**APEX SPECIALIST SUPERBADGE**

**CHALLENGE 1-Automate record creation:**

**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));  
                } 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> 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;  
        }  
    }  
}

**MaitenanceRequest.apxt :-**

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

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

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

    }

}

**CHALLENGE 2 :Synchronize Salesforce data with an external system**

**WarehouseCalloutService.apxc :-**

public with sharing class WarehouseCalloutService implements Queueable {

    private static final String WAREHOUSE\_URL = 'https://th-superbadge-apex.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();

    }

}

**anonymous window:**

System.enqueueJob(new WarehouseCalloutService());

**CHALLENGE 3: Schedule synchronization using Apex code**

**WarehouseSyncShedule.apxc :-**

global with sharing class WarehouseSyncSchedule implements Schedulable{

    global void execute(SchedulableContext ctx){

        System.enqueueJob(new WarehouseCalloutService());

    }

}

**CHALLENGE 4: Test automation logic**

**MaintenanceRequestHelperTest.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);

    }

}

**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;

        }

    }

}

**MaintenanceRequest.apxt :-**

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

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

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

    }

}

**CHALLENGE 5: Test callout logic**

**WarehouseCalloutService.apxc :-**

public with sharing class WarehouseCalloutService {

    private static final String WAREHOUSE\_URL = 'https://th-superbadge-apex.herokuapp.com/equipment';

    //@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());

            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 = (Decimal) mapJson.get('lifespan');

                myEq.Warehouse\_SKU\_\_c = (String) mapJson.get('sku');

                myEq.Current\_Inventory\_\_c = (Double) mapJson.get('quantity');

                warehouseEq.add(myEq);

            }

            if (warehouseEq.size() > 0){

                upsert warehouseEq;

                System.debug('Your equipment was synced with the warehouse one');

                System.debug(warehouseEq);

            }

        }

    }

}

**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]);

    }

}

**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;

    }

}

**CHALLENGE 6 : Test scheduling logic**

**WarehouseSyncSchedule.apxc :-**

global class WarehouseSyncSchedule implements Schedulable {

    global void execute(SchedulableContext ctx) {

        WarehouseCalloutService.runWarehouseEquipmentSync();

    }

}

**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 ');

    }

}