ECE 175 Homework Assignment 3

Due Date: by 11.59 pm on Tuesday September 21, 2021

Submission Instructions: Submit only .c flies in the designated Assignment Dropbox on D2L.

Conventions: Name your C programs as *hw**x**p**y**.c*
where ***x*** corresponds to the homework number and ***y*** corresponds to the problem number.
For example, the C program for homework 3, problem 1 should be named as *hw**3**p**1**.c*

Write comments in your programs. Programs with no comments will receive PARTIAL credits.
For each program that you turn in, include at least the following info at the top of the C file:
Author:
Date created:
Brief description of the program:

- input(s):
- output(s):
- an algorithm (or description/relationship between inputs and outputs)

Problem 1 (12 points)

Complete **HW 3 problem 1**: Countdown until digits are odd and find the average of those count-down number in **zyBooks chapter 14 (section 14.1)**.

Problem 2 (23 points): number to text converter

Write a C program that

1) lets a user enter a 5-digit area code. Your program must make sure that a user enters exactly 5 digits. Otherwise, your program displays number of digits that a user just entered and asks until a user enters a 5-digit number.
2) converts a 5-digit number to text.

Note: your program cannot use strings or any functions from the string library.

Sample code execution #1: **bold text** indicates information entered by a user.
Enter a 5-digit area code: **13578642**
you entered 8 digits.
Enter a 5-digit area code: **75**
you entered 2 digits.
Enter a 5-digit area code: **678231**
you entered 6 digits.
Enter a 5-digit area code: **342**
you entered 3 digits.
Enter a 5-digit area code: **1**
you entered 1 digits.
Enter a 5-digit area code: **85721**
eight five seven two one

Sample code execution #2: **bold text** indicates information entered by a user.
Enter a 5-digit area code: **7690**
you entered 4 digits.
Enter a 5-digit area code: **90346**
nine zero three four six

Problem 3 (35 points): Half-life

Half-life is the time required for a quantity of substance to reduce to half of its initial value. For example, given that the initial radiation amount is 10 and its half-life is 6 hours, after 6 hours, the amount will be 10/2 = 5. After 12 hours, the amount will be 5/2 = 2.5. After 18 hours, the amount will be 2.5/2 = 1.25.

Assume that the safe level of the radiation is at most 0.3. This means that it is unsafe if the radiation level is greater than or equal to 0.3.

Write an interactive C program that

1) lets a user enter an initial amount of radiation and its half-life value in hours.
2) checks and makes sure that the entered values are positive. If not, display appropriate statements. See sample code execution.
3) checks and displays an appropriate statement if the entered initial amount is already below safe level. See sample code execution.
4) finds and displays number of hours it takes for the radiation amount to go below the safe level and the amount at that time.
5) asks a user whether he/she wants to continue. If yes, repeat step 1) – 4)

Sample code executions: **bold text** indicates information entered by a user

Enter initial amount of radiation: **-1**
Enter half-life in hours: **-2**
entered values CANNOT be negative
Continue (Q to Quit)?: **r**
Enter initial amount of radiation: **-100**
Enter half-life in hours: **2**
entered values CANNOT be negative
Continue (Q to Quit)?: **y**
Enter initial amount of radiation: **1**
Enter half-life in hours: **-2.5**
entered values CANNOT be negative
Continue (Q to Quit)?: **Y**
Enter initial amount of radiation: **0.2**
Enter half-life in hours: **2**
0.20 is already below a safe level of 0.30
Continue (Q to Quit)?: **g**
Enter initial amount of radiation: **175.1**
Enter half-life in hours: **6**
After 60.00 hours, the radiation level is 0.170996 (below 0.30)
Continue (Q to Quit)?: **w**
Enter initial amount of radiation: **234.56**
Enter half-life in hours: **5.5**
After 55.00 hours, the radiation level is 0.229063 (below 0.30)
Continue (Q to Quit)?: **p**
Enter initial amount of radiation: **89**
Enter half-life in hours: **4.5**
After 40.50 hours, the radiation level is 0.173828 (below 0.30)
Continue (Q to Quit)?: **Q**

Lab 3 (30 points): complete this assignment when you attend the lab session after HW 3 is due.