

Project Document

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Apex Triggers

Get started with Apex Triggers:

AccountAddressTigger:

```
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:

ClosedOpportunityTigger:

```
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

```
public class VerifyDate {
```

```

    public static Date CheckDates(Date date1, Date date2) {
        if(DateWithin30Days(date1,date2)) {
            return date2;
        } else {
            return SetEndOfMonthDate(date1);
        }
    }
    @TestVisible private static Boolean DateWithin30Days(Date date1, Date date2) {
        if( date2 < date1) { return false; }
        Date date30Days = date1.addDays(30);
        if( date2 >= date30Days ) { return false; }
        else { return true; }
    }
    @TestVisible 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

```

@Test
private class TestVerifyDate {
    @isTest static void Test_CheckDates_case1()
    {
        Date D=VerifyDate.CheckDates(date.parse('01/01/2020'), date.parse('01/05/2020'));
        System.assertEquals(date.parse('01/05/2020'),D);
    }
    @isTest static void Test_CheckDates_case2()
    {
        Date D=VerifyDate.CheckDates(date.parse('01/01/2020'), date.parse('05/05/2020'));
        System.assertEquals(date.parse('01/31/2020'),D);
    }
    @isTest static void Test_DateWithin30Days_case1()
    {
        Boolean
flag=VerifyDate.DateWithin30Days(date.parse('01/01/2020'),date.parse('12/30/2019'));
        System.assertEquals(false, flag);
    }
    @isTest static void Test_DateWithin30Days_case2()

```

```

    {
        Boolean
flag=VerifyDate.DateWithin30Days(date.parse('01/01/2020'),date.parse('02/02/2020'));
        System.assertEquals(false, flag);
    }
    @isTest static void Test_DateWithin30Days_case3()
    {
        Boolean
flag=VerifyDate.DateWithin30Days(date.parse('01/01/2020'),date.parse('01/15/2020'));
        System.assertEquals(true, flag);
    }
    @isTest static void Test_SetEndOfMonthDate(){
        Date returndate=VerifyDate.SetEndOfMonthDate(date.parse('01/01/2022'));
    }
}

```

Test Apex Triggers

RestrictContactByName

```

trigger RestrictContactByName on Contact (before insert, before update) {
    For (Contact c : Trigger.New) {
        if(c.LastName == 'INVALIDNAME') {
            c.AddError('The Last Name "'+c.LastName+'" is not allowed for DML');
        }
    }
}

```

TestRestrictContactByName

```

@isTest
public class TestRestrictContactByName {
    @isTest static void Test_insertupdateContact()
    {
        Contact cnt= new Contact();
        cnt.LastName='INVALIDNAME';
        Test.startTest();
        Database.SaveResult result=Database.insert(cnt,false);
        Test.stopTest();
        System.assert(!result.isSuccess());
        System.assert(result.getErrors().size()>0);
    }
}

```

```

        System.assertEquals('The Last Name "INVALIDNAME" is not allowed for
DML',result.getErrors()[0].getMessage());
    }
}

```

Create Test Data for Apex Testes

RandomContactFactory

```

public class RandomContactFactory {
    public static List<Contact> generateRandomContacts(Integer numcnt,string lastname){
        List <Contact> contacts= new List<Contact>();
        for(Integer i=0;i<numcnt;i++){
            Contact cnt=new Contact(FirstName='Test'+i,LastName=lastname);
            contacts.add(cnt);
        }
        return contacts;
    }
}

```

Asynchronous Apex

Use Future Methods

AccountProcessor

```

public class AccountProcessor {
    @future
    public static void countContacts(List<Id> accountIds){
        List<Account> accountToUpdate = new List<Account>();
        List<Account> accounts=[Select Id, Name,(Select Id from Contacts) from Account where Id
in :accountIds];
        for(Account acc:accounts){
            List<Contact> contactList=acc.Contacts;
            acc.Number_Of_Contacts_c=contactList.size();
            accountToUpdate.add(acc);
        }
        Update accountToUpdate;
    }
}

```

AccountProcessorTest

```
@isTest
public class AccountProcessorTest{
    @isTest
    private static void testCountContacts(){
        Account newAccount=new Account(Name='Test Account');
        insert newAccount;

        Contact newContact1=new
Contact(FirstName='John',LastName='Doe',AccountId=newAccount.Id);
        insert newContact1;

