

## APEX SPECIALIST SUPERBADGE

AUTOMATE RECORD CREATION:

MaintenanceRequest.apxt

```
1  @isTest
2  private class MaintenanceRequestTest{
3      @testSetup
4      static void setup(){
5          //Equipment SETUP
6          List<Product2> lstOfEqpmnts = new List<Product2>();
7
8          Product2 equip = new Product2(Name = 'Test Equipment',
9                                         Maintenance_Cycle__c = 10,
10                                        Cost__c = 100,
11                                        Current_Inventory__c = 10,
12                                        Lifespan_Months__c = 10,
13                                        Replacement_Part__c = true,
14                                        Warehouse_SKU__c = 'abc');
15          lstOfEqpmnts.add(equip);
16          INSERT lstOfEqpmnts;
17      }
18
19      @isTest
20      static void testMaintenanceRequest(){
21          List<Case> lstOfInsertMRs = new List<Case>();
22
23          List<Case> lstOfUpdtMRs = new List<Case>();
24
25          Id equipId = [SELECT Id FROM Product2 LIMIT 1].get(0).Id;
26
27          Case newCase = new Case(Type = 'Routine Maintenance', Status =
28          'New', Origin = 'Phone');
29          newCase.Equipment__c = equipId;
30          lstOfInsertMRs.add(newCase);
31
32          Case mrInsert = new Case(Type = 'Routine Maintenance2', Status =
33          'New', Origin = 'Phone');
34          mrInsert.Equipment__c = equipId;
35          lstOfInsertMRs.add(mrInsert);
36      }
```

```

35
36     Test.startTest();
37         INSERT lstOfInsertMRs;
38
39         System.assertEquals(2, lstOfInsertMRs.size());
40
41         for(Case mrUpdt : lstOfInsertMRs){
42             mrUpdt.Status = 'Closed';
43             lstOfUpdtMRs.add(mrUpdt);
44         }
45
46         UPDATE lstOfUpdtMRs;
47
48         System.assertEquals(2, lstOfUpdtMRs.size());
49     Test.stopTest();
50 }
51 }

```

#### MaintenanceRequestHelper.apxc

```

1  public with sharing class MaintenanceRequestHelper {
2      public static void updateWorkOrders(List<Case> updWorkOrders,
3      Map<Id,Case> nonUpdCaseMap) {
4          Set<Id> validIds = new Set<Id>();
5
6          For (Case c : updWorkOrders){
7              if (nonUpdCaseMap.get(c.Id).Status != 'Closed' && c.Status
8              == 'Closed'){
9                  if (c.Type == 'Repair' || c.Type == 'Routine
10
11                      validIds.add(c.Id);
12              }
13          }
14      }
15
16      if (!validIds.isEmpty()){
17          List<Case> newCases = new List<Case>();

```

```

18         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)
19                                     FROM Case WHERE
Id IN :validIds]);
20         Map<Id,Decimal> maintenanceCycles = new Map<ID,Decimal>();
21         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];
22
23         for (AggregateResult ar : results){
24             maintenanceCycles.put((Id) ar.get('Maintenance_Request__c'),
(Decimal) ar.get('cycle'));
25         }
26
27         for(Case cc : closedCasesM.values()){
28             Case nc = new Case (
29                 ParentId = cc.Id,
30                 Status = 'New',
31                 Subject = 'Routine Maintenance',
32                 Type = 'Routine Maintenance',
33                 Vehicle__c = cc.Vehicle__c,
34                 Equipment__c =cc.Equipment__c,
35                 Origin = 'Web',
36                 Date_Reported__c = Date.Today()
37
38             );
39
40             If (maintenanceCycles.containsKey(cc.Id)){
41                 nc.Date_Due__c = Date.today().addDays((Integer)
maintenanceCycles.get(cc.Id));
42             } else {
43                 nc.Date_Due__c = Date.today().addDays((Integer)
cc.Equipment__r.maintenance_Cycle__c);
44             }
45
46             newCases.add(nc);
47         }
48
49         insert newCases;
50
51         List<Equipment_Maintenance_Item__c> clonedWPs = new
List<Equipment_Maintenance_Item__c>();

```

```

52         for (Case nc : newCases){
53             for (Equipment_Maintenance_Item__c wp :
closedCasesM.get(nc.ParentId).Equipment_Maintenance_Items__r){
54                 Equipment_Maintenance_Item__c wpClone = wp.clone();
55                 wpClone.Maintenance_Request__c = nc.Id;
56                 ClonedWPs.add(wpClone);
57
58             }
59         }
60         insert ClonedWPs;
61     }
62 }
63 }

```

SYNCHRONIZATION SALESFORCE DATA WITH AN EXTERNAL SYSTEM:

