Apex Triggers

Get Started with Apex Triggers:

AccountAddressTrigger

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

Bulk Apex Triggers:

ClosedOpportunityTrigger.apxt

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

Apex Testing

Get Started with Apex Unit Tests

VerifyDate.apxc

```
public class VerifyDate {
 //method to handle potential checks against two dates
 public static Date CheckDates(Date date1, Date date2) {
  //if date2 is within the next 30 days of date1, use date2. Otherwise use the end of the
month
  if(DateWithin30Days(date1,date2)) {
   return date2;
 } else {
   return SetEndOfMonthDate(date1);
 }
 }
 //method to check if date2 is within the next 30 days of date1
 private static Boolean DateWithin30Days(Date date1, Date date2) {
  //check for date2 being in the past
     if( date2 < date1) { return false; }
     //check that date2 is within (>=) 30 days of date1
     Date date30Days = date1.addDays(30); //create a date 30 days away from date1
  if( date2 >= date30Days ) { return false; }
  else { return true; }
 }
 //method to return the end of the month of a given date
 private static Date SetEndOfMonthDate(Date date1) {
  Integer totalDays = Date.daysInMonth(date1.year(), date1.month());
  Date lastDay = Date.newInstance(date1.year(), date1.month(), totalDays);
  return lastDay;
 }
}
```

TestVerifyDate .apxc

```
@isTest
public class TestVerifyDate
{
    static testMethod void testMethod1()
    {
        Date d = VerifyDate.CheckDates(System.today(),System.today()+1);
        Date d1 = VerifyDate.CheckDates(System.today(),System.today()+60);
    }
}
```

Test Apex Triggers:

RestrictContactByName.apxt

```
trigger RestrictContactByName on Contact (before insert, before update) {
  //check contacts prior to insert or update for invalid data
  For (Contact c : Trigger.New) {
    if(c.LastName == 'INVALIDNAME') { //invalidname is invalid
        c.AddError('The Last Name ""+c.LastName+"" is not allowed for DML');
    }
}
```

TestRestrictContactByName.apxc

```
@isTest
private class TestRestrictContactByName {
    static testMethod void metodoTest()
    {
        List<Contact> listContact= new List<Contact>();
        Contact c1 = new Contact(FirstName='Francesco', LastName='Riggio',
        email='Test@test.com');
        Contact c2 = new Contact(FirstName='Francesco1', LastName =
'INVALIDNAME',email='Test@test.com');
        listContact.add(c1);
```

```
listContact.add(c2);
    Test.startTest();
    try
    {
        insert listContact;
    }
        catch(Exception ee)
    {
        }
        Test.stopTest();
    }
}
```

Create Test Data for Apex Tests

RandomContactFactory

```
//@isTest
public class RandomContactFactory {
    public static List<Contact> generateRandomContacts(Integer
numContactsToGenerate, String FName) {
        List<Contact> contactList = new List<Contact>();
        for(Integer i=0;i<numContactsToGenerate;i++) {
            Contact c = new Contact(FirstName=FName + ' ' + i, LastName = 'Contact '+i);
            contactList.add(c);
            System.debug(c);
        }
        //insert contactList;
        System.debug(contactList.size());
        return contactList;
}</pre>
```

Asynchronous Apex

Use Future Methods:

c2.AccountId = a.ld:

```
AccountProcessor .apxc
public class AccountProcessor {
  @future
  public static void countContacts(List<Id> accountIds){
    List<Account> accounts = [Select Id, Name from Account Where Id IN: accountIds];
    List<Account> updatedAccounts = new List<Account>();
    for(Account account : accounts){
     account.Number_of_Contacts__c = [Select count() from Contact Where AccountId
=: account.ld];
      System.debug('No Of Contacts = ' + account.Number_of_Contacts__c);
      updatedAccounts.add(account);
    update updatedAccounts;
AccountProcessorTest.apxc
@isTest
public class AccountProcessorTest {
  @isTest
  public static void testNoOfContacts(){
    Account a = new Account();
    a.Name = 'Test Account':
    Insert a:
    Contact c = new Contact();
    c.FirstName = 'Bob';
    c.LastName = 'Willie';
    c.AccountId = a.Id;
    Contact c2 = new Contact();
    c2.FirstName = 'Tom';
    c2.LastName = 'Cruise';
```

```
List<Id> acctIds = new List<Id>();
acctIds.add(a.Id);
Test.startTest();
AccountProcessor.countContacts(acctIds);
Test.stopTest();
}
```

