

*Apex Triggers :*

[https://trailhead.salesforce.com/content/learn/modules/apex\\_triggers?trailmix\\_creator\\_id=trailblazerconnect&trailmix\\_slug=salesforce-developer-catalyst](https://trailhead.salesforce.com/content/learn/modules/apex_triggers?trailmix_creator_id=trailblazerconnect&trailmix_slug=salesforce-developer-catalyst)

### **1) Get Started with Apex Trigger**

**AccountAddressTrigger Code :**

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

### **2) Bulk Apex Triggers Unit**

**ClosedOpportunityTrigger Code :**

```
trigger ClosedOpportunityTrigger on Opportunity (after insert, after update) {
    List<Task> taskList = new List<Task>();

    for (Opportunity o :[SELECT Id,Name FROM Opportunity
        WHERE Id IN :Trigger.New]){
        taskList.add(new Task(Subject='Follow Up Test Task',
            WhatId=o.Id,
            Status='Not Started',
            Priority='Normal'));
    }
    if (taskList.size() > 0){
        insert taskList;
    }
}
```

*Apex Testing :*

[https://trailhead.salesforce.com/content/learn/modules/apex\\_testing?trailmix\\_creator\\_id=trail](https://trailhead.salesforce.com/content/learn/modules/apex_testing?trailmix_creator_id=trail)

*blazerconnect&trailmix\_slug=salesforce-developer-catalyst*

### *1)Get Started with Apex Unit Testing*

**VerifyDate Code :**

```
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;
    }
}
```

```
}
```

**TestVerifyDate Code :**

**@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);**

**}**

**}**

**2) Test Apex Triggers Unit**

**RestrictContactByName Code :**

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

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

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

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

**c.AddError('The Last Name "' + c.LastName + '" is not allowed**

**for DML');**

**}**

**}**

```
}
```

**TestRestrictContactByName Code :**

**@isTest**

**private class TestRestrictContactByName {**

**@isTest**

**static void invalidName() {**

**try {**

**Contact c = new Contact(LastName='INVALIDNAME');**

**insert c;**

**}**

**catch (Exception e) {**

**System.assert(true);**

**}**

**}**

```
}
```

**3) Create Test Data for Apex Tests :**

**RandomContactFactory Code :**

**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*

*:[https://trailhead.salesforce.com/content/learn/modules/asynchronous\\_apex?trailmix\\_creator\\_id=trailblazerconnect&trailmix\\_slug=salesforce-developer-catalyst](https://trailhead.salesforce.com/content/learn/modules/asynchronous_apex?trailmix_creator_id=trailblazerconnect&trailmix_slug=salesforce-developer-catalyst)*

1)Quiz

2)Use Future Methods

**AccountProcessor Code :**

```
public class AccountProcessor {
    @future
    public static void countContacts(List<Id> accountIds) {
        List<Account> accounts = [SELECT Id,
                                   Name,
                                   Number_of_Contacts__c,
                                   (
                                       SELECT Contact.Id
                                       FROM Contacts
                                   )
                                   FROM Account
                                   WHERE Id in :accountIds];
        for (Account a : accounts) {
            a.Number_of_Contacts__c = a.Contacts.size();
        }
        update accounts;
    }
}
```

**AccountProcessorTest Code :**

```
@isTest
private class AccountProcessorTest {
```

```

static TestMethod void myTest() {
    List<Account> accounts = new List<Account>();
    for (Integer i=0; i<100; i++) {
        Account account = new Account();
        account.Name = 'AccountProcessorTest Account ' + i;
        accounts.add(account);
    }
    insert accounts;

    List<Id> accountIds = new List<Id>();
    List<Contact> contacts = new List<Contact>();
    for (Account a : accounts) {
        accountIds.add(a.Id);
        for (Integer i=0; i<5; i++) {
            Contact contact = new Contact();
            contact.FirstName = 'AccountProcessor Test Contact';
            contact.LastName = String.valueOf(i);
            contact.AccountId = a.Id;
            contacts.add(contact);
        }
    }
    insert contacts;

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

    List<Account> results = [SELECT Id, Number_of_Contacts__c
                            FROM Account
                            WHERE Id in :accountIds];
    for (Account a : results) {
        System.AssertEquals(5, a.Number_of_Contacts__c);
    }
}
}