WarehouseCalloutService.apxc

```

1  public with sharing class WarehouseCalloutService {
2
3      private static final String endpoint = 'https://th-superbadge-
4
5      @future(callout = true)    //need this so that it knows to call to
external source
6      public static void runWarehouseEquipmentSync(){
7          Http http = new Http();
8          HttpRequest httpRequest = new HttpRequest();
9          httpRequest.setEndpoint(endpoint);
10         httpRequest.setMethod('GET');
11         HttpResponse httpResponse = http.send(httpRequest);
12
13         //if successfully get the JSON file, need to parse out to
different equipment objects
14         if (httpResponse.getStatusCode() == 200){ //status = "OK" (this
is for GET or HEAD requests)
15             List<Object> equipmentList = (List<Object>)
JSON.deserializeUntyped(httpResponse.getBody());
16             List<Product2> products = new List<Product2>();
17
18             for(Object item: equipmentList){

```

```

19         Map<String, Object> productMap = (Map<String,Object>)
    item;        //map of item(s) in JSON file
20         Product2 product = new Product2();           //list of
    products to insert/update in system
21
22         product.Replacement_Part__c = (Boolean)
    productMap.get('replacement');
23         product.Cost__c = (Integer) productMap.get('cost');
24         product.Current_Inventory__c = (Integer)
    productMap.get('quantity');
25         product.Lifespan_Months__c = (Integer)
    productMap.get('lifespan');
26         product.Maintenance_Cycle__c = (Integer)
    productMap.get('maintenanceperiod');
27         product.Warehouse_SKU__c = (String)
    productMap.get('sku');
28         product.Name = (String) productMap.get('name');
29         product.ProductCode = (String) productMap.get('_id');
30         products.add(product);
31     }
32
33     if(products.size() > 0){ //only need to upsert if items
    actually exist
34         System.debug(products);
35         upsert products;
36     }
37 }
38 }
39 }

```

SCHEDULE SYNCHRONIZATION USING APEX CODE:

WarehouseSyncSchedule.apxc

```

1  global class WarehouseSyncSchedule implements Schedulable
2  {
3      global void execute ( SchedulableContext sc )
4      {
5          WarehouseCalloutService.runWarehouseEquipmentSync();
6      }
7  }

```

## TEST AUTOMATION LOGIC:

MaintenanceRequestHelperTest.apxc

```
1  @istest
2  public with sharing class MaintenanceRequestHelperTest {
3
4      private static final string STATUS_NEW = 'New';
5      private static final string WORKING = 'Working';
6      private static final string CLOSED = 'Closed';
7      private static final string REPAIR = 'Repair';
8      private static final string REQUEST_ORIGIN = 'Web';
9      private static final string REQUEST_TYPE = 'Routine Maintenance';
10     private static final string REQUEST_SUBJECT = 'Testing subject';
11
12     PRIVATE STATIC Vehicle__c createVehicle(){
13         Vehicle__c Vehicle = new Vehicle__C(name = 'SuperTruck');
14         return Vehicle;
15     }
16
17     PRIVATE STATIC Product2 createEq(){
18         product2 equipment = new product2(name = 'SuperEquipment',
19                                           lifespan_months__C = 10,
20                                           maintenance_cycle__C = 10,
21                                           replacement_part__c = true);
22         return equipment;
23     }
24
25     PRIVATE STATIC Case createMaintenanceRequest(id vehicleId, id
equipmentId){
26         case cs = new case(Type=REPAIR,
27                           Status=STATUS_NEW,
28                           Origin=REQUEST_ORIGIN,
29                           Subject=REQUEST_SUBJECT,
30                           Equipment__c=equipmentId,
31                           Vehicle__c=vehicleId);
32         return cs;
```

```

33 }
34
35 PRIVATE STATIC Equipment_Maintenance_Item__c createWorkPart(id
equipmentId,id requestId){
36     Equipment_Maintenance_Item__c wp = new
Equipment_Maintenance_Item__c(Equipment__c = equipmentId,
37     Maintenance_Request__c = requestId);
38     return wp;
39 }
40
41
42 @istest
43 private static void testMaintenanceRequestPositive(){
44     Vehicle__c vehicle = createVehicle();
45     insert vehicle;
46     id vehicleId = vehicle.Id;
47
48     Product2 equipment = createEq();
49     insert equipment;
50     id equipmentId = equipment.Id;
51
52     case somethingToUpdate =
createMaintenanceRequest(vehicleId,equipmentId);
53     insert somethingToUpdate;
54
55     Equipment_Maintenance_Item__c workP =
createWorkPart(equipmentId,somethingToUpdate.id);
56     insert workP;
57
58     test.startTest();
59     somethingToUpdate.status = CLOSED;
60     update somethingToUpdate;
61     test.stopTest();
62
63     Case newReq = [Select id, subject, type, Equipment__c,
Date_Reported__c, Vehicle__c, Date_Due__c
64                 from case
65                 where status =:STATUS_NEW];
66
67     Equipment_Maintenance_Item__c workPart = [select id
68                                               from
Equipment_Maintenance_Item__c
69                                               where

