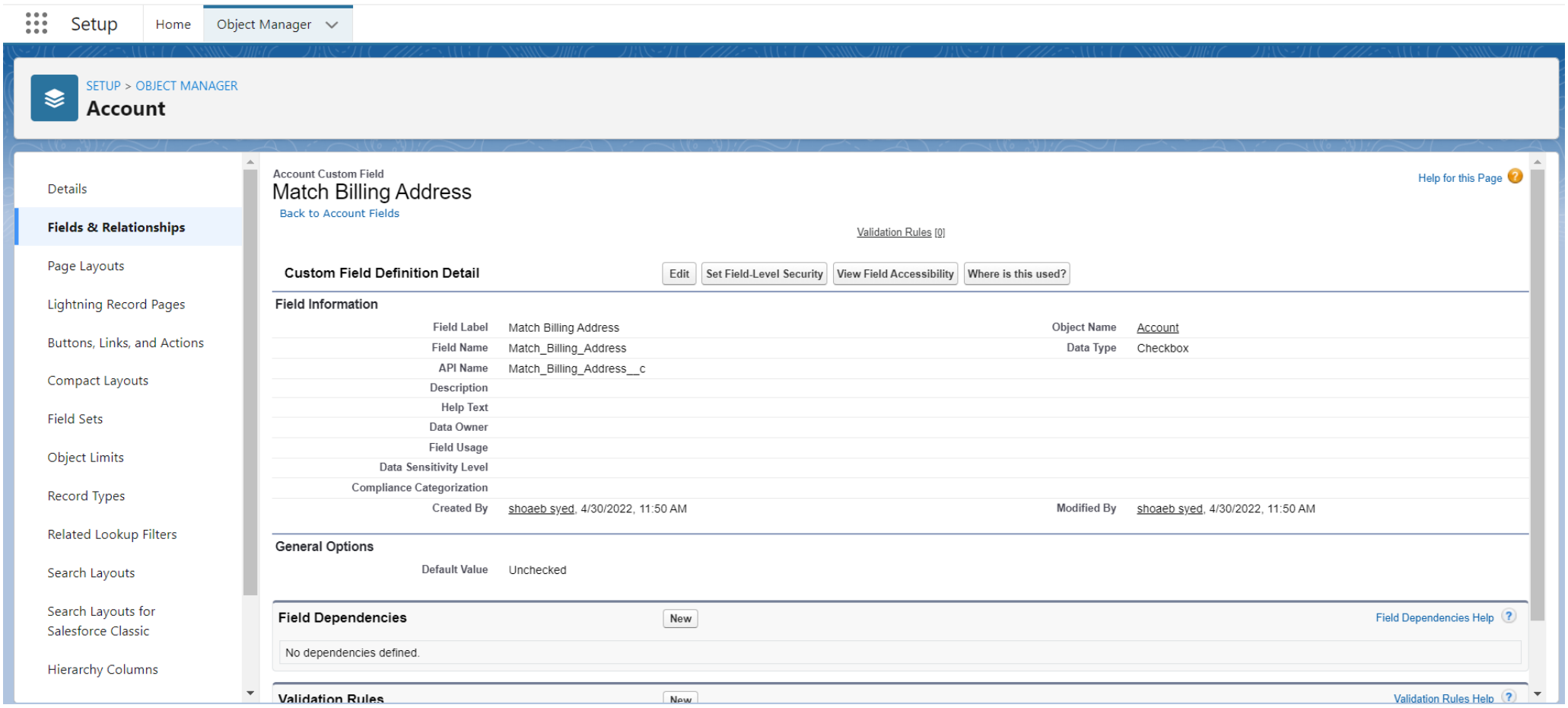
APEX MODULES

1.Apex Triggers

Get Started with Apex Triggers

Create match billing address of checkbox datatype



Create an apex trigger

```
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

Create a apex trigger Closed opprtunity

```
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;
    }
}
```

2.Apex Testing

Get Started with Apex Unit Tests

Create an apex class VerifyDate:

```
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;
 }

}
```

Create an apex class TestVerifyDate

```
@isTest
private class TestVerifyDate {

    //testing that if date2 is within 30 days of date1, should return date 2
    @isTest static void testDate2within30daysofDate1() {
        Date date1 = date.newInstance(2022, 03, 20);
        Date date2 = date.newInstance(2022, 04, 11);
        Date resultDate = VerifyDate.CheckDates(date1,date2);
        Date testDate = Date.newInstance(2022, 04, 11);
        System.assertEquals(testDate,resultDate);
    }

    //testing that date2 is before date1. Should return "false"
    @isTest static void testDate2beforeDate1() {
        Date date1 = date.newInstance(2022, 03, 20);
        Date date2 = date.newInstance(2022, 02, 11);
        Date resultDate = VerifyDate.CheckDates(date1,date2);
        Date testDate = Date.newInstance(2022, 02, 11);
        System.assertNotEquals(testDate, resultDate);
    }

    //Test date2 is outside 30 days of date1. Should return end of month.
    @isTest static void testDate2outside30daysofDate1() {
        Date date1 = date.newInstance(2022, 03, 20);
        Date date2 = date.newInstance(2022, 04, 25);
        Date resultDate = VerifyDate.CheckDates(date1,date2);
        Date testDate = Date.newInstance(2022, 03, 31);
        System.assertEquals(testDate,resultDate);
    }
}
```

Test Apex Triggers

Create an apex trigger RestrictContactByName(Code already is given):

```
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');
        }
  }
}
```

Create an apex test class called TestRestrictContactByName:

```
@isTest
public class TestRestrictContactByName {
    @isTest
    public static void testContact(){
        Contact ct = new Contact();
        ct.LastName = 'INVALIDNAME';
        Database.SaveResult res = Database.insert(ct,false);
        SSystem.assertEquals('The Last Name "INVALIDNAME" is not allowed for DML',res.getErrors()[0].getMessage());
    }
}
```

Create Test Data for Apex Tests

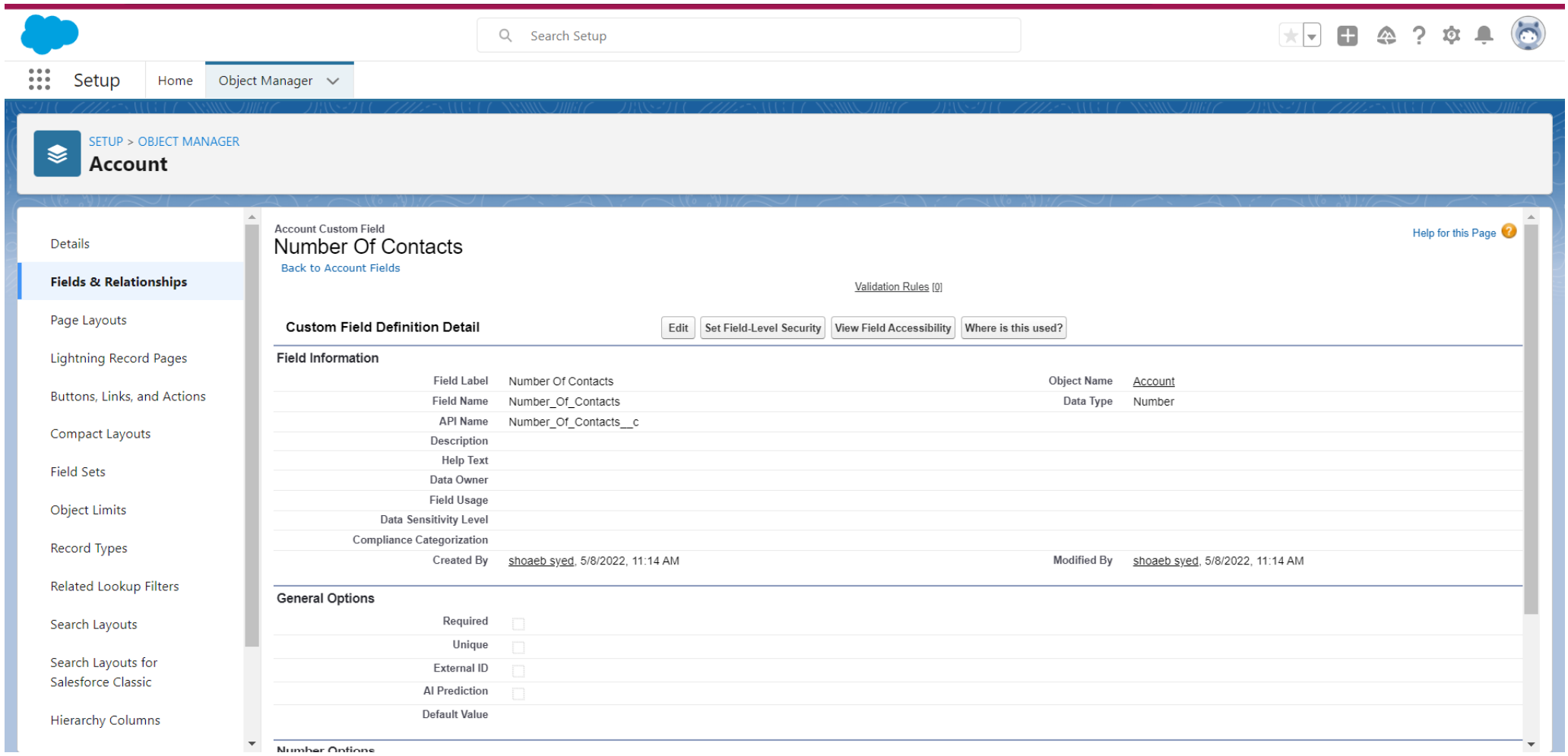
Create an apex class RandomContactFactory

