APEX TRIGGERS

1. AccountAddressTrigger

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

2. ClosedOpportunityTrigger

```
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

VerifyDate (Apex class)

```
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
       @TestVisible private static Boolean DateWithin30Days(Date date1, Date date2) {
              //check for date2 being in the past
       if( date2 < date1) { return false; }</pre>
       //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
       @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

```
@isTest
private class TestVerifyDate{
  @isTest static void testCheckDates1(){
    date D = VerifyDate.CheckDates(date.parse('01/01/2022'),date.parse('01/15/2022'));
    System.assertEquals(date.parse('01/15/2022'), D);
  }
  @isTest static void testCheckDates2(){
    date D = VerifyDate.CheckDates(date.parse('01/01/2022'),date.parse('05/05/2022'));
    System.assertEquals(date.parse('01/31/2022'), D);
  }
  @isTest static void testDateWithin30Days1(){
    boolean flag =
VerifyDate.DateWithin30Days(date.parse('01/01/2022'),date.parse('12/30/2021'));
    System.assertEquals(false, flag);
  @isTest static void testDateWithin30Days2(){
    boolean flag =
VerifyDate.DateWithin30Days(date.parse('01/01/2022'),date.parse('02/02/2022'));
    System.assertEquals(false, flag);
  @isTest static void testDateWithin30Days3(){
    boolean flag =
VerifyDate.DateWithin30Days(date.parse('01/01/2022'),date.parse('01/20/2022'));
    System.assertEquals(true, flag);
  @isTest static void testSetEndOfMonthDate(){
    Date returndate = VerifyDate.SetEndOfMonthDate(date.parse('01/01/2022'));
 }
}
```

RestrictContactByName (Apex Trigger)

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

```
@istest
private class TestRestrictContactByName {
    @istest static void RestrictContactOnInsertUpdate(){
        Contact con = new Contact();
        con.LastName = 'INVALIDNAME';

        Test.startTest();
        Database.SaveResult result =Database.insert(con,false);
        Test.stopTest();

        System.assert(!result.isSuccess());
        System.assert(result.getErrors().size()>0);
        System.assertEquals('LastName as INVALIDNAME is not allowed for DML',result.getErrors()[0].getMessage());
    }
}
```

3. RandomContactFactory

```
public class RandomContactFactory {
    public static List<Contact> generateRandomContacts(Integer numcont, String lastname){
        List<Contact> cons = new List<Contact>();
        for(Integer i=0; i<numcont; i++){
            Contact cont = new Contact(FirstName = 'Test' +i, LastName = lastname);
            cons.add(cont);
        }
        return cons;
        }
}</pre>
```

Asynchronous Apex

AccountProcessor (Apex Class)

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

AccountProcessorTest

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

        Contact newcon1 = new Contact(FirstName='Ram', LastName='Rhon', AccountId = newAcc.Id);
        insert newcon1;
        Contact newcon2 = new Contact(FirstName='Jorge', LastName='Reddy', AccountId = newAcc.Id);
        insert newcon2;
```

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

LeadProcessor (Apex Class)

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

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();
    Id batchId = Database.executeBatch(Ip);
    Test.stopTest();
 }
}
```

AddPrimaryContact (Apex Class)

```
public class AddPrimaryContact implements Queueable {
  private Contact con;
  private String state;
    public AddPrimaryContact(Contact con, String state){
      this.con = con:
      this.state = state;
    }
  public void execute(QueueableContext context){
    List<Account> accounts = [Select Id, Name, (Select FirstName, LastName, Id from contacts)
from Account where BillingState = :state Limit 200];
    List<Contact> primarycontacts = new List<Contact>();
    for(Account acc : accounts){
      Contact c = con.clone();
      c.AccountId = acc.Id;
      primaryContacts.add(c);
    }
           if(primaryContacts.size()>0){
      insert primaryContacts;
```

```
}
```

AddPrimaryContactTest

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

DailyLeadProcessor (Apex class)

```
public class DailyLeadProcessor implements Schedulable {
   public void execute(SchedulableContext ctx){
```

DailyLeadProcessorTest

Apex Integration Services

AnimalLocator (Apex Class)

```
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

```
@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 );
    }
}
```

2. ParkLocator

```
public class ParkLocator {
```

```
public static string[] country(string theCountry){
    ParkService.ParksImplPort parkSvc = new ParkService.ParksImplPort(); // remove space
    return parkSvc.byCountry(theCountry);
}
```

ParkLocatorTest