```

```

Maintenance_Request__c =:newReq.Id];
70
71     system.assert(workPart != null);
72     system.assert(newReq.Subject != null);
73     system.assertEquals(newReq.Type, REQUEST_TYPE);
74     SYSTEM.assertEquals(newReq.Equipment__c, equipmentId);
75     SYSTEM.assertEquals(newReq.Vehicle__c, vehicleId);
76     SYSTEM.assertEquals(newReq.Date_Reported__c, system.today());
77 }
78
79 @istest
80 private static void testMaintenanceRequestNegative(){
81     Vehicle__C vehicle = createVehicle();
82     insert vehicle;
83     id vehicleId = vehicle.Id;
84
85     product2 equipment = createEq();
86     insert equipment;
87     id equipmentId = equipment.Id;
88
89     case emptyReq = createMaintenanceRequest(vehicleId,equipmentId);
90     insert emptyReq;
91
92     Equipment_Maintenance_Item__c workP =
createWorkPart(equipmentId, emptyReq.Id);
93     insert workP;
94
95     test.startTest();
96     emptyReq.Status = WORKING;
97     update emptyReq;
98     test.stopTest();
99
100     list<case> allRequest = [select id
101                             from case];
102
103     Equipment_Maintenance_Item__c workPart = [select id
104                                                from
Equipment_Maintenance_Item__c
105                                                where
Maintenance_Request__c = :emptyReq.Id];
106
107     system.assert(workPart != null);
108     system.assert(allRequest.size() == 1);
109 }

```



[illegible]

```

Equipment_Maintenance_Item__c
150                                     where
Maintenance_Request__c in: oldRequestIds];
151
152     system.assert(allRequests.size() == 300);
153 }
154}

```

## MaintenanceRequestHelper.apxc

```

1  public with sharing class MaintenanceRequestHelper {
2      public static void updateWorkOrders(List<Case> updWorkOrders, Map<Id,Case>
nonUpdCaseMap) {
3          Set<Id> validIds = new Set<Id>();
4
5
6          For (Case c : updWorkOrders){
7              if (nonUpdCaseMap.get(c.Id).Status != 'Closed' && c.Status == 'Closed'){
8                  if (c.Type == 'Repair' || c.Type == 'Routine Maintenance'){
9                      validIds.add(c.Id);
10
11
12              }
13          }
14      }
15
16      if (!validIds.isEmpty()){
17          List<Case> newCases = new List<Case>();
18          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)
19                      FROM Case WHERE Id IN :validIds]);
20          Map<Id,Decimal> maintenanceCycles = new Map<Id,Decimal>();
21          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];
22
23          for (AggregateResult ar : results){
24              maintenanceCycles.put((Id) ar.get('Maintenance_Request__c'), (Decimal) ar.get('cycle'));
25          }

```

```

26
27     for(Case cc : closedCasesM.values()){
28         Case nc = new Case (
29             ParentId = cc.Id,
30             Status = 'New',
31             Subject = 'Routine Maintenance',
32             Type = 'Routine Maintenance',
33             Vehicle__c = cc.Vehicle__c,
34             Equipment__c = cc.Equipment__c,
35             Origin = 'Web',
36             Date_Reported__c = Date.Today()
37
38         );
39
40         If (maintenanceCycles.containsKey(cc.Id)){
41             nc.Date_Due__c = Date.today().addDays((Integer) maintenanceCycles.get(cc.Id));
42         }
43
44         newCases.add(nc);
45     }
46
47     insert newCases;
48
49     List<Equipment_Maintenance_Item__c> clonedWPs = new
List<Equipment_Maintenance_Item__c>();
50     for (Case nc : newCases){
51         for (Equipment_Maintenance_Item__c wp :
closedCasesM.get(nc.ParentId).Equipment_Maintenance_Items__r){
52             Equipment_Maintenance_Item__c wpClone = wp.clone();
53             wpClone.Maintenance_Request__c = nc.Id;
54             ClonedWPs.add(wpClone);
55
56         }
57     }
58     insert ClonedWPs;
59 }
60 }
61 }

```

MaintenanceRequest.apxt

```

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

```

```

2     if(Trigger.isUpdate && Trigger.isAfter){
3         MaintenanceRequestHelper.updateWorkOrders(Trigger.New, Trigger.OldMap);
4     }
5 }

```

TEST CALLOUT LOGIC:

