APEX SPECIALIST SUPERBADGE -1
Appex Triggers

1.RandomContactFactory.apxc

```
public class RandomContactFactory {
    public static List<Contact> generateRandomContacts(Integer num,String lastName){
        List<Contact> contactList=new List<Contact>();
        for(Integer i=1;i<=num;i++){
            Contact ct=new Contact(FirstName='Test'+i,LastName=lastName);
            contactList.add(ct);
        }
        return contactList;
    }
}
```

2.AccountAddressTrigger.apxt

```
trigger AccountAddressTrigger on Account (before insert,before update) {
    for (Account account : trigger.new){
        if(account.Match_Billing_Address__c==true){
            account.ShippingPostalCode=account.BillingPostalCode;
        }
    }
}
```

Bulk Apex Triggers

1.ClosedOpportunityTrigger.apxt

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

Apex Testings

```
1.VerifyDate.apxc
 public class VerifyDate {

        //method to handle potential checks against two dates
        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);
                }
        }

        //method to check if date2 is within the next 30 days of date1
        private static Boolean DateWithin30Days(Date date1, Date date2) {
                //check for date2 being in the past
        if( date2 < date1) { return false; }

        //check that date2 is within (>=) 30 days of date1
        Date date30Days = date1.addDays(30); //create a date 30 days away from date1
                if( date2 >= date30Days ) { return false; }
                else { return true; }
        }

        //method to return the end of the month of a given date
        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
public class TestVerifyDate
{
   static testMethod void testMethod1()
   {
      Date d = VerifyDate.CheckDates(System.today(),System.today()+1);
```

```
            Date d1 = VerifyDate.CheckDates(System.today(),System.today()+60);
    }
}


 TextApexTriggers
1.RestrictContactByName.apxt
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');
                }


        }



}


2.TestRestrictContactByName.apxc
@IsTest
public class TestRestrictContactByName {
    @IsTest static void createBadContact(){

        Contact c=new Contact(Firstname='John',LastName='INVALIDNAME');

        Test.startTest();
        Database.SaveResult result = Database.insert(c, false);
        Test.stopTest();

        System.assert(!result.isSuccess());
    }
}

Create Test Data For Apex Tests
1.RandomContactFactory.apxc
public class RandomContactFactory {
    public static List<Contact> generateRandomContacts(Integer num,String lastName){
        List<Contact> contactList=new List<Contact>();
      for(Integer i=1;i<=num;i++){
```

```
        Contact ct=new Contact(FirstName='Test'+i,LastName=lastName);
        contactList.add(ct);
    }
    return contactList;
  }
}


  ASYNCHRONOUS APEX
Use Future Methods
1.AccountProcessor.apxc
public class AccountProcessor {
   @future
   public static void countContacts(List<Id> accountIds){
      List<Account> accounts = [Select Id, Name from Account Where Id IN : accountIds];
      List<Account> updatedAccounts = new List<Account>();
      for(Account account : accounts){
         account.Number_of_Contacts__c = [Select count() from Contact Where AccountId =:
account.Id];
          System.debug('No Of Contacts = ' + account.Number_of_Contacts__c);
          updatedAccounts.add(account);
      }
      update updatedAccounts;
   }

}

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

```
public class LeadProcessor implements Database.Batchable<sObject> {

    public Database.QueryLocator start(Database.BatchableContext bc) {
        // collect the batches of records or objects to be passed to execute
        return Database.getQueryLocator([Select LeadSource From Lead ]);
    }
    public void execute(Database.BatchableContext bc, List<Lead> leads){
        // process each batch of records
        for (Lead Lead : leads) {
            lead.LeadSource = 'Dreamforce';
        }
        update leads;
    }
    public void finish(Database.BatchableContext bc){
    }

}
```

2.LeadProcessorTest.apxc

```
@isTest
public class LeadProcessorTest {

    @testSetup
    static void setup() {
        List<Lead> leads = new List<Lead>();
```

```
      for(Integer counter=0 ;counter <200;counter++){
        Lead lead = new Lead();
        lead.FirstName ='FirstName';
        lead.LastName ='LastName'+counter;
        lead.Company ='demo'+counter;
        leads.add(lead);
      }
      insert leads;
    }

