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APEX TRIGGERS

- GET STARTED WITH APEX TRIGGERS:

1.AccountAddressTrigger.apxt

```
trigger AccountAddressTrigger on Account (before insert, before update) {  
    for(Account a: Trigger.New){        if(a.Match_Billing_Address_c == true  
    && a.BillingPostalCode!= null){  
        a.ShippingPostalCode=a.BillingPostalCode;  
    }  
}  
  
}
```

- BULK APEX TRIGGERS:

1.ClosedOpportunityTrigger.apxt

```
trigger ClosedOpportunityTrigger on Opportunity (after insert, after update) {  
    List<Task> taskList = new List<Task>();  
    for(Opportunity opp : [SELECT Id, StageName FROM Opportunity WHERE  
    StageName='Closed Won' AND Id IN : Trigger.New]){        taskList.add(new  
    Task(Subject='Follow Up Test Task', WhatId = opp.Id));  
    }  
    if(taskList.size()>0){  
        insert tasklist;  
    }  
}
```

APEX TESTING

•GET STARTED WITH APEX UNIT TEST:

1. VerifyDate.apxc

```
public class VerifyDate {  
    public static Date CheckDates(Date date1, Date date2) {  
        //if date2 is within the next 30 days of date1, use date2. Otherwise use the end of the  
        month if(DateWithin30Days(date1,date2)) { return date2;  
        } else {  
            return SetEndOfMonthDate(date1);  
        }  
    }  
  
    private static Boolean DateWithin30Days(Date date1, Date date2) {  
        Date date30Days = date1.addDays(30); //create a date 30 days away from date1 if(  
        date2 > date30Days ) { return false; }  
        else { return true; }  
    }  
  
    private static Date SetEndOfMonthDate(Date date1) {  
        Integer totalDays = Date.daysInMonth(date1.year(), date1.month()); Date  
        lastDay = Date.newInstance(date1.year(), date1.month(), totalDays); return  
        lastDay;  
    }  
}
```

2. TestVerifyDate.apxc

```
@isTest private class  
TestVerifyDate {  
  
    @isTest static void testCheckDates() {  
        Date now = Date.today();  
        Date lastOfTheMonth = Date.newInstance(now.year(), now.month(),  
        Date.daysInMonth(now.year(), now.month()));  
        Date plus60 = Date.today().addDays(60);  
  
        Date d1 = VerifyDate.CheckDates(now, now);
```

```
System.assertEquals(now, d1);
```

```
Date d2 = VerifyDate.CheckDates(now, plus60);
```

```
System.assertEquals(lastOfTheMonth, d2);
```

```
}
```

```
}
```

•TEST APEX TRIGGERS:

1.RestrictContactByName.apxt

```
trigger RestrictContactByName on Contact (before insert) {    For (Contact
c : Trigger.New) { if(c.LastName == 'INVALIDNAME') {
    //invalidname is invalid
        c.AddError('The Last Name "'+c.LastName+'" is not allowed for DML');
    }
}
}
```

•CREATE TEST DATA FOR APEX TESTS:

1.RandomContactFactory.apxc

```
public class RandomContactFactory {

    public static List<Contact> generateRandomContacts(Integer num, String lastName) {
List<Contact> contacts = new List<Contact>();    for (Integer i = 0; i < num; i++) {
        Contact c = new Contact(FirstName=i.format(), LastName=lastName);
contacts.add(c);
    }
    return contacts;
}
}
```

ASYNCHRONOUS APEX

- USE FUTURE METHODS:

1.AccountProcessor.apxc

```
public without sharing class AccountProcessor {  
    //Add annotation to declare a future method  
    @future(callout=false)    public static void countContacts(List<Id>  
accountIds){  
        //Query all accounts in the list of Ids passed  
        Map<Id, Account> accountMap = new Map<Id, Account>([SELECT Id, (SELECT Id FROM  
Contacts) FROM Account WHERE Id IN:accountIds]);  
  
        List<Account> listName = new List<Account>();  
  
        //Loop through list of accounts        for(Account  
a: accountMap.values()){  
            //Assign field to number of contact  
            a.Number_of_Contacts_c=accountMap.get(a.Id).Contacts.size();  
        }  
        //Update Accounts  
        update accountMap.values();  
  
    }  
}
```

2.AccountProcessorTest.apxc

```
@isTest public class  
AccountProcessorTest {  
    @isTest  
    public static void testNoOfContacts(){  
Account a = new Account();    a.Name  
= 'Test Account';
```