WarehouseCalloutService.apxc

```

1  public with sharing class WarehouseCalloutService {
2
3      private static final String endpoint = 'https://th-superbadge-
4
5      @future(callout = true)    //need this so that it knows to call to
        external source
6      public static void runWarehouseEquipmentSync(){
7          Http http = new Http();
8          HttpRequest httpRequest = new HttpRequest();
9          httpRequest.setEndpoint(endpoint);
10         httpRequest.setMethod('GET');
11         HttpResponse httpResponse = http.send(httpRequest);
12
13         //if successfully get the JSON file, need to parse out to
        different equipment objects
14         if (httpResponse.getStatusCode() == 200){ //status = "OK" (this
        is for GET or HEAD requests)
15             List<Object> equipmentList = (List<Object>)
        JSON.deserializeUntyped(httpResponse.getBody());
16             List<Product2> products = new List<Product2>();
17
18             for(Object item: equipmentList){
19                 Map<String, Object> productMap = (Map<String, Object>)
        item;    //map of item(s) in JSON file
20                 Product2 product = new Product2();    //list of
        products to insert/update in system
21
22                 product.Replacement_Part__c = (Boolean)
        productMap.get('replacement');

```

```

23         product.Cost__c = (Integer) productMap.get('cost');
24         product.Current_Inventory__c = (Integer)
productMap.get('quantity');
25         product.Lifespan_Months__c = (Integer)
productMap.get('lifespan');
26         product.Maintenance_Cycle__c = (Integer)
productMap.get('maintenanceperiod');
27         product.Warehouse_SKU__c = (String)
productMap.get('sku');
28         product.Name = (String) productMap.get('name');
29         product.ProductCode = (String) productMap.get('_id');
30         products.add(product);
31     }
32
33     if(products.size() > 0){ //only need to upsert if items
actually exist
34         System.debug(products);
35         upsert products;
36     }
37 }
38 }
39 }

```

WarehouseCalloutServiceTest.apxc

```

1  public with sharing class WarehouseCalloutService {
2
3      private static final String WAREHOUSE_URL = 'https://th-superbadge-
4
5      //@future(callout=true)
6      public static void runWarehouseEquipmentSync(){
7
8          Http http = new Http();
9          HttpRequest request = new HttpRequest();
10
11         request.setEndpoint(WAREHOUSE_URL);
12         request.setMethod('GET');
13         HttpResponse response = http.send(request);
14

```

```

15
16     List<Product2> warehouseEq = new List<Product2>();
17
18     if (response.getStatusCode() == 200){
19         List<Object> jsonResponse =
20         (List<Object>)JSON.deserializeUntyped(response.getBody());
21         System.debug(response.getBody());
22
23         for (Object eq : jsonResponse){
24             Map<String,Object> mapJson = (Map<String,Object>)eq;
25             Product2 myEq = new Product2();
26             myEq.Replacement_Part__c = (Boolean)
27             mapJson.get('replacement');
28             myEq.Name = (String) mapJson.get('name');
29             myEq.Maintenance_Cycle__c = (Integer)
30             mapJson.get('maintenanceperiod');
31             myEq.Lifespan_Months__c = (Integer)
32             mapJson.get('lifespan');
33             myEq.Cost__c = (Decimal) mapJson.get('lifespan');
34             myEq.Warehouse_SKU__c = (String) mapJson.get('sku');
35             myEq.Current_Inventory__c = (Double)
36             mapJson.get('quantity');
37             warehouseEq.add(myEq);
38         }
39
40         if (warehouseEq.size() > 0){
41             upsert warehouseEq;
42             System.debug('Your equipment was synced with the
43
44             System.debug(warehouseEq);
45         }
46     }
47 }
48
49
50

```

WarehouseCalloutServiceMock.apxc

```

1 @isTest
2 global class WarehouseCalloutServiceMock implements
  HttpCalloutMock {
3     // implement http mock callout
4     global static HttpResponse respond(HttpRequest request){
5
6         System.assertEquals('https://th-superbadge-
7     ));
8         System.assertEquals('GET', request.getMethod());
9
10        // Create a fake response
11        HttpResponse response = new HttpResponse();
12        response.setHeader('Content-Type', 'application/json');
13
14        response.setBody(' [{"_id": "55d66226726b611100aaf741", "replacement
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```

```

1  @isTest
2  public class WarehouseSyncScheduleTest {
3
4      @isTest static void WarehousescheduleTest(){
5          String scheduleTime = '00 00 01 * * ?';
6          Test.startTest();
7          Test.setMock(HttpCalloutMock.class, new
WarehouseCalloutServiceMock());
8          String jobID=System.schedule('Warehouse Time To

WarehouseSyncSchedule());
9          Test.stopTest();
10         //Contains schedule information for a scheduled
job. CronTrigger is similar to a cron job on UNIX systems.
11         // This object is available in API version 17.0 and
later.
12         CronTrigger a=[SELECT Id FROM CronTrigger where
NextFireTime > today];
13         System.assertEquals(jobID, a.Id,'Schedule ');
14
15
16     }
17 }

```

## APPEX TRIGGERS

GET STARTED WITH APEX TRIGGERS:

AccountAddressTrigger.apxt