```

*3)Use Batch Apex*

## LeadProcessor Code :

global class LeadProcessor implements Database.Batchable<sObject>, Database.Stateful {

    global Integer recs\_processed = 0;

    global Database.QueryLocator start(Database.BatchableContext bc) {

        String sQuery = '';

        sQuery += 'SELECT Id, Name, Status,';

        sQuery += 'LeadSource ';

        sQuery += 'FROM Lead ';

        sQuery += 'LIMIT 100000';

        return Database.getQueryLocator(sQuery);

    }

    global void execute(Database.BatchableContext bc, List<Lead> scope) {

        for (Lead l : scope) {

            l.LeadSource = 'Dreamforce';

            recs\_processed += 1;

        }

        update scope;

    }

    global void finish(Database.BatchableContext bc) {

        AsyncApexJob job = [SELECT Id,

                                Status,

                                NumberOfErrors,

                                TotalJobItems,

                                JobItemsProcessed,

                                CreatedBy.Email

                FROM AsyncApexJob

                WHERE Id = :bc.getJobId()];

        String s = '';

        s += job.JobItemsProcessed + ' job items processed ';

        s += 'out of ' + job.TotalJobItems + ' total job items. ';

        s += job.NumberOfErrors + ' error(s) encountered. ';

```

        System.debug(s);
        s = recs_processed + ' record(s) processed.';
        System.debug(s);
    }
}

```

**LeadProcessorTest Code :**

```

@isTest
private class LeadProcessorTest {

    @testSetup
    static void createLeads() {
        List<Lead> leads = new List<Lead>();
        for (Integer i=0; i<200; i++) {
            Lead l = new Lead();
            l.FirstName = 'Test';
            l.LastName = 'Lead';
            l.Company = 'Test Lead ' + i;
            leads.add(l);
        }
        insert leads;
    }

    static TestMethod void myTest() {
        Test.startTest();
        LeadProcessor lp = new LeadProcessor();
        Id batchId = Database.executeBatch(lp);
        Test.stopTest();

        System.assertEquals(200, [SELECT Count()
                                FROM Lead
                                WHERE Name = 'Test Lead'
                                AND LeadSource = 'Dreamforce']);
    }
}

```



#### *4)Controp Processes with Queueable Apex*

**AddPrimaryContact Code :**

```
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;
        }
    }
}
```

**AddPrimaryContactTest Code :**

```
@isTest
private class AddPrimaryContactTest {
```

```

@testSetup
static void setup() {
    List<Account> accounts = new List<Account>();
    for (Integer i=0; i<50; i++) {
        Account ny = new Account();
        ny.Name = 'Test Account (NY)';
        ny.BillingState = 'NY';
        accounts.add(ny);
        Account ca = new Account();
        ca.Name = 'Test Account (CA)';
        ca.BillingState = 'CA';
        accounts.add(ca);
    }
    insert accounts;
}

static TestMethod void myTest() {
    Contact contactObj = new Contact(
        FirstName = 'California',
        LastName = 'Bob'
    );
    String state_abbrev = 'CA';

    Test.startTest();
    AddPrimaryContact apc = new AddPrimaryContact(contactObj, state_abbrev);
    Id jobId = System.enqueueJob(apc);
    Test.stopTest();

    List<Account> accounts = [SELECT Id, (SELECT Contact.Name FROM
Account.Contacts) FROM Account WHERE BillingState = 'CA'];
    System.assertEquals(50, accounts.size());
    for (Account a : accounts) {
        System.assertEquals(a.Contacts.size(), 1);
    }
}
}

```

### ***5)Schedule Jobs Using the Apex Scheduler***

**DailyLeadProcessor Code :**

```
global class DailyLeadProcessor implements Schedulable {

    global void execute(SchedulableContext ctx) {
        List<Lead> leads = [SELECT Id,
                               LeadSource
                               FROM Lead
                               WHERE LeadSource = '' OR LeadSource = null
                               LIMIT 200];
        for (Lead l : leads) {
            l.LeadSource = 'Dreamforce';
        }

        if (leads.size() > 0) {
            update leads;
        }
    }
}
```