```
@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);
    }
}
```

3. AccountManager

AccountManagerTest

```
@isTest
private class AccountManagerTest {
  private static testMethod void getAccountTest1() {
    Id recordId = createTestRecord();
    // Set up a test request
    RestRequest request = new RestRequest();
    request.requestUri = 'https://na1.salesforce.com/services/apexrest/Accounts/'+
recordId +'/contacts';
    request.httpMethod = 'GET';
    RestContext.request = request;
    // Call the method to test
    Account this Account = Account Manager.get Account();
    // Verify results
    System.assert(thisAccount != null);
    System.assertEquals('Test record', thisAccount.Name);
 }
  // Helper method
    static Id createTestRecord() {
    // Create test record
    Account TestAcc = new Account(
     Name='Test record');
    insert TestAcc;
    Contact TestCon= new Contact(
    LastName='Test',
    AccountId = TestAcc.id);
```

Apex Specialist

MaintenanceRequest (Apex Trigger)

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

MaintenanceRequestHelper (Apex Class)

```
public with sharing class MaintenanceRequestHelper {
  public static void updateworkOrders(List<Case> updWorkOrders, Map<Id,Case>
nonUpdCaseMap) {
    Set<Id> validIds = new Set<Id>();
    For (Case c : updWorkOrders){
      if (nonUpdCaseMap.get(c.Id).Status != 'Closed' && c.Status == 'Closed'){
        if (c.Type == 'Repair' || c.Type == 'Routine Maintenance'){
          validIds.add(c.Id);
        }
      }
    }
    //When an existing maintenance request of type Repair or Routine Maintenance is closed,
    //create a new maintenance request for a future routine checkup.
    if (!validIds.isEmpty()){
      Map<ld,Case> closedCases = new Map<ld,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>();
      //calculate the maintenance request due dates by using the maintenance cycle defined
on the related equipment records.
      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'));
      }
      List<Case> newCases = new List<Case>();
      for(Case cc : closedCases.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 multiple pieces of equipment are used in the maintenance request,
        //define the due date by applying the shortest maintenance cycle to today's date.
        //If (maintenanceCycles.containskey(cc.ld)){
          nc.Date_Due__c = Date.today().addDays((Integer) maintenanceCycles.get(cc.ld));
        //} else {
        // nc.Date_Due__c = Date.today().addDays((Integer)
cc.Equipment__r.maintenance_Cycle__c);
        //}
        newCases.add(nc);
```

}

```
insert newCases;

List<Equipment_Maintenance_Item__c> clonedList = new
List<Equipment_Maintenance_Item__c>();
    for (Case nc : newCases){
        for (Equipment_Maintenance_Item__c clonedListItem :
    closedCases.get(nc.ParentId).Equipment_Maintenance_Items__r){
            Equipment_Maintenance_Item__c item = clonedListItem.clone();
            item.Maintenance_Request__c = nc.Id;
            clonedList.add(item);
        }
    }
   insert clonedList;
}
```

MaintenanceRequestHelperTest

```
@isTest
public with sharing class MaintenanceRequestHelperTest {
  // createVehicle
  private static Vehicle__c createVehicle(){
    Vehicle__c vehicle = new Vehicle__C(name = 'Testing Vehicle');
    return vehicle;
  }
  // createEquipment
  private static Product2 createEquipment(){
    product2 equipment = new product2(name = 'Testing equipment',
                      lifespan_months__c = 10,
                      maintenance_cycle__c = 10,
                      replacement_part__c = true);
    return equipment;
  }
  // createMaintenanceRequest
  private static Case createMaintenanceRequest(id vehicleId, id equipmentId){
```

```
case cse = new case(Type='Repair',
              Status='New',
               Origin='Web',
              Subject='Testing subject',
              Equipment_c=equipmentId,
              Vehicle_c=vehicleId);
    return cse;
  }
  // createEquipmentMaintenanceItem
  private static Equipment_Maintenance_Item__c createEquipmentMaintenanceItem(id
equipmentId, id requestId){
    Equipment_Maintenance_Item__c equipmentMaintenanceItem = new
Equipment_Maintenance_Item__c(
      Equipment_c = equipmentId,
      Maintenance_Request__c = requestId);
    return equipmentMaintenanceItem;
  }
  @isTest
  private static void testPositive(){
    Vehicle__c vehicle = createVehicle();
    insert vehicle:
    id vehicleId = vehicle.Id;
    Product2 equipment = createEquipment();
    insert equipment;
    id equipmentId = equipment.Id;
    case createdCase = createMaintenanceRequest(vehicleId, equipmentId);
    insert createdCase:
    Equipment_Maintenance_Item__c equipmentMaintenanceItem =
createEquipmentMaintenanceItem(equipmentId, createdCase.id);
    insert equipmentMaintenanceItem;
    test.startTest();
    createdCase.status = 'Closed';
    update createdCase;
    test.stopTest();
```