Use Batch Apex:

LeadProcessor.apxc

```
public class LeadProcessor implements Database.Batchable<sObject> {
    public Database.QueryLocator start(Database.BatchableContext bc) {
        return Database.getQueryLocator([Select LeadSource From Lead ]);
    }
    public void execute(Database.BatchableContext bc, List<Lead> leads) {
        for (Lead Lead : leads) {
            lead.LeadSource = 'Dreamforce';
            }
            update leads;
    }
    public void finish(Database.BatchableContext bc) {
        }
}
```

LeadProcessorTest .apxc

```
@isTest
public class LeadProcessorTest {
    @testSetup
    static void setup() {
        List<Lead> leads = new List<Lead>();
        for(Integer counter=0 ;counter <200;counter++){
        Lead lead = new Lead();
        lead.FirstName ='FirstName';
        lead.LastName ='LastName'+counter;
        lead.Company ='demo'+counter;
        leads.add(lead);</pre>
```

```
insert leads;

insert leads;

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

Control Processes with Queueable Apex:

AddPrimaryContact .apxc

```
public class AddPrimaryContact implements Queueable
  private Contact c;
  private String state;
  public AddPrimaryContact(Contact c, String state)
    this.c = c;
    this.state = state;
  public void execute(QueueableContext context)
     List<Account> ListAccount = [SELECT ID, Name ,(Select id,FirstName,LastName from
contacts ) FROM ACCOUNT WHERE BillingState = :state LIMIT 200];
     List<Contact> lstContact = new List<Contact>();
     for (Account acc:ListAccount)
    {
         Contact cont = c.clone(false,false,false,false);
         cont.AccountId = acc.id;
         lstContact.add( cont );
    if(lstContact.size() >0 )
       insert lstContact;
```

```
}
}
AddPrimaryContactTest .apxc
@isTest
public class AddPrimaryContactTest
{
  @isTest static void TestList()
    List<Account> Teste = new List <Account>();
    for(Integer i=0;i<50;i++)
    {
       Teste.add(new Account(BillingState = 'CA', name = 'Test'+i));
    for(Integer j=0;j<50;j++)
       Teste.add(new Account(BillingState = 'NY', name = 'Test'+j));
    insert Teste;
    Contact co = new Contact();
    co.FirstName='demo';
    co.LastName ='demo';
    insert co;
    String state = 'CA';
     AddPrimaryContact apc = new AddPrimaryContact(co, state);
     Test.startTest();
      System.enqueueJob(apc);
     Test.stopTest();
```

}

}

Schedule Jobs Using the Apex Scheduler:

DailyLeadProcessor.apxc

}

```
public class DailyLeadProcessor implements Schedulable {
  Public void execute(SchedulableContext SC){
   List<Lead> LeadObj=[SELECT Id from Lead where LeadSource=null limit 200];
    for(Lead I:LeadObj){
      I.LeadSource='Dreamforce';
      update I;
    }
 }
DailyLeadProcessorTest .apxc
@isTest
private class DailyLeadProcessorTest {
      static testMethod void testDailyLeadProcessor() {
             String CRON_EXP = '0 0 1 * * ?';
             List<Lead> |List = new List<Lead>();
        for (Integer i = 0; i < 200; i++) {
                   IList.add(new Lead(LastName='Dreamforce'+i, Company='Test1
Inc.', Status='Open - Not Contacted'));
             insert IList;
             Test.startTest();
             String jobId = System.schedule('DailyLeadProcessor', CRON_EXP, new
DailyLeadProcessor());
```

Apex Integration Services

Apex REST Callouts:

AnimalLocator.apxc

}

