**Problem1. (15 points) Letter Grade Program.  (Entire Problem-solving process required)**

    You should already understand this problem from class, but the steps of the PSP are still required.   I expect UML Class Diagrams, a screen capture of successful results and a completed test plan.

Your Letter Grade application to include:

1. A while loop so one does not have to re-start the program after every grade.
2. Use any score less than 0 (zero) as the sentinel to stop the while loop.
3. You need to use If and else statements, not just If statements.
4. Input grade and letter grade should be output to screen with each number grade input.
5. Finally, your application will calculate and output the average grade for the grades input.
6. I do want to see the UML Class Diagram/s.

Your application should ask the user to input a grade (integer from 1-100) and then output the letter grade.

 Scale:

Greater than or equal to 90 is an "A"; Greater than or equal to 80 but less than 90 is a "B", Greater than or equal to 70 but less then 80 is a "C", Greater than or equal to 60 but less than 70 is a "D", and less than 60 is an "F".

**Sample Inputs and Outputs (Note1: Does not have to be exactly like example) (Note2: This could be a Test Plan)**

Enter Grade (integer 1-100): 95

Your Letter Grade is: A

Enter Grade (integer 1-100): 85

Your Letter Grade is: B

Enter Grade (integer 1-100): 75

Your Letter Grade is: C

Enter Grade (integer 1-100): 0

The average for these 3 grades is: 85

**Problem2 (10 points):  Improved Account Problem. (Problem-solving process is required)**

Description:  Using the Account/AccountTest examples used in the previous lesson and found in the notes, add the following functionality and test.  You may be familiar with this problem from class, but you still need to do the entire PSP.  Don’t forget:  Screen captures, a completed Test Plan, and UML Class Diagrams.

Functionality Requirement:   Write a method to debit the account (subtract an input value), but do not allow overdraft.

**Test Plan:**

1. Include, at least, one Case that tries to create an account with a negative balance.
2. Include, at least, one Case that tries to debit more than is in the account (use if/ else selection).
3. Include, at least, one Case where one credits the account then debits the same amount.

**Problem3 (25 points):  YourCarApp Problem.  (Problem-solving process IS required with UML Class Diagram/s)**

Description:  I would like you to create a Java Application "YourCarTripApp" that will help you calculate the total distance from one point (point A) to a second point (point B), how long it will take you to get there, and if you need gas for the return trip.  You must use a **while** loop with a sentinel for this application.  You may use a single class or earn an extra five points for using two classes with a car class (MyCar class) to create car-objects and hold non-static methods.

     YourCarTripApp should define the necessary variables to hold the number of gallons in the tank (must collect input at some point), the number of miles in the trip (starts at zero), current speed (starts at zero).  Your car will travel at a consistent speed for each leg of a trip, but should change speeds for each leg (increase, decrease), and finally, determine if you need gas to complete the trip.   Needs gas, implies you will need to calculate your fuel consumption, so assume your car averages 20 MPG at any speed.  You must input a start fuel level.

**Example Trip**:  Depart UHCL (point A), take a left on to Bay Area Boulevard for 3.5 miles at 30 MPH, take a left onto I45 South for 26.3 miles at 65 MPH, exit right onto 61st street, go 2.0 miles at 30 MPH to Stewart Drive, take a right and go 4.3 miles at 45 MPH to your destination on the right (point B).

**Example Output (you can be more creative):**

Are you going on a trip (1 = Yes or 0 = No)?  1

How many gallons of gas in your tank (Integer 1-15)? 2

Enter Leg 1 Distance (miles): 3.5

Enter Leg 1 Speed (MPH Integer): 30

Is there another Leg to your trip (1 = Yes or 0 = No)? 1

Enter Leg 2 Distance (miles): 26.3

Enter Leg 2 Speed (MPH Integer): 65

Is there another Leg to your trip (1 = Yes or 0 = No)? 1

Enter Leg 3 Distance (miles): 2.0

Enter Leg 3 Speed (MPH Integer): 30

Is there another Leg to your trip (1 = Yes or 0 = No)? 1

Enter Leg 4 Distance (miles): 4.3

Enter Leg 4 Speed (MPH Integer): 45

Is there another Leg to your trip (1 = Yes or 0 = No)? 0

You traveled about 36.1 miles in about 41.4 minutes.

Your car will need more gas to return.