```
Case newCase = [Select id,
            subject,
            type,
            Equipment__c,
            Date_Reported__c,
            Vehicle__c,
            Date_Due__c
            from case
            where status ='New'];
    Equipment_Maintenance_Item__c workPart = [select id
                          from Equipment_Maintenance_Item__c
                          where Maintenance_Request__c =:newCase.Id];
    list<case> allCase = [select id from case];
    system.assert(allCase.size() == 2);
    system.assert(newCase != null);
    system.assert(newCase.Subject != null);
    system.assertEquals(newCase.Type, 'Routine Maintenance');
    system.assertEquals(newCase.Equipment_c, equipmentId);
    system.assertEquals(newCase.Vehicle_c, vehicleId);
    system.assertEquals(newCase.Date_Reported__c, system.today());
  @isTest
  private static void testNegative(){
    Vehicle__C vehicle = createVehicle();
    insert vehicle:
    id vehicleId = vehicle.Id;
    product2 equipment = createEquipment();
    insert equipment;
    id equipmentId = equipment.Id;
    case createdCase = createMaintenanceRequest(vehicleId,equipmentId);
    insert createdCase:
    Equipment_Maintenance_Item_c workP = createEquipmentMaintenanceItem(equipmentId,
createdCase.ld);
    insert workP;
```

}

```
test.startTest();
    createdCase.Status = 'Working';
    update createdCase;
    test.stopTest();
    list<case> allCase = [select id from case];
    Equipment_Maintenance_Item__c equipmentMaintenanceItem = [select id
                           from Equipment_Maintenance_Item__c
                           where Maintenance_Request__c = :createdCase.Id];
    system.assert(equipmentMaintenanceItem != null);
    system.assert(allCase.size() == 1);
  }
  @isTest
  private static void testBulk(){
    list<Vehicle_C> vehicleList = new list<Vehicle_C>();
    list<Product2> equipmentList = new list<Product2>();
    list<Equipment_Maintenance_Item__c> equipmentMaintenanceItemList = new
list<Equipment_Maintenance_Item__c>();
    list<case> caseList = new list<case>();
    list<id> oldCaseIds = new list<id>();
    for(integer i = 0; i < 300; i++){
      vehicleList.add(createVehicle());
      equipmentList.add(createEquipment());
    }
    insert vehicleList;
    insert equipmentList;
    for(integer i = 0; i < 300; i++){
      caseList.add(createMaintenanceRequest(vehicleList.get(i).id, equipmentList.get(i).id));
    }
    insert caseList;
    for(integer i = 0; i < 300; i++){
equipmentMaintenanceItemList.add(createEquipmentMaintenanceItem(equipmentList.get(i).id,
caseList.get(i).id));
    }
```

```
insert equipmentMaintenanceItemList;
    test.startTest();
    for(case cs : caseList){
      cs.Status = 'Closed';
      oldCaseIds.add(cs.Id);
    }
    update caseList;
    test.stopTest();
    list<case> newCase = [select id
                  from case
                  where status ='New'];
    list<Equipment_Maintenance_Item__c> workParts = [select id
                               from Equipment_Maintenance_Item__c
                               where Maintenance_Request__c in: oldCaseIds];
    system.assert(newCase.size() == 300);
    list<case> allCase = [select id from case];
    system.assert(allCase.size() == 600);
 }
}
```

WarehouseCalloutService (Apex Class)

```
public with sharing class WarehouseCalloutService implements Queueable {
   private static final String WAREHOUSE_URL = 'https://th-superbadge-
   apex.herokuapp.com/equipment';
```

//Write a class that makes a REST callout to an external warehouse system to get a list of equipment that needs to be updated.

//The callout's JSON response returns the equipment records that you upsert in Salesforce.