```
public class AnimalLocator{
  public static String getAnimalNameById(Integer x){
    Http http = new Http();
    HttpRequest req = new HttpRequest();
    req.setEndpoint('https://th-apex-http-callout.herokuapp.com/animals/' + x);
    req.setMethod('GET');
    Map<String, Object> animal= new Map<String, Object>();
    HttpResponse res = http.send(reg);
      if (res.getStatusCode() == 200) {
    Map<String, Object> results = (Map<String,
Object>)JSON.deserializeUntyped(res.getBody());
   animal = (Map<String, Object>) results.get('animal');
return (String)animal.get('name');
}
AnimalLocatorTest.apxc
@isTest
private class AnimalLocatorTest{
  @isTest static void AnimalLocatorMock1() {
    Test.setMock(HttpCalloutMock.class, new AnimalLocatorMock());
    string result = AnimalLocator.getAnimalNameById(3);
    String expectedResult = 'chicken';
    System.assertEquals(result,expectedResult);
  }
```

Apex SOAP Callouts:

ParkService.apxc

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

Apex Web Services

AccountManager.apxc

```
@RestResource(urlMapping='/Accounts/*/contacts')
global class AccountManager {
  @HttpGet
  global static Account getAccount() {
    RestRequest req = RestContext.request;
    String accid = reg.requestURI.substringBetween('Accounts/', '/contacts');
    Account acc = [SELECT Id, Name, (SELECT Id, Name FROM Contacts)
            FROM Account WHERE Id = :accld];
    return acc;
 }
}
AccountManagerTest.apxc
@isTest
private class AccountManagerTest {
  private static testMethod void getAccountTest1() {
    Id recordId = createTestRecord();
    RestRequest request = new RestRequest();
    request.requestUri = 'https://na1.salesforce.com/services/apexrest/Accounts/'+
recordId +'/contacts';
    request.httpMethod = 'GET';
    RestContext.request = request;
    Account this Account = Account Manager.get Account();
    System.assert(thisAccount != null);
    System.assertEquals('Test record', thisAccount.Name);
  }
  // Helper method
    static Id createTestRecord() {
    Account TestAcc = new Account(
     Name='Test record');
    insert TestAcc:
    Contact TestCon= new Contact(
    LastName='Test',
    AccountId = TestAcc.id);
```

```
return TestAcc.Id;
}
```

Apex Specialist

MaintenanceRequestHelper .apxc

```
public with sharing class MaintenanceRequestHelper {
  public static void updateworkOrders(List<Case> updWorkOrders, Map<Id,Case>
nonUpdCaseMap) {
    Set<Id> validIds = new Set<Id>();
    For (Case c : updWorkOrders){
      if (nonUpdCaseMap.get(c.Id).Status != 'Closed' && c.Status == 'Closed'){
        if (c.Type == 'Repair' || c.Type == 'Routine Maintenance'){
          validIds.add(c.Id);
        }
    if (!validIds.isEmpty()){
      List<Case> newCases = new List<Case>();
      Map<Id,Case> closedCasesM = new Map<Id,Case>([SELECT Id, Vehicle__c,
Equipment_c, Equipment_r.Maintenance_Cycle_c,(SELECT
Id,Equipment_c,Quantity_c FROM Equipment_Maintenance_Items_r)
                              FROM Case WHERE Id IN :validIds]);
      Map<Id,Decimal> maintenanceCycles = new Map<ID,Decimal>();
      AggregateResult[] results = [SELECT Maintenance_Request__c,
MIN(Equipment_r.Maintenance_Cycle_c)cycle FROM
Equipment_Maintenance_Item__c WHERE Maintenance_Request__c IN :ValidIds GROUP
BY Maintenance_Request__c];
    for (AggregateResult ar : results){
      maintenanceCycles.put((Id) ar.get('Maintenance_Request__c'), (Decimal)
ar.get('cycle'));
```