Insert a;

```
    Contact c = new Contact();    c.FirstName
= 'Bob';
    c.LastName = 'Willie';
    c.AccountId = a.Id;
```

```
    Contact c2 = new Contact();
c2.FirstName = 'Tom';    c2.LastName
= 'Cruise';    c2.AccountId = a.Id;
```

```
List<Id> acctIds = new List<Id>();    acctIds.add(a.Id);
```

```
    Test.startTest();
    AccountProcessor.countContacts(acctIds);
    Test.stopTest();
}
}
```

•USE BATCH APEX:

1. LeadProcessor.apxc

```
global class LeadProcessor implements Database.Batchable<sObject>,
Database.Stateful {    // instance member to retain state across transactions
global Integer recordsProcessed = 0;
```

```
    global Database.QueryLocator start(Database.BatchableContext bc) {    return
Database.getQueryLocator('SELECT Id, LeadSource FROM Lead');
    }
```

```
    global void execute(Database.BatchableContext bc, List<Lead> scope){
        // process each batch of records
        List<Lead> leads = new List<Lead>();    for
        (Lead lead : scope) {
```

```

        lead.LeadSource = 'Dreamforce';           //
increment the instance member counter
recordsProcessed = recordsProcessed + 1;

    }
    update leads;
}
global void finish(Database.BatchableContext bc){
    System.debug(recordsProcessed + ' records processed. Shazam!');
}
}

```

2. LeadProcessorTest.apxc

```

@isTest public class
LeadProcessorTest {
    @testSetup    static
void setup() {
    List<Lead> leads = new List<Lead>();
    // insert 200 leads    for (Integer i=0;i<200;i++) {
leads.add(new Lead(LastName='Lead '+i,
Company='Lead', Status='Open - Not Contacted'));
    }
    insert leads;
}

static testmethod void test() {
    Test.startTest();
    LeadProcessor lp = new LeadProcessor();
    Id batchId = Database.executeBatch(lp, 200);
    Test.stopTest();
}
}

```

```

        // after the testing stops, assert records were updated properly
        System.assertEquals(200, [select count() from lead where LeadSource =
'Dreamforce']);
    } }

```

•CONTROL PROCESSES WITH QUEUEABLE APEX:

1.AddPrimaryContact.apxc

```

public class AddPrimaryContact implements Queueable {

    private Contact contactObj;
    private String state_code;

    public AddPrimaryContact(Contact c, String s) {
this.contactObj = c;    this.state_code = s;
    }

    public void execute(QueueableContext context) {
        List<Account> accounts = [SELECT Id
                                FROM Account
                                WHERE BillingState = :this.state_code
                                LIMIT 200];
        List<Contact> contacts = new List<Contact>();
        for (Account a : accounts) {
            Contact c = this.contactObj.clone(false, false, false, false);    c.AccountId
            = a.Id;    contacts.add(c);
        }

        if (contacts.size() > 0) {
insert contacts;
        }
    }
}

```

2. AddPrimaryContactTest.apxc

```
@isTest public class
AddPrimaryContactTest{
    @testSetup    static
    void setup(){
        List<Account> lstOfAcc = new List<Account>();    for(Integer
i = 1; i <= 100; i++){        if(i <= 50)
            lstOfAcc.add(new Account(name='AC'+i, BillingState = 'NY'));
        else
            lstOfAcc.add(new Account(name='AC'+i, BillingState = 'CA'));
        }

        INSERT lstOfAcc;
    }

    static testmethod void testAddPrimaryContact(){        Contact
con = new Contact(LastName = 'TestCont');
        AddPrimaryContact addPCIns = new AddPrimaryContact(CON , 'CA');

        Test.startTest();
        System.enqueueJob(addPCIns);
        Test.stopTest();

        System.assertEquals(50, [select count() from Contact]);
    }
}
```

•SCHEDULE JOBS USING APEX SCHEDULER:

1. DailyLeadProcessor.apxc

```
public class DailyLeadProcessor implements Schedulable {
    Public void execute(SchedulableContext SC){
        List<Lead> LeadObj=[SELECT Id from Lead where LeadSource=null limit 200];
        for(Lead l:LeadObj){
            l.LeadSource='Dreamforce';
        }
    }
}
```



```

        update l;
    }
}
}