        Contact newContact2=new
Contact(FirstName='Jane',LastName='Doe',AccountId=newAccount.Id);
        insert newContact2;
        List<Id> accountIds=new List<Id>();
        accountIds.add(newAccount.Id);
        Test.startTest();
        AccountProcessor.countContacts(accountIds);
        Test.stopTest();
    }
}
```

Use Batch Apex

LeadProcessor

```
global class LeadProcessor implements Database.Batchable<sObject> {
    global Integer count = 0;
    global Database.QueryLocator start(Database.BatchableContext bc){
        return Database.getQueryLocator('SELECT ID, LeadSource From Lead');
    }
    global void execute(Database.BatchableContext bc,List<Lead> L_list){
        List<lead> L_list_new=new List<lead>();
        for(lead L:L_list){
            L.leadsource='Dreamforce';
            L_list_new.add(L);
            count+=1;
        }
        update L_list_new;
    }
}
```

```

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

```

```

@isTest
public class LeadProcessorTest{
    @isTest
    public static void testit(){
        List<lead>L_list =new List<lead>();
        for(Integer i=0;i<200;i++){
            Lead L=new lead();
            L.LastName='name'+i;
            L.Company='Company';
            L.Status='Random Status';
            L_list.add(L);
        }
        insert L_list;
        Test.startTest();
        LeadProcessor lp=new LeadProcessor();
        Id batchId=Database.executeBatch(lp);
        Test.stopTest();
    }
}

```

Control Processes with Queueable Apex

AddPrimaryContact

```

public class AddPrimaryContact implements Queueable{
    private Contact con;
    private String state;
    public AddPrimaryContact(Contact con, String state){
        this.con=con;
        this.state=state;
    }
    public void execute(QueueableContext context){
        List<Account> accounts= [Select Id,Name,(Select FirstName,LastName,Id from contacts)

```

```

from Account where BillingState = :state Limit 200];
    List<Contact> primaryContacts=new List<Contact>();

    for(Account acc:accounts){
        Contact c=con.clone();
        c.AccountId=acc.Id;
        primaryContacts.add(c);
    }
    if(primaryContacts.size()>0){
        insert primaryContacts;
    }
}
}

```

AddPrimaryContactTest

```

@Test
public class AddPrimaryContactTest {
    static testmethod void testQueueable(){
        List<Account> testAccounts=new List<Account>();
        for(Integer i=0;i<50;i++){
            testAccounts.add(new Account(Name='Account'+i,BillingState='CA'));
        }
        for(Integer j=0;j<50;j++){
            testAccounts.add(new Account(Name='Account'+j,BillingState='NY'));
        }
        insert testAccounts;
        Contact testContact = new Contact(FirstName='John',LastName='Doe');
        insert testContact;
        AddPrimaryContact addit= new addPrimaryContact(testContact,'CA');
        Test.startTest();
        system.enqueueJob(addit);
        Test.stopTest();
        System.assertEquals(50,[Select count() from Contact where accountId in (Select Id from
Account where BillingState='CA')]);
    }
}

```

Schedule jobs Using the Apex Scheduler

DailyLeadProcessor

```
global class DailyLeadProcessor implements Schedulable {
    global void execute(SchedulableContext ctx){
        List<lead> leadstoupdate=new List<lead>();
        List <Lead> leads=[Select id from Lead where LeadSource=NULL Limit 200];
        for(Lead l:leads){
            l.LeadSource='Dreamforce';
            leadstoupdate.add(l);
        }
        update leadstoupdate;
    }
}
```

DailyLeadProcessorTest

```
@isTest
public class DailyLeadProcessorTest {

    static testMethod void testMethod1(){
        Test.startTest();
        List<Lead> lstLead = new List<Lead>();
        for(Integer i = 0; i<200;i++){
            Lead led = new Lead();
            led.FirstName ='FirstName';
            led.LastName ='LastName'+i;
            led.Company ='demo'+i;
            lstLead.add(led);
        }
        insert lstLead;

        DailyLeadProcessor ab = new DailyLeadProcessor();
        String jobId = System.schedule('jobName', '0 5 * * * ?',ab);

        Test.stopTest();
    }
}
```


Apex Integration Services

Apex REST Callouts

AnimalLocator