```
}
      for(Case cc : closedCasesM.values()){
        Case nc = new Case (
          ParentId = cc.Id,
        Status = 'New',
         Subject = 'Routine Maintenance',
          Type = 'Routine Maintenance',
          Vehicle_c = cc.Vehicle_c,
          Equipment_c = cc.Equipment_c,
          Origin = 'Web',
          Date_Reported__c = Date.Today()
        );
        If (maintenanceCycles.containskey(cc.ld)){
          nc.Date_Due__c = Date.today().addDays((Integer)
maintenanceCycles.get(cc.ld));
        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.ld;
          ClonedWPs.add(wpClone);
        }
      insert ClonedWPs;
```

```
}
MaintenanceRequest.apxt
trigger MaintenanceRequest on Case (before update, after update) {
  if(Trigger.isUpdate && Trigger.isAfter){
    MaintenanceRequestHelper.updateWorkOrders(Trigger.New, Trigger.OldMap);
 }
}
WarehouseCalloutService.apxc
public with sharing class WarehouseCalloutService {
  private static final String WAREHOUSE_URL = 'https://th-superbadge-
apex.herokuapp.com/equipment';
  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);
      }
    }
  }
WarehouseSyncSchedule.apxc
global class WarehouseSyncSchedule implements Schedulable {
  global void execute(SchedulableContext ctx) {
    WarehouseCalloutService.runWarehouseEquipmentSync();
 }
}
MaintenanceRequestHelperTest .apxc
@istest
public with sharing class MaintenanceRequestHelperTest {
  private static final string STATUS_NEW = 'New';
  private static final string WORKING = 'Working';
  private static final string CLOSED = 'Closed';
  private static final string REPAIR = 'Repair';
  private static final string REQUEST_ORIGIN = 'Web';
  private static final string REQUEST_TYPE = 'Routine Maintenance';
```

```
private static final string REQUEST_SUBJECT = 'Testing subject';
  PRIVATE STATIC Vehicle_c createVehicle(){
    Vehicle_c Vehicle = new Vehicle_C(name = 'SuperTruck');
    return Vehicle;
 }
  PRIVATE STATIC Product2 createEq(){
    product2 equipment = new product2(name = 'SuperEquipment',
                     lifespan_months__C = 10,
                     maintenance_cycle__C = 10,
                     replacement_part__c = true);
    return equipment;
  }
  PRIVATE STATIC Case createMaintenanceRequest(id vehicleId, id equipmentId){
    case cs = new case(Type=REPAIR,
             Status=STATUS_NEW,
             Origin=REQUEST_ORIGIN,
             Subject=REQUEST_SUBJECT,
             Equipment_c=equipmentId,
             Vehicle_c=vehicleId);
    return cs;
 }
  PRIVATE STATIC Equipment_Maintenance_Item__c createWorkPart(id equipmentId,id
requestId){
    Equipment_Maintenance_Item__c wp = new
Equipment_Maintenance_Item__c(Equipment__c = equipmentId,
                                        Maintenance_Request__c = requestId);
    return wp;
  }
  @istest
  private static void testMaintenanceRequestPositive(){
    Vehicle__c vehicle = createVehicle();
```

```
insert vehicle;
    id vehicleId = vehicle.Id;
    Product2 equipment = createEq();
    insert equipment;
    id equipmentId = equipment.Id;
    case somethingToUpdate = createMaintenanceRequest(vehicleId,equipmentId);
    insert somethingToUpdate;
    Equipment_Maintenance_Item__c workP =
createWorkPart(equipmentId,somethingToUpdate.id);
    insert workP;
    test.startTest();
    somethingToUpdate.status = CLOSED;
    update somethingToUpdate;
    test.stopTest();
    Case newReq = [Select id, subject, type, Equipment_c, Date_Reported_c,
Vehicle__c, Date_Due__c
           from case
           where status =:STATUS_NEW];
    Equipment_Maintenance_Item__c workPart = [select id
                         from Equipment_Maintenance_Item__c
                         where Maintenance_Request__c =:newReq.Id];
    system.assert(workPart != null);
    system.assert(newReq.Subject != null);
    system.assertEquals(newReq.Type, REQUEST_TYPE);
    SYSTEM.assertEquals(newReq.Equipment_c, equipmentId);
    SYSTEM.assertEquals(newReq.Vehicle_c, vehicleId);
    SYSTEM.assertEquals(newReq.Date_Reported__c, system.today());
 }
  @istest
```