**DailyLeadProcessorTest Code :**

```
@isTest
private class DailyLeadProcessorTest {

    @testSetup
    static void setup() {
        List<Lead> leads = new List<Lead>();
        for (Integer i=0; i<200; i++) {
            Lead l = new Lead();
            l.FirstName = 'Test';
            l.LastName = 'Lead ' + i;
        }
    }
}
```

```

        l.Company = 'Test Company ' + i;
        leads.add(l);
    }
    insert leads;
}

static TestMethod void myTest() {
    String jobName = 'Daily Lead Processor - Test';
    String CRON_EXP = '0 0 0 15 3 ? 2017'; // dummy cron entry

    test.startTest();
    DailyLeadProcessor dp = new DailyLeadProcessor();
    String JobId = System.schedule(jobName, CRON_EXP, dp);
    test.stopTest();

    List<Lead> results = [SELECT Id FROM Lead WHERE LeadSource =
'Dreamforce'];
    System.assertEquals(200, results.size());
}
}

```

### *Apex Integration Services*

*:[https://trailhead.salesforce.com/content/learn/modules/apex\\_integration\\_services?trailmix\\_creator\\_id=trailblazerconnect&trailmix\\_slug=salesforce-developer-catalyst](https://trailhead.salesforce.com/content/learn/modules/apex_integration_services?trailmix_creator_id=trailblazerconnect&trailmix_slug=salesforce-developer-catalyst)*

1)Quiz

2)Apex REST Callouts

**AnimalLocator Code :**

```

public class AnimalLocator {

    public static HttpResponse makeGetCallout {

```

```

    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);
    // If the request is successful, parse the JSON response.
    if (response.getStatusCode() == 200) {
        // Deserialize the JSON string into collections of primitive data types.
        Map<Integer, Object> Results
    }
}
}
}

```

**AnimalLocatorTest Code :**

```

@Test
private class AnimalLocatorTest{
    @Test static void AnimalLocatorMock1() {
        Test.SetMock(HttpCallOutMock.class, new AnimalLocatorMock());
        string result=AnimalLocator.getAnimalNameById(3);
        string expectedResult='chicken';
        System.assertEquals(result, expectedResult);
    }
}

```

**AnimalLocatorMock Code :**

```

@Test
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;
    }
}

```

## **2)Apex SOAP Callouts**

**ParkService Code :**

**//Generated by wsdl2apex**

```
public class ParkService {  
  
    public class byCountryResponse {  
  
        public String[] return_x;  
  
        private String[] return_x_type_info = new  
String[]{'return','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[]{'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;
}
}
}

```

ParkLocator Code :

```

public class ParkLocator {

    public static String[] country(String country){

        ParkService.ParksImplPort parks = new
ParkService.ParksImplPort();

        String[] parksname = parks.byCountry(country);

        return parksname;

    }
}

```



```
}
```

ParkLocatorTest Code :

```
@isTest

private class ParkLocatorTest{

    @isTest

    static void testParkLocator() {

        Test.setMock(WebServiceMock.class, new
ParkServiceMock());

        String[] arrayOfParks = ParkLocator.country('India');

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

    }

}
```

ParkServiceMock Code :

```
@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);

    }
}

```

#### 4) Apex Web Services

AccountManager Code :

```

@RestResource(urlMapping='/Accounts/*/contacts')
global with sharing class AccountManager {

    @HttpGet
    global static account getAccount() {

        RestRequest request = RestContext.request;

        String accountId =
request.requestURI.substring(request.requestURI.lastIndexOf('/')-18,

```

```

        request.requestURI.lastIndexOf('/'));
        List<Account> a = [select id, name, (select id, name from
contacts) from account where id = :accountId];
        List<contact> co = [select id, name from contact where
account.id = :accountId];
        system.debug('** a[0]= '+ a[0]);
        return a[0];

    }

}

```

AccountManagerTest Code :

```

@Test
public class AccountManagerTest {

    @IsTest
    public static void testaccountmanager() {
        RestRequest request = new RestRequest();
        request.requestUri = 'https://mannharleen-dev-
ed.my.salesforce.com/services/apexrest/Accounts/00190000016cw4tAAA/con
tacts';
        request.httpMethod = 'GET';
        RestContext.request = request;

        system.debug('test account result = '+
AccountManager.getAccount());

    }

}