```

2. DailyLeadProcessorTest.apxc

```

@isTest private class
DailyLeadProcessorTest { static testMethod
void testDailyLeadProcessor() {    String
    CRON_EXP = '0 0 1 * * ?';
        List<Lead> lList = new List<Lead>();    for (Integer i = 0; i < 200; i++) {
lList.add(new Lead(LastName='Dreamforce'+i, Company='Test1 Inc.', Status='Open
- Not Contacted'));
        }
        insert lList;

        Test.startTest();
        String jobId = System.schedule('DailyLeadProcessor', CRON_EXP, new
DailyLeadProcessor());
    }
}

```

APEX INTEGRATION SERVICES

•APEX REST CALLOUTS:

1. AnimalLocator.apxc

```

public class AnimalLocator {
    public static String getAnimalNameById(Integer animalId) {
        String animalName;
        Http http = new Http();
    }
}

```

```

    HttpRequest request = new HttpRequest();
    request.setEndpoint('https://thapexhttpcallout.herokuapp.com/animals/'+animalId)
;    request.setMethod('GET');
    HttpResponse response = http.send(request);
    // If the request is successful, parse the JSON response.
    if(response.getStatusCode() == 200) {
        Map<String, Object> r = (Map<String, Object>)
            JSON.deserializeUntyped(response.getBody());
        Map<String, Object> animal = (Map<String, Object>)r.get('animal');    animalName
= string.valueOf(animal.get('name'));
    }
    return animalName;
}
}

```

2. AnimalLocatorMock.apxc

```

@isTest global class AnimalLocatorMock implements
HttpCalloutMock {    global HTTPResponse respond(HTTPRequest
request) {
    HttpResponse response = new HttpResponse();    response.setHeader('Content-
Type', 'application/json');
    response.setBody('{"animal":{"id":1,"name":"chicken","eats":"chicken
food","says":"cluck cluck"}}');
    response.getStatusCode(200);
    return response;
}
}

```

3. AnimalLocatorTest.apxc

```

@isTest private class AnimalLocatorTest { @isTest
static void getAnimalNameById()
{
    // Set mock callout class
    Test.setMock(HttpCalloutMock.class, new AnimalLocatorMock());
    // This causes a fake response to be sent
}
}

```

```

// from the class that implements HttpCalloutMock.
String response = AnimalLocator.getAnimalNameById(1);
// Verify that the response received contains fake values    System.assertEquals('chicken',
response);
}
}

```

•APEX SOAP CALLOUTS:

1. ParkLocator.apxc

```

public class ParkLocator {
    public static String [] country (String x) {
        String parks = x; // {'Yellowstone','Kanha','Mount Fuji'};
        ParkService.ParksImplPort findCountries = new ParkService.ParksImplPort ();    return
findCountries.byCountry (parks);
    }
}

```

2. ParkLocatorTest.apxc

```

@isTest public class
ParkLocatorTest {
    @isTest static void testCallout () {
        // This causes a fake response to be generated
        Test.setMock (WebServiceMock.class, new ParkServiceMock ());
        String x ='Yellowstone';
        List <String> result = ParkLocator.country(x);

        string resultstring = string.join (result,',');    System.assertEquals
('USA', resultstring);
    }
}

```

3. ParkServiceMock

@isTest global class ParkServiceMock implements

```

WebServiceMock {    global void doInvoke (        Object stub,
        Object request,
        Map <String,Object> response,
        String endpoint,
        String soapAction,
        String requestName,
        String responseNS,
        String responseName,
        String responseType) {
        ParkService.byCountryResponse response_x =new ParkService.byCountryResponse
    );
        response_x.return_x = new List <String> {'USA'};
    response.put ('response_x', response_x);
    }
}

```

•APEX WEB SERVICES:

1.AccountManager.apxc

```

@RestResource(urlMapping='/Accounts/*/contacts') global with sharing class
AccountManager{
    @HttpGet
    global static Account getAccount(){        RestRequest
    req = RestContext.request;
        String accId = req.requestURI.substringBetween('Accounts/', '/contacts');
        Account acc = [SELECT Id, Name, (SELECT Id, Name FROM Contacts)
            FROM Account WHERE Id = :accId];

        return acc;
    }
}