```
public class AnimalLocator{
    public static String getAnimalNameById(Integer x){
        Http http = new Http();
        HttpRequest req = new HttpRequest();
        req.setEndpoint('https://th-apex-http-callout.herokuapp.com/animals/' + x);
        req.setMethod('GET');
        Map<String, Object> animal= new Map<String, Object>();
        HttpResponse res = http.send(req);
        if (res.getStatusCode() == 200) {
            Map<String, Object> results = (Map<String,
Object>)JSON.deserializeUntyped(res.getBody());
            animal = (Map<String, Object>) results.get('animal');
        }
        return (String)animal.get('name');
    }
}
```

AnimalLocatorTest

```
@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

```
@isTest
global class AnimalLocatorMock implements HttpCalloutMock {
    global HTTPResponse respond(HTTPRequest request) {
```

```

        HttpResponse response = new HttpResponse();
        response.setHeader('Content-Type', 'application/json');
        response.setBody('{ "animals": ["majestic badger", "fluffy bunny", "scary bear", "chicken",
"mighty moose"]}');
        response.setStatusCode(200);
        return response;
    }
}

```

Apex Web Services

AccountManager

```

@RestResource(urlMapping='/Accounts/*/contacts')
global class AccountManager {
    @HttpGet
    global static Account getAccount() {
        RestRequest req = RestContext.request;
        String accId = req.requestURI.substringBetween('Accounts/', '/contacts');
        Account acc = [SELECT Id, Name, (SELECT Id, Name FROM Contacts)
                        FROM Account WHERE Id = :accId];
        return acc;
    }
}

```

AccountManagerTest

```

@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 thisAccount = AccountManager.getAccount();
    }
}

```

```

        System.assert(thisAccount != null);
        System.assertEquals('Test record', thisAccount.Name);
    }

    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 Superbadge

MaintenanceRequest

```

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

```

MaintenanceRequestHelper

```

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;
}
}
}
}
}

```

MaintenanceRequestHelperTest

@istest

public with sharing class MaintenanceRequestHelperTest {

```

    private static final string STATUS_NEW = 'New';
    private static final string WORKING = 'Working';
    private static final string CLOSED = 'Closed';
    private static final string REPAIR = 'Repair';
    private static final string REQUEST_ORIGIN = 'Web';
    private static final string REQUEST_TYPE = 'Routine Maintenance';
    private static final string REQUEST_SUBJECT = 'Testing subject';

```

```

    PRIVATE STATIC Vehicle_c createVehicle(){
        Vehicle_c Vehicle = new Vehicle_C(name = 'SuperTruck');
        return Vehicle;
    }

```

```

    PRIVATE STATIC Product2 createEq(){
        product2 equipment = new product2(name = 'SuperEquipment',
            lifespan_months_C = 10,
            maintenance_cycle_C = 10,
            replacement_part_c = true);

        return equipment;
    }

```

```

    PRIVATE STATIC Case createMaintenanceRequest(id vehicleId, id equipmentId){
        case cs = new case(Type=REPAIR,
            Status=STATUS_NEW,
            Origin=REQUEST_ORIGIN,

```

```

        Subject=REQUEST_SUBJECT,
        Equipment_c=equipmentId,
        Vehicle_c=vehicleId);
    return cs;
}

PRIVATE STATIC Equipment_Maintenance_Item_c createWorkPart(id equipmentId,id
requestId){
    Equipment_Maintenance_Item_c wp = new
Equipment_Maintenance_Item_c(Equipment_c = equipmentId,
                             Maintenance_Request_c = requestId);
    return wp;
}

@istest
private static void testMaintenanceRequestPositive(){
    Vehicle_c vehicle = createVehicle();
    insert vehicle;
    id vehicleId = vehicle.Id;

    Product2 equipment = createEq();
    insert equipment;
    id equipmentId = equipment.Id;

    case somethingToUpdate = createMaintenanceRequest(vehicleId,equipmentId);
    insert somethingToUpdate;

    Equipment_Maintenance_Item_c workP =
createWorkPart(equipmentId,somethingToUpdate.id);
    insert workP;

    test.startTest();
    somethingToUpdate.status = CLOSED;
    update somethingToUpdate;
    test.stopTest();

    Case newReq = [Select id, subject, type, Equipment_c, Date_Reported_c, Vehicle_c,
Date_Due_c
                  from case
                  where status =:STATUS_NEW];

```