```

1 trigger AccountAddressTrigger on Account (before insert, before
  update) {
2     for (Account a : Trigger.New) {
3         if (a.Match_Billing_Address__c == true &&
4             a.BillingPostalCode != null) {
5             a.ShippingPostalCode = a.BillingPostalCode;
6         }
7     }
}

```

BULK APEX TRIGGERS:

ClosedOpportunityTrigger.apxt

```

1 trigger ClosedOpportunityTrigger on Opportunity (after insert, after
  update) {
2
3     List<Task> newTasks = new List<Task>();
4
5     //Iterate through opps in this trigger (updated or created
6     opps)
7     for (Opportunity opp : Trigger.New) {
8
9         //Check if stage is 'Closed Won'
10        if (opp.StageName=='Closed Won') {
11
12            //If stage is 'Closed won', create task and associate it
13            with Opportunity via the WhatId field
14            newTasks.add(new Task(
15                OwnerId=opp.OwnerId,
16                Subject='Follow up Task',
17                WhatId = opp.Id,
18                ActivityDate= System.Today().addDays(2)
19            ));
20        }
21    }
22
23    //Check if there were any new tasks created
24    if(newTasks.size()>0){

```

```
24         insert newTasks;
25     }
26
27 }
```

## APPEX TESTING

GET STARTED WITH APEX UNIT TEST:

VerifyDate.apxc

```
1  public class VerifyDate {
2
3      //method to handle potential checks against two dates
4      public static Date CheckDates(Date date1, Date date2) {
5          //if date2 is within the next 30 days of date1, use date2.
           Otherwise use the end of the month
6          if(DateWithin30Days(date1,date2)) {
7              return date2;
8          } else {
9              return SetEndOfMonthDate(date1);
10         }
11     }
12
13     //method to check if date2 is within the next 30 days of date1
14     private static Boolean DateWithin30Days(Date date1, Date date2) {
15         //check for date2 being in the past
16         if( date2 < date1) { return false; }
17
18         //check that date2 is within (>=) 30 days of date1
19         Date date30Days = date1.addDays(30); //create a date 30 days away
           from date1
20         if( date2 >= date30Days ) { return false; }
21         else { return true; }
22     }
23
24     //method to return the end of the month of a given date
25     private static Date SetEndOfMonthDate(Date date1) {
26         Integer totalDays = Date.daysInMonth(date1.year(),
```

```

        date1.month());
27         Date lastDay = Date.newInstance(date1.year(), date1.month(),
        totalDays);
28         return lastDay;
29     }
30
31 }

```

#### TestVerifyDate.apxc

```

1  @isTest
2  private class TestVerifyDate {
3
4      //testing that if date2 is within 30 days of date1, should return date 2
5      @isTest static void testDate2within30daysofDate1() {
6          Date date1 = date.newInstance(2018, 03, 20);
7          Date date2 = date.newInstance(2018, 04, 11);
8          Date resultDate = VerifyDate.CheckDates(date1,date2);
9          Date testDate = Date.newInstance(2018, 04, 11);
10         System.assertEquals(testDate,resultDate);
11     }
12
13     //testing that date2 is before date1. Should return "false"
14     @isTest static void testDate2beforeDate1() {
15         Date date1 = date.newInstance(2018, 03, 20);
16         Date date2 = date.newInstance(2018, 02, 11);
17         Date resultDate = VerifyDate.CheckDates(date1,date2);
18         Date testDate = Date.newInstance(2018, 02, 11);
19         System.assertNotEquals(testDate, resultDate);
20     }
21
22     //Test date2 is outside 30 days of date1. Should return end of month.
23     @isTest static void testDate2outside30daysofDate1() {
24         Date date1 = date.newInstance(2018, 03, 20);
25         Date date2 = date.newInstance(2018, 04, 25);
26         Date resultDate = VerifyDate.CheckDates(date1,date2);
27         Date testDate = Date.newInstance(2018, 03, 31);
28         System.assertEquals(testDate,resultDate);
29     }
30 }

```

## TEST APEX TRIGGERS:

RestrictContactByName.apxt