```

2. AccountManagerTest.apxc

```
@IsTest private class AccountManagerTest{
@isTest static void testAccountManager(){
    Id recordId = getTestAccountId();
    // Set up a test request
    RestRequest request = new RestRequest();    request.requestUri
=
    'https://ap5.salesforce.com/services/apexrest/Accounts/'+ recordId +'/contacts';
    request.httpMethod = 'GET';
    RestContext.request = request;

    // Call the method to test
    Account acc = AccountManager.getAccount();

    // Verify results
    System.assert(acc != null);
}

private static Id getTestAccountId(){
    Account acc = new Account(Name = 'TestAcc2');
    Insert acc;

    Contact con = new Contact(LastName = 'TestCont2', AccountId = acc.Id);
    Insert con;

    return acc.Id;
}
}
```

APEX SPECIALIST SUPERBADGE

•AUTOMATE RECORD CREATION:

1. MaintenanceRequest.apxt

```
trigger MaintenanceRequest on Case (before update, after update) {    //
ToDo: Call MaintenanceRequestHelper.updateWorkOrders
if(Trigger.isUpdate && Trigger.isAfter){

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

}
}
```

2. MaintenanceRequestHelper.apxc

```
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);

        }
    }
}

if (!validIds.isEmpty()){
    List<Case> newCases = new List<Case>();
    Map<Id,Case> closedCasesM = 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>();
    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'));
    }

    for(Case cc : closedCasesM.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 (maintenanceCycles.containsKey(cc.Id)){          nc.Date_Due__c
= Date.today().addDays((Integer) maintenanceCycles.get(cc.Id));
        }

        newCases.add(nc);
    }

    insert newCases;

    List<Equipment_Maintenance_Item_c> clonedWPs = new
List<Equipment_Maintenance_Item__c>();          for (Case nc :
newCases){          for

```

```

(Equipment_Maintenance_Item_c wp :
closedCasesM.get(nc.ParentId).Equipment_Maintenance_Items_r){
Equipment_Maintenance_Item_c wpClone = wp.clone();
wpClone.Maintenance_Request_c = nc.Id;
    ClonedWPs.add(wpClone);

    }
    }
    insert ClonedWPs;
}
}
}
}

```

•SYNCHRONIZATION SALESFORCE DATA WITH AN EXTERNAL SYSTEM:

1.WarehouseCalloutService.apxc

```

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

```

//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(){
```

```
    Http http = new Http();
```

```
    HttpRequest request = new HttpRequest();
```

```
    request.setEndpoint(WAREHOUSE_URL);    request.setMethod('GET');
```

```
    HttpResponse response = http.send(request);
```

```
    List<Product2> warehouseEq = new List<Product2>();
```

```
    if (response.getStatusCode() == 200){
```



```

        List<Object> jsonResponse =
(List<Object>)JSON.deserializeUntyped(response.getBody());
        System.debug(response.getBody());

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

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

public static void execute (QueueableContext context){
runWarehouseEquipmentSync();
} }

```

•SCHEDULE SYNCHRONIZATION USING APEX CODE:

1.WarehouseSyncSchedule.apxc

```

global class WarehouseSyncSchedule implements Schedulable {

```

```

global void execute(SchedulableContext ctx) {

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

```

•TEST AUTOMATION LOGIC:

1. MaintenanceRequestHelperTest.apxc

```

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);

        }
    }
}

    if (!validIds.isEmpty()){
        List<Case> newCases = new List<Case>();
        Map<Id,Case> closedCasesM = 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>();
        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'));        }

        for(Case cc : closedCasesM.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 (maintenanceCycles.containsKey(cc.Id)){            nc.Date_Due__c
= Date.today().addDays((Integer) maintenanceCycles.get(cc.Id));
        }

            newCases.add(nc);
        }

        insert newCases;

        List<Equipment_Maintenance_Item_c> clonedWPs = new
List<Equipment_Maintenance_Item__c>();            for (Case nc :
newCases){            for
(Equipment_Maintenance_Item_c wp :
closedCasesM.get(nc.ParentId).Equipment_Maintenance_Items_r){
Equipment_Maintenance_Item_c wpClone = wp.clone();
wpClone.Maintenance_Request_c = nc.Id;
                ClonedWPs.add(wpClone);

```

```

    }
}
insert ClonedWPs;
}
}
}

```

2. MaintenanceRequestHelper.apxc

@istest public with sharing class

MaintenanceRequestHelperTest {

```

    private static final string STATUS_NEW = 'New';    private static
final string WORKING = 'Working';    private static final string
CLOSED = 'Closed';    private static final string REPAIR = 'Repair';
private static final string REQUEST_ORIGIN = 'Web';    private static
final string REQUEST_TYPE = 'Routine Maintenance';    private static
final string REQUEST_SUBJECT = 'Testing subject';

```