```
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;
    }
}
```

3.Asynchronous Apex

Use Future Methods

Create Numerofcontacts field under Account object of number datatype of length 18



Create an apex class:

```
public class AccountProcessor {
    @future
    public static void countContacts(List<Id> accountIds){
        List<Account> accList=[Select Id, Number_of_Contacts__c, (Select Id from Contacts) from Account where Id in :accountIds];
        For (Account acc : accList){
            acc.Number_of_Contacts__c=acc.Contacts.size();
  }
        update acclist;
    }
}
```

Create an apex test class:

```
@isTest
public class AccountProcessorTest {

    public static testmethod void testAccountProcessor(){

        Account a = new Account ();
        a.Name = 'Test Account';
        insert a;

        Contact con = new Contact();
        con.FirstName = 'Syed';
        con.LastName = 'Shoaeb';
        con.AccountId = a.Id;

        insert con;

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

        Test.startTest();
        AccountProcessor.countContacts(accListId);
        Test.stopTest();

        Account acc = [Select Number_Of_Contacts__c from Account where Id =: a.Id];
        System.assertEquals(Integer.valueOf(acc.Number_Of_Contacts__c),1);
    }
}
```

Use Batch Apex

Create an apex class:

```
global class LeadProcessor implements Database.Batchable<sobject> {
    global Integer count = 0;

    global Database.QueryLocator start(Database.BatchableContext bc){
        return Database.getQueryLocator('SELECT ID, LeadSource FROM Lead');
    }
    global void execute (Database.BatchableContext bc, List<Lead> L_list){
        List<lead> L_list_new = new List<lead>();

        for(lead L:L_list){
            L.leadsource = 'Dreamforce';
            L_list_new.add(L);
            count += 1;
        }
```

```
        update L_list_new;
    }

    global void finish(Database.BatchableContext bc){
            system.debug('count = ' + count);
    }
}
```

Create an apex test class:

```
@isTest
public class LeadProcessorTest{

    @isTest
    public static void testit(){
        List<lead> L_list=new List<lead>();

        for (Integer i=0; i<200; i++){
            Lead L = new lead();
            L.LastName = 'name' + i;
            L.Company = 'Company';
            L.Status = 'Random Status';
            L_list.add(L);
        }
        insert L_list;

        Test.startTest();
        LeadProcessor lp=new LeadProcessor ();
        Id batchId = Database.executeBatch(lp);
        Test.stopTest();
    }
}
```

Control Processes with Queueable Apex

Create an apex class:

```
public class AddPrimaryContact implements Queueable{

    private Contact con;
    private String state;

    public AddPrimaryContact(Contact con, String state){
        this.con = con;
        this.state = state;
    }
    public void execute(QueueableContext context){
```