```
1  @isTest
2  public class TestRestrictContactByName {
3      @isTest static void TestInsertContact_INVALIDNAME(){
4          Contact contact = new Contact(LastName='INVALIDNAME');
5          Test.startTest();
6          Database.SaveResult result = Database.insert(contact);
7          Test.stopTest();
8          System.assert(!result.isSuccess());
9          System.assert(result.getErrors().size() > 0);
10         System.assertEquals('The Last Name "'+contact.LastName+'" is
11
12             result.getErrors()[0].getMessage());
13     }
14
15     @isTest static void TestInsertContact_VALIDNAME(){
16         Contact contact = new Contact(LastName='VALIDNAME');
17         Test.startTest();
18         Database.SaveResult result = Database.insert(contact);
19         Test.stopTest();
20         System.assert(result.isSuccess());
21     }
22
23     @isTest(SeeAllData=true) static void
24     TestUpdateContact_INVALIDNAME(){
25         Contact contact = [SELECT Id FROM Contact WHERE LastName =
26         'Test Contact' LIMIT 1];
27         contact.LastName = 'INVALIDNAME';
28         Test.startTest();
29         Database.SaveResult result = Database.update(contact);
30         Test.stopTest();
31         System.assert(!result.isSuccess());
32         System.assert(result.getErrors().size() > 0);
33         System.assertEquals('The Last Name "'+contact.LastName+'" is
34
35             result.getErrors()[0].getMessage());
36     }
37 }
```

```

34     @isTest(SeeAllData=true) static void
TestUpdateContact_VALIDNAME(){
35         Contact contact = [SELECT Id FROM Contact WHERE LastName =
'Test Contact' LIMIT 1];
36         contact.LastName = 'VALIDNAME';
37         Test.startTest();
38         Database.SaveResult result = Database.update(contact);
39         Test.stopTest();
40         System.assert(result.isSuccess());
41     }
42 }

```

CREATE TEST DATA FOR APEX TESTS:

RandomContactFactory.apxc

```

1  public class RandomContactFactory{
2      public static List<Contact> generateRandomContacts(integer
n,string lastname){
3          integer n1= n;
4          list<contact> c=[select  FirstName from contact limit : n1];
5          return c;
6      }
7
8  }
9
10
11 but for me it was giving error of class not created as static or
either the method is not returning the first name. so for me it
worked as follows:
12
13 public class RandomContactFactory{
14
15     public static List<Contact> generateRandomContacts(integer
n,string LastName){
16         integer n1=n;
17         List<contact> c1 = new list<contact>();
18         list<contact> c2 =new list<contact>();
19         c1 = [select FirstName from Contact Limit : n1];
20         integer i=0;
21         for(contact cnew : c1){

```

```

22     contact cnew1 = new contact();
23     cnew1.firstname = cnew.firstname + i;
24
25     c2.add(cnew1);
26     i++;
27 }
28 return c2;
29
30 }
31 }

```

## ASYNCHRONOUS APEX

USE FUTURE METHODS:

AccountProcessor.apxc

```

1  global class AccountProcessor {
2      @future
3      public static void countContacts(Set<id> setId){
4          List<Account> lstAccount = [SELECT Id,
Number_of_Contacts__c, (SELECT Id FROM Contacts) FROM Account where
id in : setId];
5          for(Account acc: lstAccount){
6              List<Contact> lstCont=acc.contacts;
7          acc.Number_of_Contacts__c = lstCont.size();
8          }
9          update lstAccount;
10     }
11 }

```

AccountProcessorTest.apxc

```

1  @isTest private class AccountProcessorTest {
2      @isTest static void countContacts() {
3          Test.setMock(AccountProcessorTest.class, new Account());
4          Test.startTest();
5          AccountProcessor.countContacts();

```

```
6         Test.stopTest();
7
8     }
9 }
```

USE BATCH APEX:

LeadProcessor.apxc

```
1  global class LeadProcessor implements Database.Batchable<Subject>
2  {
3      global Database.QueryLocator start(Database.BatchableContext bc)
4      {
5          Database.QueryLocator qObj;
6          qObj = Database.getQueryLocator('select Id, Name,
7
8          return qObj;
9      }
10     global void execute(Database.BatchableContext bc, List<sObject>
11     records)
12     {
13         List<Lead> leadRecords = (List<Lead>) records;
14         List<Lead> updatingLeadList = new List<Lead>();
15         for (Lead leadObj : leadRecords)
16         {
17             leadObj.LeadSource = 'Dreamforce';
18             updatingLeadList.add(leadObj);
19         }
20         if(!updatingLeadList.isEmpty()){
21             update updatingLeadList;
22         }
23     }
24 }
25
26 global void finish(Database.BatchableContext bc){ }
27 }
```

LeadProcessorTest.apxc

```
1  @isTest
2  private class LeadProcessorTest
3  {
4      private static testMethod void LeadProcess()
5      {
6          List<Lead> lstLead = new List<Lead>();
7          for(Integer i=0 ;i <200;i++)
8          {
9              lstLead.add(new Lead(LastName ='LastName'+i, Company
              ='demo'+i, City='New York', Country='US', LeadSource='Phone
10             });
11
12             insert lstLead;
13
14             Test.startTest();
15
16             LeadProcessor obj = new LeadProcessor();
17             DataBase.executeBatch(obj);
18
19             Test.stopTest();
20         }
21 }
```

CONTROL PROCESSES WITH QUEUEABLE APEX:

AddPrimaryContact.apxc