```

    PRIVATE STATIC Vehicle__c createVehicle(){
        Vehicle__c Vehicle = new Vehicle__C(name = 'SuperTruck');    return
Vehicle;
    }

```

```

    PRIVATE STATIC Product2 createEq(){    product2 equipment = new
product2(name = 'SuperEquipment',
        lifespan_months__C = 10,
maintenance_cycle__C = 10,    replacement_part__c
= true);    return equipment;
    }

```

```

    PRIVATE STATIC Case createMaintenanceRequest(id vehicleId, id equipmentId){
case cs = new case(Type=REPAIR,
        Status=STATUS_NEW,
        Origin=REQUEST_ORIGIN,
        Subject=REQUEST_SUBJECT,
        Equipment__c=equipmentId,

```

```
Vehicle__c=vehicleId);    return cs;
}
```

```
PRIVATE STATIC Equipment_Maintenance_Item_c createWorkPart(id equipmentId,id
requestId){
    Equipment_Maintenance_Item_c wp = new
Equipment_Maintenance_Item_c(Equipment_c = equipmentId,
                             Maintenance_Request__c = requestId);    return
wp;
}
```

```
@istest
private static void testMaintenanceRequestPositive(){
Vehicle__c vehicle = createVehicle();    insert vehicle;
    id vehicleId = vehicle.Id;
```

```
    Product2 equipment = createEq();    insert
equipment;
    id equipmentId = equipment.Id;
```

```
    case somethingToUpdate = createMaintenanceRequest(vehicleId,equipmentId);
insert somethingToUpdate;
```

```
    Equipment_Maintenance_Item_c workP =
createWorkPart(equipmentId,somethingToUpdate.id);    insert
workP;
```

```
    test.startTest();
    somethingToUpdate.status = CLOSED;
update somethingToUpdate;
test.stopTest();
```

```
Case newReq = [Select id, subject, type, Equipment_c, Date_Reported_c, Vehicle_c,
Date_Due_c
```

```
        from case           where status  
=:STATUS_NEW];
```

```
Equipment_Maintenance_Item__c workPart = [select id  
        from Equipment_Maintenance_Item__c  
where Maintenance_Request__c =:newReq.Id];
```

```
system.assert(workPart != null);  
system.assert(newReq.Subject != null);    system.assertEquals(newReq.Type,  
REQUEST_TYPE);  
SYSTEM.assertEquals(newReq.Equipment__c, equipmentId);  
SYSTEM.assertEquals(newReq.Vehicle__c, vehicleId);  
SYSTEM.assertEquals(newReq.Date_Reported__c, system.today());  
}
```

```
@istest
```

```
private static void testMaintenanceRequestNegative(){  
Vehicle__C vehicle = createVehicle();    insert vehicle;  
id vehicleId = vehicle.Id;
```

```
product2 equipment = createEq();  
insert equipment;    id equipmentId  
= equipment.Id;
```

```
case emptyReq = createMaintenanceRequest(vehicleId,equipmentId);  
insert emptyReq;
```

```
Equipment_Maintenance_Item__c workP = createWorkPart(equipmentId, emptyReq.Id);  
insert workP;
```

```
test.startTest();  
emptyReq.Status = WORKING;  
update emptyReq;    test.stopTest();
```

```
list<case> allRequest = [select id
```

```

        from case];

Equipment_Maintenance_Item__c workPart = [select id
        from Equipment_Maintenance_Item__c
where Maintenance_Request__c = :emptyReq.Id];

    system.assert(workPart != null);
system.assert(allRequest.size() == 1);
}

@istest    private static void testMaintenanceRequestBulk(){
list<Vehicle_C> vehicleList = new list<Vehicle_C>();
list<Product2> equipmentList = new list<Product2>();
list<Equipment_Maintenance_Item__c> workPartList = new
list<Equipment_Maintenance_Item__c>();    list<case> requestList
= new list<case>();    list<id> oldRequestIds
= new list<id>();

    for(integer i = 0; i < 300; i++){
vehicleList.add(createVehicle());        equipmentList.add(createEq());
    }
    insert vehicleList;    insert
equipmentList;

    for(integer i = 0; i < 300; i++){
requestList.add(createMaintenanceRequest(vehicleList.get(i).id,
equipmentList.get(i).id));
    }
    insert requestList;