```
        List<Account> accounts=[Select Id, Name, (Select FirstName, LastName, Id from contacts)
                                from Account where BillingState = :state Limit 200];
        List<Contact> primaryContacts = new List<Contact>();

        for(Account acc:accounts){
            Contact c = con.clone();
            c.AccountId = acc.Id;
            primaryContacts.add(c);
        }

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

Create an apex test class:

```
@isTest
public class AddprimaryContactTest {

    static testmethod void testQueueable(){
        List<Account> testAccounts = new List<Account>();
        for (Integer i=0;i<50;i++){
            testAccounts.add(new Account(Name='Account '+i, BillingState='CA'));
        }
        for(Integer j=0;j<50;j++){
            testAccounts.add(new Account(Name='Account '+j,BillingState='NY'));
        }
        insert testAccounts;

        Contact testContact = new Contact(FirstName = 'John', LastName ='Doe');
        insert testContact;

        AddPrimaryContact addit = new addPrimaryContact(testContact, 'CA');

        Test.startTest();
        system.enqueueJob(addit);
        Test.stopTest();

        System.assertEquals(50,[Select count() from Contact where accountId in (Select Id from Account where BillingState='CA')]);
    }
}
```

Schedule Jobs Using the Apex Scheduler

Create an apex class:

```
global class DailyLeadProcessor implements Schedulable{
    global void execute(SchedulableContext sc){
        List<Lead> lstofLead = [SELECT Id FROM Lead WHERE Leadsource = null LIMIT 200];

        List<Lead> lstofupdatedLead = new List<lead>();
        if(!lstoflead.isEmpty()){
            for(Lead ld : lstofLead){
                 ld.Leadsource = 'Dreamforce';
                 lstofupdatedLead.add(ld);
            }
            UPDATE lstofupdatedLead;
        }
    }
}
```

Create an apex test class:

```
@isTest
private class DailyLeadProcessorTest {
    @testsetup
  static void setup(){
  List<Lead> lstofLead = new List<Lead>();
  for (Integer i = 1;i <= 200; i++){
            Lead ld=new Lead(Company='Comp'+i, LastName='LN'+i, Status='Working-Contacted');
            lstofLead.add(ld);
        }
  Insert lstofLead;
  }
    static testmethod void testDailyLeadProcessorScheduledJob(){
        String sch = '0 5 12 * * ?';
        Test.startTest();
        String jobId = System.Schedule('ScheduledApexText', sch, new DailyLeadProcessor());

        List<Lead> lstofLead = [SELECT Id FROM Lead WHERE Leadsource = null LIMIT 200];
        system.assertEquals(200, lstofLead.size());

        Test.stopTest();
    }
}
```

4.Apex Integration Services

Apex REST Callouts

Create an apex class:

```
public class AnimalLocator
{
  public static String getAnimalNameById(Integer id)
   {
        Http http = new Http();
        HttpRequest request = new HttpRequest();
        request.setEndpoint('https://th-apex-http-callout.herokuapp.com/animals/'+id);
        request.setMethod('GET');
        HttpResponse response = http.send(request);
            String strResp = '';
             system.debug('******response '+response.getStatusCode());
             system.debug('******response '+response.getBody());
          // If the request is successful, parse the JSON response.
          if (response.getStatusCode() == 200)
          {
              // Deserializes the JSON string into collections of primitive data types.
             Map<String, Object> results = (Map<String, Object>) JSON.deserializeUntyped(response.getBody());
              // Cast the values in the 'animals' key as a list
             Map<string,object> animals = (map<string,object>) results.get('animal');
              System.debug('Received the following animals:' + animals );
              strResp = string.valueof(animals.get('name'));
              System.debug('strResp >>>>>>' + strResp );
          }
          return strResp ;
    }

}
```

Create an apex mock class:

```
@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.setStatusCode(200);
        return response;
    }
}
```

Create an apex test class:

```
@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);
    }
}
```

