
insert workP;

test.startTest();
createdCase.Status = 'Working';
update createdCase;
test.stopTest();

list<case> allCase = [select id from case];

Equipment_Maintenance_Item__c equipmentMaintenanceItem =
[select id
                                from Equipment_Maintenance_Item__c
                                where Maintenance_Request__c =
:createdCase.Id];

system.assert(equipmentMaintenanceItem != null);
system.assert(allCase.size() == 1);
}
@isTest
private static void testBulk(){
    list<Vehicle__C> vehicleList = new list<Vehicle__C>();
    list<Product2> equipmentList = new list<Product2>();
    list<Equipment_Maintenance_Item__c>
equipmentMaintenanceItemList = new
list<Equipment_Maintenance_Item__c>();

```



```
Equipment_Maintenance_Item__c
                                where
Maintenance_Request__oldCaseIds];
```

```
    system.assert(newCase.size() == 300);

    list<case> allCase = [select id from case];
    system.assert(allCase.size() == 600);
}
}
```

STEP 6 Test integration logic using callout mocks

```
public with sharing class WarehouseCalloutService implements Queueable {
    private static final String WAREHOUSE_URL = 'https://th-
superbadgeapex.herokuapp.com/equipment';
```

//Write a class that makes a REST callout to an external warehouse system to get a list of equipment that needs to be updated.

//The callout's JSON response returns the equipment records that you upsert in Salesforce.

```
@future(callout=true)
public static void runWarehouseEquipmentSync(){
    System.debug('go into runWarehouseEquipmentSync');
    Http http = new Http();
    HttpRequest request = new HttpRequest();

    request.setEndpoint(WAREHOUSE_URL);
    request.setMethod('GET');
    HttpResponse response = http.send(request);
    List<Product2> product2List = new List<Product2>();
    System.debug(response.getStatusCode());
    if (response.getStatusCode() == 200){
        List<Object> jsonResponse =
(List<Object>)JSON.deserializeUntyped(response.getBody());
        System.debug(response.getBody());
        //class maps the following fields:
        //warehouse SKU will be external ID for identifying which equipment records to
```

update within

Salesforce

```
    for (Object jR : jsonResponse){
        Map<String,Object> mapJson = (Map<String,Object>)jR;
        Product2 product2 = new Product2();
        //replacement part (always true),
        product2.Replacement_Part__c = (Boolean) mapJson.get('replacement');
        //cost
        product2.Cost__c = (Integer) mapJson.get('cost');
        //current inventory
        product2.Current_Inventory__c = (Double) mapJson.get('quantity');
        //lifespan
        product2.Lifespan_Months__c = (Integer) mapJson.get('lifespan');
        //maintenance cycle
        product2.Maintenance_Cycle__c = (Integer)
mapJson.get('maintenanceperiod');
        //warehouse SKU
        product2.Warehouse_SKU__c = (String) mapJson.get('sku');
        product2.Name = (String) mapJson.get('name');
        product2.ProductCode = (String) mapJson.get('_id');
        product2List.add(product2);
    }

    if (product2List.size() > 0){
        upsert product2List;
        System.debug('Your equipment was synced with the warehouse one');
    }
}

}

public static void execute (QueueableContext context){
    System.debug('start runWarehouseEquipmentSync');
    runWarehouseEquipmentSync();
    System.debug('end runWarehouseEquipmentSync');
}

}

@Test
```

```

global class WarehouseCalloutServiceMock implements HttpCalloutMock {
    // implement http mock callout
    global static HttpResponse respond(HttpRequest request) {

        HttpResponse response = new HttpResponse();
        response.setHeader('Content-Type', 'application/json');

        response.setBody(['{"_id":"55d66226726b611100aaf741","replacement":false,"quantity":5
,"name":"Generator 1000
kW","maintenanceperiod":365,"lifespan":120,"cost":5000,"sku":"100003"},"{"_id":"55d66226
726b611100
aaf742","replacement":true,"quantity":183,"name":"Cooling
Fan","maintenanceperiod":0,"lifespan":0,"cost":300,"sku":"100004"},"{"_id":"55d66226726b6
11100aaf74
3","replacement":true,"quantity":143,"name":"Fuse
20A","maintenanceperiod":0,"lifespan":0,"cost":22,"sku":"100005"}']);
        response.setStatusCode(200);

        return response;
    }
}

@Test
private class WarehouseCalloutServiceTest {
    // implement your mock callout test here
    @Test
    static void testWarehouseCallout() {
        test.startTest();
        test.setMock(HttpCalloutMock.class, new WarehouseCalloutServiceMock());
        WarehouseCalloutService.execute(null);
        test.stopTest();

        List<Product2> product2List = new List<Product2>();
        product2List = [SELECT ProductCode FROM Product2];

        System.assertEquals(3, product2List.size());
        System.assertEquals('55d66226726b611100aaf741',
product2List.get(0).ProductCode);
    }
}

```

```
    System.assertEquals('55d66226726b611100aaf742',  
product2List.get(1).ProductCode);
```

```
    System.assertEquals('55d66226726b611100aaf743',  
product2List.get(2).ProductCode);
```

```
    }  
}
```

STEP7 TEST SCHEDULING LOGIC

@isTest

```
global class WarehouseCalloutServiceMock implements HttpCalloutMock {
```

```
    // implement http mock callout
```

```
    global static HttpResponse respond(HttpRequest request) {
```

```
        HttpResponse response = new HttpResponse();
```

```
        response.setHeader('Content-Type', 'application/json');
```

```
        response.setBody(['{"_id":"55d66226726b611100aaf741","replacement":false,"quantity":5  
,"name":"Gen
```

```
erator 1000
```

```
kW","maintenanceperiod":365,"lifespan":120,"cost":5000,"sku":"100003"},{"_id":"55d66226  
726b611100
```

```
aaf742","replacement":true,"quantity":183,"name":"Cooling
```

```
Fan","maintenanceperiod":0,"lifespan":0,"cost":300,"sku":"100004"},{"_id":"55d66226726b6  
11100aaf74
```

```
3","replacement":true,"quantity":143,"name":"Fuse
```

```
20A","maintenanceperiod":0,"lifespan":0,"cost":22,"sku":"100005"}]]');
```

```
        response.setStatusCode(200);
```

```
        return response;
```

```
    }  
}
```

```
global with sharing class WarehouseSyncSchedule implements Schedulable {
```

```
    // implement scheduled code here
```

```
    global void execute (SchedulableContext ctx){
```

```
        System.enqueueJob(new WarehouseCalloutService());
```

```
    }  
}
```

@isTest

```

public with sharing class WarehouseSyncScheduleTest {
    // implement scheduled code here
    //
    @isTest static void test() {
        String scheduleTime = '00 00 00 * * ? *';
        Test.startTest();
        Test.setMock(HttpCalloutMock.class, new WarehouseCalloutServiceMock());
        String jobId = System.schedule('Warehouse Time to Schedule to test',
scheduleTime, new
WarehouseSyncSchedule());
        CronTrigger c = [SELECT State FROM CronTrigger WHERE Id =: jobId];
        System.assertEquals('WAITING', String.valueOf(c.State), 'JobId does not match');

        Test.stopTest();
    }
}

```