```
1  public class AddPrimaryContact implements Queueable {
2      public contact c;
3      public String state;
4
5      public AddPrimaryContact(Contact c, String state) {
6          this.c = c;
7          this.state = state;
8      }
9
10     public void execute(QueueableContext qc) {
```



```

11 system.debug('this.c = '+this.c+' this.state = '+this.state);
12 List<Account> accList = new List<account>([select id, name,
    BillingState from account where account.BillingState = :this.state
    limit 200]);
13 List<contact> insertContact = new List<contact>();
14 for(account a: accList) {
15     contact c = new contact();
16     c = this.c.clone(false, false, false, false);
17     c.AccountId = a.Id;
18     insertContact.add(c);
19 }
20 insert insertContact;
21 }
22
23 }

```

AddPrimaryContactTest.apxc

```

1  @isTest
2  public class AddPrimaryContactTest {
3
4  @testSetup
5  static void setup() {
6      List<Account> insertAccount = new List<Account>();
7      for(integer i=0; i<=100; i++) {
8          if(i <=50) {
9              insertAccount.add(new Account(Name='Acc'+i, BillingState = 'NY'));
10         } else {
11             insertAccount.add(new Account(Name='Acc'+i, BillingState = 'CA'));
12         }
13     }
14     insert insertAccount;
15 }
16
17 static testMethod void testAddPrimaryContact() {
18     Contact con = new Contact(LastName = 'LastName');
19     AddPrimaryContact addPC = new AddPrimaryContact(con, 'CA');
20     Test.startTest();
21     system.enqueueJob(addPC);
22     Test.stopTest();
23 }

```

```

24 system.assertEquals(50, [select count() from Contact]);
25 }
26
27 }

```

SCHEDULE JOBS USING APEX SCHEDULER:

DailyLeadProcessor.apxc

```

1  global class DailyLeadProcessor implements Schedulable{
2      global void execute(SchedulableContext ctx){
3          List<Lead> leads = [SELECT Id, LeadSource FROM Lead WHERE
4              LeadSource = ''];
5
6          if(leads.size() > 0){
7              List<Lead> newLeads = new List<Lead>();
8
9              for(Lead lead : leads){
10                  lead.LeadSource = 'DreamForce';
11                  newLeads.add(lead);
12              }
13
14              update newLeads;
15          }
16 }

```

DailyLeadProcessorTest.apxc

```

1
2  @isTest
3  private class DailyLeadProcessorTest{
4      //Seconds Minutes Hours Day_of_month Month Day_of_week
5      optional_year
6      public static String CRON_EXP = '0 0 0 2 6 ? 2022';
7
8      static testmethod void testScheduledJob(){
9          List<Lead> leads = new List<Lead>();
10
11          for(Integer i = 0; i < 200; i++){
12              Lead lead = new Lead(LastName = 'Test ' + i, LeadSource

```

```

    = '', Company = 'Test Company ' + i, Status = 'Open - Not

12         leads.add(lead);
13     }
14
15     insert leads;
16
17     Test.startTest();
18     // Schedule the test job
19     String jobId = System.schedule('Update LeadSource to

20
21     // Stopping the test will run the job synchronously
22     Test.stopTest();
23 }
24 }

```

## APEX INTEGRATION SERVICES

APEX REST CALLOUTS:

AnimalLocator.apxc

```

1  public class AnimalLocator {
2      public static string getAnimalNameById(integer numSubmitted) {
3          Http http = new Http();
4          HttpRequest request = new HttpRequest();
5          request.setEndpoint('https://th-apex-http-

6          request.setMethod('GET');
7          HttpResponse response = http.send(request);
8          string replyName = 'None returned';
9          if (response.getStatusCode() == 200) {
10             replyName = response.getBody();
11         }
12         return replyName;
13     }
14 }

```

AnimalLocatorMock.apxc

```

1  @IsTest
2  global class AnimalLocatorMock implements HttpCalloutMock {
3      //Implement this interface method
4      global HTTPResponse respond(HTTPRequest request) {
5          // Create a fake response
6          HTTPResponse response = new HTTPResponse();
7          response.setHeader('Content-Type', 'application/json');
8          response.setBody('Charles H Bones Esquire');
9          response.setStatusCode(200);
10         return response;
11     }
12 }

```

AnimalLocatorTest.apxc