    @isTest static void test() {
      Test.startTest();
      LeadProcessor leadProcessor = new LeadProcessor();
      Id batchId = Database.executeBatch(leadProcessor);
      Test.stopTest();
    }

}
```

Control Processes with Queuable Apex
1.AddPrimaryContact.apxc

```
public class AddPrimaryContact implements Queueable
{
    private Contact c;
    private String state;
    public  AddPrimaryContact(Contact c, String state)
    {
      this.c = c;
      this.state = state;
    }
    public void execute(QueueableContext context)
    {
      List<Account> ListAccount = [SELECT ID, Name ,(Select id,FirstName,LastName from
contacts ) FROM ACCOUNT WHERE BillingState = :state LIMIT 200];
      List<Contact> lstContact = new List<Contact>();
      for (Account acc:ListAccount)
      {
          Contact cont = c.clone(false,false,false,false);
          cont.AccountId =  acc.id;
          lstContact.add( cont );
      }
```

```
        if(lstContact.size() >0 )
        {
            insert lstContact;
        }

    }

}

2.AddPrimaryContactTest.apxc
@isTest
public class AddPrimaryContactTest
{
    @isTest static void TestList()
    {
        List<Account> Teste = new List <Account>();
        for(Integer i=0;i<50;i++)
        {
            Teste.add(new Account(BillingState = 'CA', name = 'Test'+i));
        }
        for(Integer j=0;j<50;j++)
        {
            Teste.add(new Account(BillingState = 'NY', name = 'Test'+j));
        }
        insert Teste;

        Contact co = new Contact();
        co.FirstName='demo';
        co.LastName ='demo';
        insert co;
        String state = 'CA';

        AddPrimaryContact apc = new AddPrimaryContact(co, state);
        Test.startTest();
            System.enqueueJob(apc);
        Test.stopTest();
    }
}
```

Schedule Jobs using the 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 x){
      Http http = new Http();
      HttpRequest req = new HttpRequest();
      req.setEndpoint('https://th-apex-http-callout.herokuapp.com/animals/' + x);
      req.setMethod('GET');
      Map<String, Object> animal= new Map<String, Object>();
      HttpResponse res = http.send(req);
        if (res.getStatusCode() == 200) {
```

```apex
        Map<String, Object> results = (Map<String,
Object>)JSON.deserializeUntyped(res.getBody());
    animal = (Map<String, Object>) results.get('animal');
      }
return (String)animal.get('name');
   }
}
```

2.AnimalLocatorTest.apxc
```apex
@isTest
private class AnimalLocatorTest{
   @isTest static void AnimalLocatorMock1() {
      Test.setMock(HttpCalloutMock.class, new AnimalLocatorMock());
      string result = AnimalLocator.getAnimalNameById(3);
      String expectedResult = 'chicken';
      System.assertEquals(result,expectedResult );
   }
}
```
3.AnimalLocatorMock.apxc
```apex
@isTest
global class AnimalLocatorMock implements HttpCalloutMock {
    // Implement this interface method
   global HTTPResponse respond(HTTPRequest request) {
     // Create a fake response
     HttpResponse response = new HttpResponse();
     response.setHeader('Content-Type', 'application/json');
     response.setBody('{"animals": ["majestic badger", "fluffy bunny", "scary bear", "chicken",
"mighty moose"]}');
     response.setStatusCode(200);
     return response;
   }
}
```