```
@future(callout=true)
public static void runWarehouseEquipmentSync(){
```

```
System.debug('go into runWarehouseEquipmentSync');
          Http http = new Http();
    HttpRequest request = new HttpRequest();
    request.setEndpoint(WAREHOUSE_URL);
    request.setMethod('GET');
    HttpResponse response = http.send(request);
    List<Product2> product2List = new List<Product2>();
    System.debug(response.getStatusCode());
    if (response.getStatusCode() == 200){
      List<Object> jsonResponse =
(List<Object>)JSON.deserializeUntyped(response.getBody());
      System.debug(response.getBody());
      //class maps the following fields:
      //warehouse SKU will be external ID for identifying which equipment records to update
within Salesforce
      for (Object iR: jsonResponse){
        Map<String,Object> mapJson = (Map<String,Object>)jR;
        Product2 product2 = new Product2();
        //replacement part (always true),
        product2.Replacement_Part__c = (Boolean) mapJson.get('replacement');
        //cost
        product2.Cost__c = (Integer) mapJson.get('cost');
        //current inventory
        product2.Current_Inventory__c = (Double) mapJson.get('quantity');
        //lifespan
        product2.Lifespan_Months__c = (Integer) mapJson.get('lifespan');
        //maintenance cycle
        product2.Maintenance_Cycle__c = (Integer) mapJson.get('maintenanceperiod');
        //warehouse SKU
        product2.Warehouse_SKU__c = (String) mapJson.get('sku');
                      product2.Name = (String) mapJson.get('name');
        product2.ProductCode = (String) mapJson.get('_id');
        product2List.add(product2);
      }
      if (product2List.size() > 0){
```

```
upsert product2List;
    System.debug('Your equipment was synced with the warehouse one');
}

public static void execute (QueueableContext context){
    System.debug('start runWarehouseEquipmentSync');
    runWarehouseEquipmentSync();
    System.debug('end runWarehouseEquipmentSync');
}
```

WarehouseCalloutServiceTest

```
@IsTest
private class WarehouseCalloutServiceTest {
  // implement your mock callout test here
       @isTest
  static void testWarehouseCallout() {
    test.startTest();
    test.setMock(HttpCalloutMock.class, new WarehouseCalloutServiceMock());
    WarehouseCalloutService.execute(null);
    test.stopTest();
    List<Product2> product2List = new List<Product2>();
    product2List = [SELECT ProductCode FROM Product2];
    System.assertEquals(3, product2List.size());
    System.assertEquals('55d66226726b611100aaf741', product2List.get(0).ProductCode);
    System.assertEquals('55d66226726b611100aaf742', product2List.get(1).ProductCode);
    System.assertEquals('55d66226726b611100aaf743', product2List.get(2).ProductCode);
 }
}
```

WarehouseCalloutServiceMock

```
@isTest
global class WarehouseCalloutServiceMock implements HttpCalloutMock {
    // implement http mock callout
    global static HttpResponse respond(HttpRequest request) {

        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"},{"_id":"55d66226726b611
100aaf742","replacement":true,"quantity":183,"name":"Cooling
Fan","maintenanceperiod":0,"lifespan":0,"cost":300,"sku":"100004"},{"_id":"55d66226726b611100a
af743","replacement":true,"quantity":143,"name":"Fuse
20A","maintenanceperiod":0,"lifespan":0,"cost":22,"sku":"100005"}]');
        response.setStatusCode(200);

        return response;
    }
}
```

WarehouseSyncSchedule (Apex Class)

```
global with sharing class WarehouseSyncSchedule implements Schedulable{
  global void execute(SchedulableContext ctx){
    System.enqueueJob(new WarehouseCalloutService());
  }
}
```

WarehouseSyncScheduleTest

```
@isTest
public with sharing class WarehouseSyncScheduleTest {
   // implement scheduled code here
```

```
(//
  @isTest static void test() {
    String scheduleTime = '00 00 00 * * ? *';
    Test.startTest();
    Test.setMock(HttpCalloutMock.class, new WarehouseCalloutServiceMock());
    String jobId = System.schedule('Warehouse Time to Schedule to test', scheduleTime, new WarehouseSyncSchedule());
    CronTrigger c = [SELECT State FROM CronTrigger WHERE Id =: jobId];
    System.assertEquals('WAITING', String.valueOf(c.State), 'JobId does not match');
    Test.stopTest();
}
```