COMPUTER PROGRAMMING

BATCH – A, B & C
[FRIDAY OCTOBER 20, 2017]   DEADLINE: OCTOBER 23, 2017 @ 23:59 HRS

ASSIGNMENTS – 8   CODE: assign09

NOTES: You must use gcc compiler under Ubuntu OS
   i)   Please carefully read all assignment problems and answer in the same c file.
   ii) Create a .c file by strictly following the file name convention: If your roll number is
        171 & code is assign09, file name should be 171-assign09.c
   iii) If you do not follow the above instruction, your file will not be evaluated.

PROBLEMS   **[Total Marks: 25]**

1) **[Marks: 6]**
    Generate an array of n (n is in [20, 30]) integers.
    Write a function to find consecutive odd numbers and find the sum of these two odd
    numbers, and the greatest common divisor of these two numbers.
    Print all such consecutive pairs of odd numbers, their sum and their GCD.

2) **[Marks: 6]**
    Assume an array of 50 integers. Assume or generate these 50 integers.
    Now write functions to find the sum of consecutive pairs of integers whose sum
    is also present in the array. To do this task, you may 1) write a function to
    compute the sum of two consecutive integers and 2) write another function to
    check whether the sum is present in the array or not?

3) **[Marks: 5]**
    Assume the following integer array:

1	3	4	5	6	2	3	8	7	6	5	4	3	2	3	4	2	5	1	8	9	4	3	2	1	5	2	6	7	8

    Write a function to a sub-array of length 3 whose reflexive image (one
    occurrence is enough) can be found in the same array. For example, the reflexive
    image of the sub-array 4 5 6 appears as 6 5 4 and found in the same array. Print
    the starting and ending positions of all such sub-arrays and its reflexive image.

4) **[Marks: 8]**
    Assume a square matrix of order n (n can be assumed in the interval [5, 8]) and
    store them as a one-dimensional array A. Now using random number generator,
    generate 2-digit integers in [10, 30] for the values of A. Now the task is to find
    the following (do not assume additional memory):

    a) Write a function to find a sub-matrix, which is also a square matrix of order 3
        of A whose center element is an even number. Inputs to this function would
        be: 1) the one-dimensional array A, and 2) the index k, the starting index of
        the square matrix of order 3. Find all such sub-matrices and print the same.

    b) Write a function to compute the row and column sum of such sub-matrices
        and print the same.

    Hint: To solve this problem use the trick: the array index of any element can be used
    to derive row and column index of a square matrix of order 3. For example, assume
    that A is a square matrix of order 5. An element at A[8] can be seen as A[1][3]. Use
    this logic to find sub-matrices.