```

1  @IsTest
2  private class AnimalLocatorTest {
3      @isTest static void testGetCallout() {
4          // Set mock callout class
5          Test.setMock(HttpCalloutMock.class, new AnimalLocatorMock());
6          // This causes a fake response to be sent
7          // from the class that implements HttpCalloutMock.
8          String animalname = AnimalLocator.getAnimalNameById(2);
9          // Verify that the response received contains fake values
10         String expectedValue = 'Charles H Bones Esquire';
11         System.assertEquals(animalname, expectedValue);
12     }
13 }

```

APEX SOAP CALLOUTS:

ParkService.apxc

```

1  public class ParkService {
2      public class byCountryResponse {
3          public String[] return_x;
4          private String[] return_x_type_info = new
String[] {'return','http://parks.services/',null,'0','-1','false'};
5          private String[] apex_schema_type_info = new

```

```

    String[]{'http://parks.services/','false','false'};
6     private String[] field_order_type_info = new
String[]{'return_x'};
7     }
8     public class byCountry {
9         public String arg0;
10        private String[] arg0_type_info = new
String[]{'arg0','http://parks.services/','null','0','1','false'};
11        private String[] apex_schema_type_info = new
String[]{'http://parks.services/','false','false'};
12        private String[] field_order_type_info = new
String[]{'arg0'};
13    }
14    public class ParksImplPort {
15        public String endpoint_x = 'https://th-apex-soap-

16        public Map<String,String> inputHttpHeaders_x;
17        public Map<String,String> outputHttpHeaders_x;
18        public String clientCertName_x;
19        public String clientCert_x;
20        public String clientCertPasswd_x;
21        public Integer timeout_x;
22        private String[] ns_map_type_info = new
String[]{'http://parks.services/','ParkService'};
23        public String[] byCountry(String arg0) {
24            ParkService.byCountry request_x = new
ParkService.byCountry();
25            request_x.arg0 = arg0;
26            ParkService.byCountryResponse response_x;
27            Map<String, ParkService.byCountryResponse>
response_map_x = new Map<String, ParkService.byCountryResponse>();
28            response_map_x.put('response_x', response_x);
29            WebServiceCallout.invoke(
30                this,
31                request_x,
32                response_map_x,
33                new String[]{endpoint_x,
34                    '',
35                    'http://parks.services/',
36                    'byCountry',
37                    'http://parks.services/',
38                    'byCountryResponse',

```

```

39         'ParkService.byCountryResponse'}
40     );
41     response_x = response_map_x.get('response_x');
42     return response_x.return_x;
43 }
44 }
45 }

```

ParkLocatorTest.apxc

```

1  @isTest
2  private class ParkLocatorTest {
3      @isTest static void testCallout() {
4          // This causes a fake response to be generated
5          Test.setMock(WebServiceMock.class, new ParkServiceMock());
6          // Call the method that invokes a callout
7          //Double x = 1.0;
8          //Double result = AwesomeCalculator.add(x, y);
9
10         String country = 'Germany';
11         String[] result = ParkLocator.Country(country);
12
13
14         // Verify that a fake result is returned
15         System.assertEquals(new List<String>{'Hamburg Wadden Sea
16     }
17 }

```

APEX WEB SERVICES:

AccountManager.apxc

```

1  @RestResource(urlMapping='/Accounts/*/contacts')
2  global with sharing class AccountManager {
3      @HttpGet
4      global static Account getAccount() {
5          RestRequest request = RestContext.request;
6          // grab the accountId from the end of the URL

```

```

7         String accountId =
            request.requestURI.substringBetween('Accounts/', '/contacts');
8         System.debug('Account ID: ' + accountId);
9         Account result = [SELECT Id, Name, (SELECT Id, Name FROM
            Contacts) FROM Account WHERE Id = :accountId LIMIT 1];
10        System.debug ('Account: ' + result);
11        return result;
12    }
13 }

```

#### AccountManagerTest.apxc

```

1  @IsTest
2  private class AccountManagerTest {
3      @IsTest static void testGetAccount() {
4          Id recordId = createTestRecord();
5          //Id recordId = '0015J000002v8JjQAI';
6          System.debug('Test ID: ' + recordId);
7          // Set up a test request
8          RestRequest request = new RestRequest();
9          request.requestUri =
            'https://myInstance.my.salesforce.com/services/apexrest/Accounts/' +
            recordId + '/contacts';
10         request.httpMethod = 'GET';
11         RestContext.request = request;
12         // Call the method to test
13         Account thisAccount = AccountManager.getAccount();
14         // Verify results
15         System.assert(thisAccount != null);
16         System.assertEquals('Test Account', thisAccount.Name);
17     }
18
19     // Helper method
20     static Id createTestRecord() {
21         // Create test record
22         Account accountTest = new Account(
23             Name='Test Account');
24         insert accountTest;
25         Contact TestCon= new Contact(
26             LastName='Test',
27             AccountId = accountTest.id);
28         return accountTest.Id;

```

29 }

30 }