```

## **APEX SPECIALIST SUPERBADGE :**

**[https://trailhead.salesforce.com/content/learn/modules/apex\\_integration\\_services?trailmix\\_creator\\_id=trailblazerconnect&trailmix\\_slug=salesforce-developer-catalyst](https://trailhead.salesforce.com/content/learn/modules/apex_integration_services?trailmix_creator_id=trailblazerconnect&trailmix_slug=salesforce-developer-catalyst)**

### **1)Quiz**

### **2)Automate Record Creation**

#### **MaintenanceRequestHelper 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;

}

}

}

```

#### MaintenanceRequest Code :

```

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

```

#### 3) Synchronize Salesforce Data

##### WarehouseCalloutService 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);**



```

    }

    }

}

```

#### *4) Schedule Synchronization*

**WarehouseSyncSchedule Code :**

```

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

        WarehouseCalloutService.runWarehouseEquipmentSync();
    }
}

```

#### *5) Test Automatic Logic*

**MaintenanceRequestHelperTest Code :**

```

@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;
}

```

**MaintenanceRequestHelper 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;
}
}
}

```

**MaintenanceRequest Code :**

```

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

```

## ***6) Test Callout Logic***

**WarehouseCalloutService 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);
    }

}

}

}

```

**WarehouseCalloutServiceTest Code :**

**@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 Code :**

**@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;
}
}

```

## 7) Test Scheduling Logic

**WarehouseSyncSchedule Code :**

```

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

        WarehouseCalloutService.runWarehouseEquipmentSync();
    }
}

```

**WarehouseSyncScheduleTest Code :**

```

@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 ');
```

```
    }
}
```

*Apex Triggers :*

[https://trailhead.salesforce.com/content/learn/modules/apex\\_triggers?trailmix\\_creator\\_id=trailblazerconnect&trailmix\\_slug=salesforce-developer-catalyst](https://trailhead.salesforce.com/content/learn/modules/apex_triggers?trailmix_creator_id=trailblazerconnect&trailmix_slug=salesforce-developer-catalyst)

### 1) Get Started with Apex Trigger

AccountAddressTrigger Code :

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

### 2) Bulk Apex Triggers Unit

ClosedOpportunityTrigger Code :

```
trigger ClosedOpportunityTrigger on Opportunity (after insert, after update) {
    List<Task> taskList = new List<Task>();

    for (Opportunity o :[SELECT Id,Name FROM Opportunity
        WHERE Id IN :Trigger.New]){
        taskList.add(new Task(Subject='Follow Up Test Task',
            WhatId=o.Id,
            Status='Not Started',
            Priority='Normal'));
    }
    if (taskList.size() > 0){
```



```
        insert taskList;
    }
}
```

### ***Apex Testing :***

***[https://trailhead.salesforce.com/content/learn/modules/apex\\_testing?trailmix\\_creator\\_id=trailblazerconnect&trailmix\\_slug=salesforce-developer-catalyst](https://trailhead.salesforce.com/content/learn/modules/apex_testing?trailmix_creator_id=trailblazerconnect&trailmix_slug=salesforce-developer-catalyst)***

### ***1)Get Started with Apex Unit Testing***

#### **VerifyDate Code :**

```
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;
}
}

```

**TestVerifyDate Code :**

```

@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);
    }

}

```

## ***2) Test Apex Triggers Unit***

**RestrictContactByName Code :**

```

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

    //check contacts prior to insert or update for invalid data
    For (Contact c : Trigger.New) {

```

```

        if(c.LastName == 'INVALIDNAME') {           //invalidname is invalid
            c.AddError('The Last Name "'+c.LastName+'" is not allowed
for DML');
        }
    }
}
}

```

**TestRestrictContactByName Code :**

```

@isTest
private class TestRestrictContactByName {

    @isTest
    static void invalidName() {
        try {
            Contact c = new Contact(LastName='INVALIDNAME');
            insert c;
        }
        catch (Exception e) {
            System.assert(true);
        }
    }
}