Apex SOAP Callouts
1.ParkLocator.apxc
```apex
public class ParkLocator {
   public static string[] country(string theCountry) {
     ParkService.ParksImplPort  parkSvc = new  ParkService.ParksImplPort(); // remove space
     return parkSvc.byCountry(theCountry);
   }
}
```

```apex
2.ParkLocatorTest.apxc
@isTest
private class ParkLocatorTest {
    @isTest static void testCallout() {
        Test.setMock(WebServiceMock.class, new ParkServiceMock ());
        String country = 'United States';
        List<String> result = ParkLocator.country(country);
        List<String> parks = new List<String>{'Yellowstone', 'Mackinac National Park', 'Yosemite'};
        System.assertEquals(parks, result);
    }
}


3.ParkServiceMock.apxc
@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) {
        // start - specify the response you want to send
        ParkService.byCountryResponse response_x = new ParkService.byCountryResponse();
        response_x.return_x = new List<String>{'Yellowstone', 'Mackinac National Park', 'Yosemite'};
        // end
        response.put('response_x', response_x);
    }
}
4.AsyncParkService.apxc
//Generated by wsdl2apex

public class AsyncParkService {
    public class byCountryResponseFuture extends System.WebServiceCalloutFuture {
        public String[] getValue() {
            ParkService.byCountryResponse response =
(ParkService.byCountryResponse)System.WebServiceCallout.endInvoke(this);
```

```apex
        return response.return_x;
      }
    }
    public class AsyncParksImplPort {
      public String endpoint_x = 'https://th-apex-soap-service.herokuapp.com/service/parks';
      public Map<String,String> inputHttpHeaders_x;
      public String clientCertName_x;
      public Integer timeout_x;
      private String[] ns_map_type_info = new String[]{'http://parks.services/', 'ParkService'};
      public AsyncParkService.byCountryResponseFuture beginByCountry(System.Continuation
continuation,String arg0) {
        ParkService.byCountry request_x = new ParkService.byCountry();
        request_x.arg0 = arg0;
        return (AsyncParkService.byCountryResponseFuture)
System.WebServiceCallout.beginInvoke(
          this,
          request_x,
          AsyncParkService.byCountryResponseFuture.class,
          continuation,
          new String[]{endpoint_x,
          '',
          'http://parks.services/',
          'byCountry',
          'http://parks.services/',
          'byCountryResponse',
          'ParkService.byCountryResponse'}
        );
      }
    }
}
```

Apex Web Services
1.AccountManager.apxc

```apex
@RestResource(urlMapping='/Accounts/*/contacts')
global 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 {

    private static testMethod void getAccountTest1() {
        Id recordId = createTestRecord();
        // Set up a test request
        RestRequest request = new RestRequest();
        request.requestUri = 'https://na1.salesforce.com/services/apexrest/Accounts/'+ recordId
+'/contacts' ;
        request.httpMethod = 'GET';
        RestContext.request = request;
        // Call the method to test
        Account thisAccount = AccountManager.getAccount();
        // Verify results
        System.assert(thisAccount != null);
        System.assertEquals('Test record', thisAccount.Name);

    }

    // Helper method
        static Id createTestRecord() {
        // Create test record
        Account TestAcc = new Account(
          Name='Test record');
        insert TestAcc;
        Contact TestCon= new Contact(
        LastName='Test',
        AccountId = TestAcc.id);
        return TestAcc.Id;
    }
}

APEX SPECIALIST
Step2:Automate Record Creation
1.MaintainanceRequest.apxt
trigger MaintenanceRequest on Case (before update, after update) {
```

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

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

    }

}
```

2.MaintainanceRequestHelper.apxc
```apex
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'));
            }
```

```apex
        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;
    }
  }
}

3.MaintainanceRequestHelperTest.apxc
public with sharing class MaintenanceRequestHelper {
    public static void updateworkOrders(List<Case> updWorkOrders, Map<Id,Case>
```

```apex
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()

            );
```

```apex
            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;
    }
  }
}
```

Step 3 :Synchronize Salesforce Data With an External Organisation
1.WarehouseCalloutService.apxc

```apex
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');
```

```apex
        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);
            }

        }
    }
}
```

Step 4 :Schedule Synchronization
1.WarehouseSyncSchedule.apxc

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

        WarehouseCalloutService.runWarehouseEquipmentSync();
    }
```

```
}

2.MaintainanceRequestHelper.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,
```

```apex
                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;
    }
  }
}


3.MaintainanceRequestHelperTest.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';
```

```apex
    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();
```

```apex
        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;
```

```apex
        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);
    }
}
```

Step 6 :Test Callout Logic
1.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;
    }
}
```

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]);
    }
}
```

Step 7 :Test Scheduling Logic
1.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 ');


    }
}
```