Apex SOAP Callouts

Create an apex service:

```
public class ParkService {
    public class byCountryResponse {
        public String[] return_x;
        private String[] return_x_type_info = new String[]{'return','http://parks.services/',null,'0','-

        private String[] apex_schema_type_info = new String[]{'http://parks.services/','false','false'};
        private String[] field_order_type_info = new String[]{'return_x'};
    }
    public class byCountry {
        public String arg0;
        private String[] arg0_type_info = new String[]{'arg0','http://parks.services/',null,'0','1','false'};
        private String[] apex_schema_type_info = new String[]{'http://parks.services/','false','false'};
        private String[] field_order_type_info = new String[]{'arg0'};
    }
    public class ParksImplPort {
        public String endpoint_x = 'https://th-apex-soap-service.herokuapp.com/service/parks';
        public Map<String,String> inputHttpHeaders_x;
        public Map<String,String> outputHttpHeaders_x;
        public String clientCertName_x;
        public String clientCert_x;
        public String clientCertPasswd_x;
        public Integer timeout_x;
        private String[] ns_map_type_info = new String[]{'http://parks.services/', 'ParkService'};
        public String[] byCountry(String arg0) {
            ParkService.byCountry request_x = new ParkService.byCountry();
            request_x.arg0 = arg0;
            ParkService.byCountryResponse response_x;
            Map<String, ParkService.byCountryResponse> response_map_x = new Map<String,
ParkService.byCountryResponse>();
            response_map_x.put('response_x', response_x);
            WebServiceCallout.invoke(
              this,
```

```
            request_x,
            response_map_x,
            new String[]{endpoint_x,
            '',
            'http://parks.services/',
            'byCountry',
            'http://parks.services/',
            'byCountryResponse',
            'ParkService.byCountryResponse'}
          );
          response_x = response_map_x.get('response_x');
          return response_x.return_x;
      }
  }
}
```

Create an apex class:

```
public class ParkLocator {
    public static String[] country(String country){
        ParkService.ParksImplPort parks = new ParkService.ParksImplPort();
        String[] parksname = parks.byCountry(country);
        return parksname;
    }
}
```

Create an apex test class:

```
@isTest
private class ParkLocatorTest{
    @isTest
    static void testParkLocator() {
        Test.setMock(WebServiceMock.class, new ParkServiceMock());
        String[] arrayOfParks = ParkLocator.country('India');

        System.assertEquals('Park1', arrayOfParks[0]);
    }
}
```

Create an apex mock test class:

```
@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();
        List<String> lstOfDummyParks = new List<String> {'Park1','Park2','Park3'};
        response_x.return_x = lstOfDummyParks;
        response.put('response_x', response_x);
    }
}
```

Apex Web Services

Create an apex class:

```
@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;
    }
}
```

Create an apex test class:

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

Apex Specialist

Automate Record Creation

- Go to the App Launcher -> Search How We Roll Maintenance -> click on Maintenance Requests -> click on first case -> click Details -> change the type Repair to Routine Maintenance -> select Origin = Phone -> Vehicle = select Teardrop Camper , save it.
- Feed -> Close Case = save it..
- Go to the Object Manager -> Maintenance Request ->Field & Relationships ->New ->Lookup Relationship -> next -> select Equipment ->next -> Field Label = Equipment ->next->next->next -> save it .
- Now go to the developer console use below code

```
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;
        }
    }
}
```