```

**3) Create Test Data for Apex Tests :**

**RandomContactFactory Code :**

```

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*

*:[https://trailhead.salesforce.com/content/learn/modules/asynchronous\\_apex?trailmix\\_creator\\_id=trailblazerconnect&trailmix\\_slug=salesforce-developer-catalyst](https://trailhead.salesforce.com/content/learn/modules/asynchronous_apex?trailmix_creator_id=trailblazerconnect&trailmix_slug=salesforce-developer-catalyst)*

1)Quiz

2)Use Future Methods

**AccountProcessor Code :**

```

public class AccountProcessor {
    @future
    public static void countContacts(List<Id> accountIds) {
        List<Account> accounts = [SELECT Id,
                                   Name,
                                   Number_of_Contacts__c,
                                   (
                                       SELECT Contact.Id
                                       FROM Contacts
                                   )
                                   FROM Account
                                   WHERE Id in :accountIds];
        for (Account a : accounts) {
            a.Number_of_Contacts__c = a.Contacts.size();
        }
        update accounts;
    }
}

```

**AccountProcessorTest Code :**

**@isTest**

**private class AccountProcessorTest {**

**static TestMethod void myTest() {**

**List<Account> accounts = new List<Account>();**

**for (Integer i=0; i<100; i++) {**

**Account account = new Account();**

**account.Name = 'AccountProcessorTest Account ' + i;**

**accounts.add(account);**

**}**

**insert accounts;**

**List<Id> accountIds = new List<Id>();**

**List<Contact> contacts = new List<Contact>();**

**for (Account a : accounts) {**

**accountIds.add(a.Id);**

**for (Integer i=0; i<5; i++) {**

**Contact contact = new Contact();**

**contact.FirstName = 'AccountProcessor Test Contact';**

**contact.LastName = String.valueOf(i);**

**contact.AccountId = a.Id;**

**contacts.add(contact);**

**}**

**}**

**insert contacts;**

**Test.startTest();**

**AccountProcessor.countContacts(accountIds);**

**Test.stopTest();**

**List<Account> results = [SELECT Id, Number\_of\_Contacts\_\_c**

**FROM Account**

**WHERE Id in :accountIds];**

```

        for (Account a : results) {
            System.AssertEquals(5, a.Number_of_Contacts__c);
        }
    }
}

```

### 3) Use Batch Apex

LeadProcessor Code :

```

global class LeadProcessor implements Database.Batchable<sObject>, Database.Stateful {

```

```

    global Integer recs_processed = 0;

```

```

    global Database.QueryLocator start(Database.BatchableContext bc) {
        String sQuery = '';
        sQuery += 'SELECT Id, Name, Status, ';
        sQuery += 'LeadSource ';
        sQuery += 'FROM Lead ';
        sQuery += 'LIMIT 100000';
        return Database.getQueryLocator(sQuery);
    }

```

```

    global void execute(Database.BatchableContext bc, List<Lead> scope) {
        for (Lead l : scope) {
            l.LeadSource = 'Dreamforce';
            recs_processed += 1;
        }
        update scope;
    }

```

```

    global void finish(Database.BatchableContext bc) {
        AsyncApexJob job = [SELECT Id,
                                Status,
                                NumberOfErrors,
                                TotalJobItems,
                                JobItemsProcessed,

```

```

        CreatedBy.Email
    FROM AsyncApexJob
    WHERE Id = :bc.getJobId()];

    String s = '';
    s += job.JobItemsProcessed + ' job items processed ';
    s += 'out of ' + job.TotalJobItems + ' total job items. ';
    s += job.NumberOfErrors + ' error(s) encountered. ';
    System.debug(s);
    s = recs_processed + ' record(s) processed.';
    System.debug(s);
}
}

```

**LeadProcessorTest Code :**

```

@isTest
private class LeadProcessorTest {

    @testSetup
    static void createLeads() {
        List<Lead> leads = new List<Lead>();
        for (Integer i=0; i<200; i++) {
            Lead l = new Lead();
            l.FirstName = 'Test';
            l.LastName = 'Lead';
            l.Company = 'Test Lead ' + i;
            leads.add(l);
        }
        insert leads;
    }

    static TestMethod void myTest() {
        Test.startTest();
        LeadProcessor lp = new LeadProcessor();
        Id batchId = Database.executeBatch(lp);
        Test.stopTest();
    }
}

```