```

Equipment_Maintenance_Item_c workPart = [select id
                                         from Equipment_Maintenance_Item_c
                                         where Maintenance_Request_c =:newReq.Id];

system.assert(workPart != null);
system.assert(newReq.Subject != null);
system.assertEquals(newReq.Type, REQUEST_TYPE);
SYSTEM.assertEquals(newReq.Equipment_c, equipmentId);
SYSTEM.assertEquals(newReq.Vehicle_c, vehicleId);
SYSTEM.assertEquals(newReq.Date_Reported_c, system.today());
}

@istest
private static void testMaintenanceRequestNegative(){
    Vehicle_C vehicle = createVehicle();
    insert vehicle;
    id vehicleId = vehicle.Id;

    product2 equipment = createEq();
    insert equipment;
    id equipmentId = equipment.Id;

    case emptyReq = createMaintenanceRequest(vehicleId,equipmentId);
    insert emptyReq;

    Equipment_Maintenance_Item_c workP = createWorkPart(equipmentId, emptyReq.Id);
    insert workP;

    test.startTest();
    emptyReq.Status = WORKING;
    update emptyReq;
    test.stopTest();

    list<case> allRequest = [select id
                           from case];

    Equipment_Maintenance_Item_c workPart = [select id
                                             from Equipment_Maintenance_Item_c
                                             where Maintenance_Request_c = :emptyReq.Id];

```

}

@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
st<Equipment_Maintenance_Item_c>();
    list<case> requestList = new list<case>();
    list<id> oldRequestIds = new list<id>();
```

```
for(integer i = 0; i < 300; i++){
    vehicleList.add(createVehicle());
    equipmentList.add(createEq());
}
```

```
insert vehicleList;  
insert equipmentList;
```

```
for(integer i = 0; i < 300; i++){
    requestList.add(createMaintenanceRequest(vehicleList.get(i).id, equipmentList.get(i).id));
}
insert requestList;
```

```
for(integer i = 0; i < 300; i++){
    workPartList.add(createWorkPart(equipmentList.get(i).id, requestList.get(i).id));
}
insert workPartList;
```

```
test.startTest();
for(case req : requestList){
    req.Status = CLOSED;
    oldRequestIds.add(req.Id);
}
update requestList;
test.stopTest();
```

```
list<case> allRequests = [select id
                          from case
                          where status =: STATUS_NEW];
```



```

        list<Equipment_Maintenance_Item_c> workParts = [select id
                                                         from Equipment_Maintenance_Item_c
                                                         where Maintenance_Request_c in: oldRequestIds];

        system.assert(allRequests.size() == 300);
    }
}

```

WarehouseCalloutService

```

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);
    }
}
}
}

```

WarehouseCalloutServiceMock

```

@isTest
global class WarehouseCalloutServiceMock implements HttpCalloutMock {
    global static HttpResponse respond(HttpRequest request){

        System.assertEquals('https://th-superbadge-apex.herokuapp.com/equipment',
            request.getEndpoint());
        System.assertEquals('GET', request.getMethod());
        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;
    }
}

```

WarehouseCalloutServiceTest

```

@isTest

```

```

private class WarehouseCalloutServiceTest {
    @isTest
    static void testWareHouseCallout(){
        Test.startTest();
        Test.setMock(HTTPCalloutMock.class, new WarehouseCalloutServiceMock());
        WarehouseCalloutService.runWarehouseEquipmentSync();
        Test.stopTest();
        System.assertEquals(1, [SELECT count() FROM Product2]);
    }
}

```

WarehouseSyncSchedule

```

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

```

WarehouseSyncScheduleTest

```

@isTest
public class WarehouseSyncScheduleTest {

    @isTest static void WarehousescheduleTest(){
        String scheduleTime = '00 00 01 * * ?';
        Test.startTest();
        Test.setMock(HttpCalloutMock.class, new WarehouseCalloutServiceMock());
        String jobID=System.schedule('Warehouse Time To Schedule to Test', scheduleTime, new
WarehouseSyncSchedule());
        Test.stopTest();
        CronTrigger a=[SELECT Id FROM CronTrigger where NextFireTime > today];
        System.assertEquals(jobID, a.Id,'Schedule ');
    }
}

```