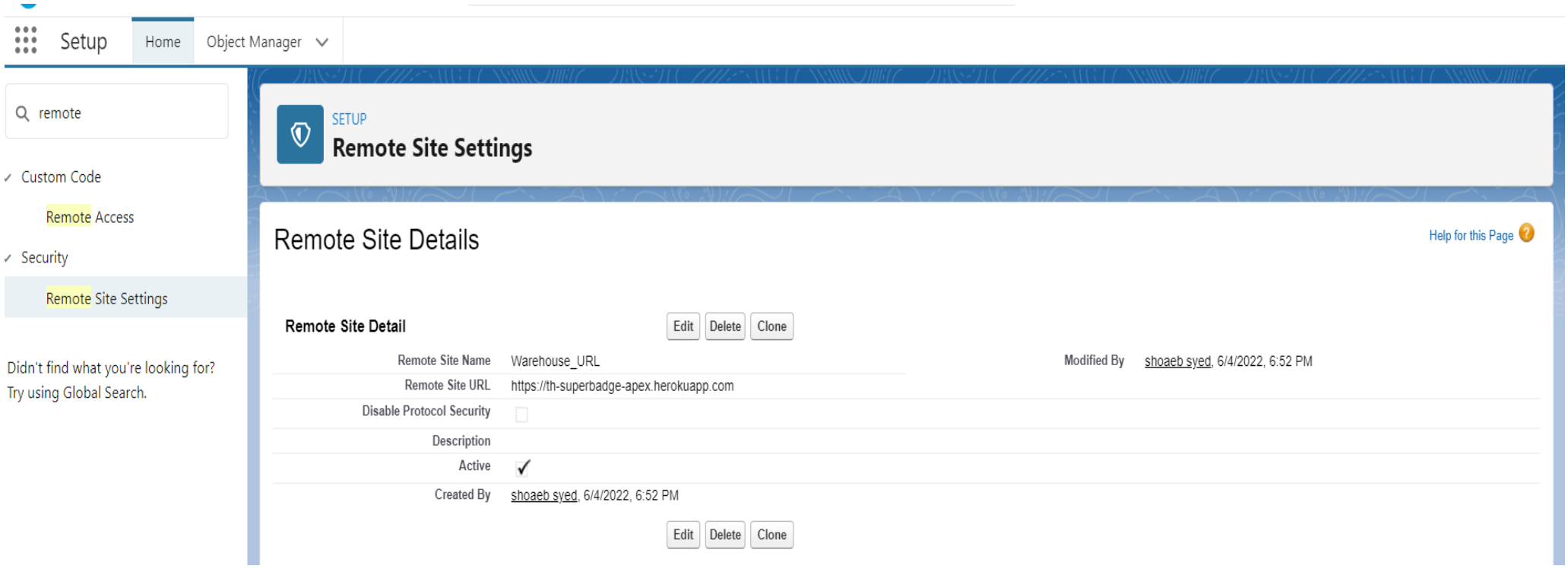
Create an Apex trigger:

```
trigger MaintenanceRequest on Case (before update, after update) {
    if(Trigger.isUpdate && Trigger.isAfter){
        MaintenanceRequestHelper.updateWorkOrders(Trigger.New, Trigger.OldMap);
    }
}
```

- After saving the code go back the How We Roll Maintenance ,
- click on Maintenance Requests -> click on 2nd case -> click Details -> change the type Repair to Routine Maintenance -> select Origin = Phone -> Vehicle = select Teardrop Camper , save it.
- Feed -> Close Case = save it.

Synchronize Salesforce data with an external system

- Setup -> Search in quick find box -> click Remote Site Settings -> Name = Warehouse URL , Remote Site URL = https://th-superbadge-apex.herokuapp.com , make sure active is selected.



- Go to the developer console use below code

```
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);
            }

        }
    }
}
```

After saving the code open execute anonymous window (CTRl+E) and run this method ,

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

Schedule Synchronization

- Go to the developer console use below code :

```
global class WarehouseSyncSchedule implements Schedulable {
    global void execute(SchedulableContext ctx) {
        WarehouseCalloutService.runWarehouseEquipmentSync();
    }
}
```

- Go to setup -> Seacrh in Quick find box -> Apex Classes -> click Schedule Apex and Job Name = WarehouseSyncScheduleJob , Apex Class = WarehouseSyncSchedule

Test Automation Logic

Create an Apex test class:

```
@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);
    }
}
```

Create an Apex class:

```
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;
        }
    }
}
```

Create an Apex trigger:

```
trigger MaintenanceRequest on Case (before update, after update) {
    if(Trigger.isUpdate && Trigger.isAfter){
        MaintenanceRequestHelper.updateWorkOrders(Trigger.New, Trigger.OldMap);
    }
}
```

Test Callout Logic

Create an Apex test class:

```
@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]);
    }
}
```

Create an Apex class:

```
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);
            }

        }
    }
}
```

Create an Apex mock class:

```
@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

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

Note-:Deleted all scheduled jobs that are under Setup -> Monitoring -> Scheduled Jobs

Test Scheduling Logic

Create an Apex test class:

```
@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();
        CronTrigger a=[SELECT Id FROM CronTrigger where NextFireTime > today];
        System.assertEquals(jobID, a.Id,'Schedule ');
    }
}
```

Create an Apex class:

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

        WarehouseCalloutService.runWarehouseEquipmentSync();
    }
}
```