```

        System.assertEquals(200, [SELECT Count()
                                FROM Lead
                                WHERE Name = 'Test Lead'
                                AND LeadSource = 'Dreamforce']);
    }
}

```

#### *4)Controp Processes with Queueable Apex*

**AddPrimaryContact Code :**

```

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;
        }
    }
}

```



```
}  
}
```

**AddPrimaryContactTest Code :**

```
@isTest  
private class AddPrimaryContactTest {  
    @testSetup  
    static void setup() {  
        List<Account> accounts = new List<Account>();  
        for (Integer i=0; i<50; i++) {  
            Account ny = new Account();  
            ny.Name = 'Test Account (NY)';  
            ny.BillingState = 'NY';  
            accounts.add(ny);  
            Account ca = new Account();  
            ca.Name = 'Test Account (CA)';  
            ca.BillingState = 'CA';  
            accounts.add(ca);  
        }  
        insert accounts;  
    }  
  
    static TestMethod void myTest() {  
        Contact contactObj = new Contact(  
            FirstName = 'California',  
            LastName = 'Bob'  
        );  
        String state_abbrev = 'CA';  
  
        Test.startTest();  
        AddPrimaryContact apc = new AddPrimaryContact(contactObj, state_abbrev);  
        Id jobId = System.enqueueJob(apc);  
        Test.stopTest();  
  
        List<Account> accounts = [SELECT Id, (SELECT Contact.Name FROM  
Account.Contacts) FROM Account WHERE BillingState = 'CA'];
```

```

        System.assertEquals(50, accounts.size());
        for (Account a : accounts) {
            System.assertEquals(a.Contacts.size(), 1);
        }
    }
}

```

### *5)Schedule Jobs Using the Apex Scheduler*

**DailyLeadProcessor Code :**

```

global class DailyLeadProcessor implements Schedulable {

    global void execute(SchedulableContext ctx) {
        List<Lead> leads = [SELECT Id,
                            LeadSource
                            FROM Lead
                            WHERE LeadSource = '' OR LeadSource = null
                            LIMIT 200];
        for (Lead l : leads) {
            l.LeadSource = 'Dreamforce';
        }

        if (leads.size() > 0) {
            update leads;
        }
    }
}

```

**DailyLeadProcessorTest Code :**

```

@isTest
private class DailyLeadProcessorTest {

```

```

@testSetup
static void setup() {
    List<Lead> leads = new List<Lead>();
    for (Integer i=0; i<200; i++) {
        Lead l = new Lead();
        l.FirstName = 'Test';
        l.LastName = 'Lead ' + i;
        l.Company = 'Test Company ' + i;
        leads.add(l);
    }
    insert leads;
}

static TestMethod void myTest() {
    String jobName = 'Daily Lead Processor - Test';
    String CRON_EXP = '0 0 0 15 3 ? 2017'; // dummy cron entry

    test.startTest();
    DailyLeadProcessor dp = new DailyLeadProcessor();
    String JobId = System.schedule(jobName, CRON_EXP, dp);
    test.stopTest();

    List<Lead> results = [SELECT Id FROM Lead WHERE LeadSource =
'Dreamforce'];
    System.assertEquals(200, results.size());
}
}

```

### *Apex Integration Services*

*:[https://trailhead.salesforce.com/content/learn/modules/apex\\_integration\\_services?trailmix\\_creator\\_id=trailblazerconnect&trailmix\\_slug=salesforce-developer-catalyst](https://trailhead.salesforce.com/content/learn/modules/apex_integration_services?trailmix_creator_id=trailblazerconnect&trailmix_slug=salesforce-developer-catalyst)*

### **1)Quiz**

## 2)Apex REST Callouts

**AnimalLocator Code :**

```
public class AnimalLocator {  
  
    public static HttpResponse makeGetCallout {  
        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);  
        // If the request is successful, parse the JSON response.  
        if (response.getStatusCode() == 200) {  
            // Deserialize the JSON string into collections of primitive data types.  
            Map<Integer, Object> Results  
        }  
    }  
}
```

**AnimalLocatorTest Code :**

```
@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);  
    }  
}
```

**AnimalLocatorMock Code :**