```
private static void testMaintenanceRequestNegative(){
    Vehicle__C vehicle = createVehicle();
    insert vehicle:
    id vehicleId = vehicle.Id;
    product2 equipment = createEq();
    insert equipment;
    id equipmentId = equipment.Id;
    case emptyReq = createMaintenanceRequest(vehicleId,equipmentId);
    insert emptyReq;
    Equipment_Maintenance_Item__c workP = createWorkPart(equipmentId,
emptyReq.ld);
    insert workP;
    test.startTest();
    emptyReq.Status = WORKING;
    update emptyReq;
    test.stopTest();
    list<case> allRequest = [select id
                 from casel;
    Equipment_Maintenance_Item__c workPart = [select id
                           from Equipment_Maintenance_Item__c
                           where Maintenance_Request__c = :emptyReq.Id];
    system.assert(workPart != null);
    system.assert(allRequest.size() == 1);
  }
  @istest
  private static void testMaintenanceRequestBulk(){
    list<Vehicle__C> vehicleList = new list<Vehicle__C>();
    list<Product2> equipmentList = new list<Product2>();
    list<Equipment_Maintenance_Item__c> workPartList = new
```

```
list<Equipment_Maintenance_Item__c>();
    list<case> requestList = new list<case>();
    list<id> oldRequestIds = new list<id>();
    for(integer i = 0; i < 300; i++){
      vehicleList.add(createVehicle());
      equipmentList.add(createEq());
    }
    insert vehicleList;
    insert equipmentList;
    for(integer i = 0; i < 300; i++){
      request List. add (create Maintenance Request (vehicle List. get (i). id, \\
equipmentList.get(i).id));
    insert requestList;
    for(integer i = 0; i < 300; i++){
      workPartList.add(createWorkPart(equipmentList.get(i).id, requestList.get(i).id));
    insert workPartList:
    test.startTest();
    for(case req : requestList){
      req.Status = CLOSED;
      oldRequestIds.add(req.Id);
    update requestList;
    test.stopTest();
    list<case> allRequests = [select id
                   from case
                   where status =: STATUS_NEW];
    list<Equipment_Maintenance_Item__c> workParts = [select id
                               from Equipment_Maintenance_Item__c
                                where Maintenance_Request__c in: oldRequestIds];
```

```
system.assert(allRequests.size() == 300);
 }
}
WarehouseCalloutServiceTest.apxc
@isTest
private class WarehouseCalloutServiceTest {
  @isTest
  static void testWareHouseCallout(){
    Test.startTest();
    // implement mock callout test here
    Test.setMock(HTTPCalloutMock.class, new WarehouseCalloutServiceMock());
    WarehouseCalloutService.runWarehouseEquipmentSync();
    Test.stopTest();
    System.assertEquals(1, [SELECT count() FROM Product2]);
 }
WarehouseCalloutServiceMock .apxc
@isTest
global class WarehouseCalloutServiceMock implements HttpCalloutMock {
  // implement http mock callout
  global static HttpResponse respond(HttpRequest request){
    System.assertEquals('https://th-superbadge-apex.herokuapp.com/equipment',
request.getEndpoint());
    System.assertEquals('GET', request.getMethod());
    // Create a fake response
    HttpResponse response = new HttpResponse();
    response.setHeader('Content-Type', 'application/json');
response.setBody('[{"_id":"55d66226726b611100aaf741","replacement":false,"quantity":5
,"name":"Generator 1000
kW","maintenanceperiod":365,"lifespan":120,"cost":5000,"sku":"100003"}]');
    response.setStatusCode(200);
    return response;
```