    for(integer i = 0; i < 300; i++){
workPartList.add(createWorkPart(equipmentList.get(i).id, requestList.get(i).id));
    }
    insert workPartList;

    test.startTest();

```

```

for(case req : requestList){          req.Status
= CLOSED;
oldRequestIds.add(req.Id);
    }
    update requestList;
test.stopTest();

list<case> allRequests = [select id
                        from case          where
status =: STATUS_NEW];

list<Equipment_Maintenance_Item__c> workParts = [select id
                                                from Equipment_Maintenance_Item__c
                                                where Maintenance_Request__c in: oldRequestIds];

system.assert(allRequests.size() == 300);
}
}

```

3. MaintenanceRequest.apxt

```

trigger MaintenanceRequest on Case (before update, after update) {    //
ToDo: Call MaintenanceRequestHelper.updateWorkOrders
if(Trigger.isUpdate && Trigger.isAfter){
MaintenanceRequestHelper.updateWorkOrders(Trigger.New, Trigger.OldMap);

}
}

```

•TEST CALLOUT LOGIC:

1. WarehouseCalloutService.apxc

```

public with sharing class WarehouseCalloutService implements Queueable {    private static
final String WAREHOUSE_URL = 'https://thsUPERBADGEApex.HEROKUAPP.COM/equipment';

```


//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(){
    Http http = new Http();
    HttpRequest request = new HttpRequest();

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

    List<Product2> warehouseEq = new List<Product2>();

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

        //class maps the following fields: replacement part (always true), cost, current
inventory, lifespan, maintenance cycle, and warehouse SKU
        //warehouse SKU will be external ID for identifying which equipment records to update
within Salesforce
        for (Object eq : jsonResponse){
            Map<String,Object> mapJson = (Map<String,Object>)eq;          Product2 myEq
= new Product2();              myEq.Replacement_Part_c = (Boolean)
mapJson.get('replacement');    myEq.Name = (String) mapJson.get('name');
myEq.Maintenance_Cycle_c = (Integer) mapJson.get('maintenanceperiod');
myEq.Lifespan_Months_c = (Integer) mapJson.get('lifespan');
myEq.Cost__c = (Integer) mapJson.get('cost');          myEq.Warehouse_SKU_c = (String)
mapJson.get('sku');          myEq.Current_Inventory__c = (Double)
mapJson.get('quantity');      myEq.ProductCode = (String) mapJson.get('_id');
warehouseEq.add(myEq);
        }
    }
}
```

```

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

```

```

    public static void execute (QueueableContext context){
runWarehouseEquipmentSync();
    }
}

```

2. WarehouseCalloutServiceTest.apxc

@isTest

```

private class WarehouseCalloutServiceTest {
    @isTest
    static void testWareHouseCallout(){
        Test.startTest();
        // implement mock callout test here
        Test.setMock(HTTPCalloutMock.class, new WarehouseCalloutServiceMock());
        WarehouseCalloutService.runWarehouseEquipmentSync();
        Test.stopTest();
        System.assertEquals(1, [SELECT count() FROM Product2]);
    }
}

```

3. WarehouseCalloutServiceMock.apxc

```

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

```

```

        System.assertEquals('https://th-superbadge-apex.herokuapp.com/equipment',
request.getEndpoint());
        System.assertEquals('GET', request.getMethod());

        // Create a fake response
        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"}');
        response.setStatusCode(200);
        return response;
    }
}

```

•TEST SCHEDULING LOGIC:

1. WarehouseSyncSchedule.apxc

```

global class WarehouseSyncSchedule implements Schedulable {
    global void execute(SchedulableContext ctx) {

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

```

2. WarehouseSyncScheduleTest.apxc

```

@isTest public class
WarehouseSyncScheduleTest {

    @isTest static void WarehousescheduleTest(){
        String scheduleTime = '00 00 01 * * ?';
        Test.startTest();
    }
}

```

```
Test.setMock(HttpCalloutMock.class, new WarehouseCalloutServiceMock());    String
jobID=System.schedule('Warehouse Time To Schedule to Test',
scheduleTime, new WarehouseSyncSchedule());
Test.stopTest();
//Contains schedule information for a scheduled job. CronTrigger is similar to a cron job on
UNIX systems.
// This object is available in API version 17.0 and later.
CronTrigger a=[SELECT Id FROM CronTrigger where NextFireTime > today];
System.assertEquals(jobID, a.Id,'Schedule ');

}
}
```