```
@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;
    }
}

```

## 2)Apex SOAP Callouts

ParkService Code :

//Generated by wsdl2apex

```

public class ParkService {

    public class byCountryResponse {

        public String[] return_x;

        private String[] return_x_type_info = new
String[0]{'return','http://parks.services/',null,'0','-1','false'};

        private String[] apex_schema_type_info = new
String[0]{'http://parks.services/','false','false'};

        private String[] field_order_type_info = new String[0]{'return_x'};

    }

    public class byCountry {

        public String arg0;

        private String[] arg0_type_info = new
String[0]{'arg0','http://parks.services/',null,'0','1','false'};

        private String[] apex_schema_type_info = new
String[0]{'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;
}
}
}

```

ParkLocator Code :

```

public class ParkLocator {

    public static String[] country(String country){

        ParkService.ParksImplPort parks = new

```

```

ParkService.ParksImplPort();

    String[] parksname = parks.byCountry(country);

    return parksname;

}

}

```

ParkLocatorTest Code :

```

@Test

private class ParkLocatorTest{

    @Test

    static void testParkLocator() {

        Test.setMock(WebServiceMock.class, new
ParkServiceMock());

        String[] arrayOfParks = ParkLocator.country('India');

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

    }

}

```

ParkServiceMock Code :

```

@Test

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);

    }
}

```

#### *4) Apex Web Services*

AccountManager Code :

```

@RestResource(urlMapping='/Accounts/*/contacts')
global with sharing class AccountManager {

    @HttpGet
    global static account getAccount() {

```

```

        RestRequest request = RestContext.request;

        String accountId =
request.requestURI.substring(request.requestURI.lastIndexOf('/')-18,
        request.requestURI.lastIndexOf('/'));
        List<Account> a = [select id, name, (select id, name from
contacts) from account where id = :accountId];
        List<contact> co = [select id, name from contact where
account.id = :accountId];
        system.debug('** a[0]= '+ a[0]);
        return a[0];

    }

}

```

AccountManagerTest Code :

```

@Istest(SeeAllData=true)
public class AccountManagerTest {

    @IsTest
    public static void testaccountmanager() {
        RestRequest request = new RestRequest();
        request.requestUri = 'https://mannharleen-dev-
ed.my.salesforce.com/services/apexrest/Accounts/00190000016cw4tAAA/con
tacts';
        request.httpMethod = 'GET';
        RestContext.request = request;

                                system.debug('test account result = '+
AccountManager.getAccount());

    }
}

```

```
}
```

#### **APEX SPECIALIST SUPERBADGE :**

**[https://trailhead.salesforce.com/content/learn/modules/apex\\_integration\\_services?trailmix\\_creator\\_id=trailblazerconnect&trailmix\\_slug=salesforce-developer-catalyst](https://trailhead.salesforce.com/content/learn/modules/apex_integration_services?trailmix_creator_id=trailblazerconnect&trailmix_slug=salesforce-developer-catalyst)**

#### **1)Quiz**

#### **2)Automate Record Creation**

#### **MaintenanceRequestHelper 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;

}

}

}

```

#### **MaintenanceRequest Code :**

```

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

```

#### **3) Synchronize Salesforce Data**

**WarehouseCalloutService 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);
        }
    }
}

```

#### *4) Schedule Synchronization*

WarehouseSyncSchedule Code :

```

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

        WarehouseCalloutService.runWarehouseEquipmentSync();
    }
}

```

#### *5) Test Automatic Logic*

MaintenanceRequestHelperTest Code :

```

@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;
}

```

**MaintenanceRequestHelper 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;
}
}
}
}

```

**MaintenanceRequest Code :**

```

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

```

## 6) Test Callout Logic

WarehouseCalloutService 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);
    }

}
}
}

```

**WarehouseCalloutServiceTest Code :**

```

@Test

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 Code :**

```

@Test

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.getStatusCode(200);
        return response;
    }
}

```

## 7) Test Scheduling Logic

WarehouseSyncSchedule Code :

```

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

        WarehouseCalloutService.runWarehouseEquipmentSync();
    }
}

```

WarehouseSyncScheduleTest Code :

```

@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 ');  
  
}  
}
```