COMPUTER PROGRAMMING

ASSIGNMENTS 08-WEEK 09 (DEADLINE: 11 FEB 2021, 06:30 PM) CODE: assign08-w9

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 naming convention: If the last 4 digits of your roll number is 0127 & code is assign08-w9, then the file name should be assign08-w9-0127-AYCOY.c where AYCOY can be any five capital letters of your choice and this could act as your secret key (do not share this with others).
iii) If you do not follow the above instruction, a suitable penalty would be imposed.
iv) All Questions are compulsory.

PROBLEMS ON RECURSIVE FUNCTIONS **[Total Marks: 40]**

1) **[Marks: 4]** Write a recursive function to compute the sum of all prime digits (digits that are prime numbers) of a given number (assume a large integer as the input).
If k = **7**3**45**86**2**419 then the output = 7 + 3 + 5 + 2 = 17.

2) **[Marks: 4]** Write a recursive function that prints all numbers less than N which consists of k digits and each digit can be 1 or 3 or multiples of 3 only (if N = 20, then output should be 19, 16, 13, 11, 9, 6, 3, 1) and finally returns their sum 78.

3) **[Marks: 6]** Consider the following string namely str of length 30 characters.

a	c	b	a	a	c	d	e	c	e	e	f	d	a	c	a	d	e	c	a	e	f	e	f	a	f	e	c	d	f

Now write a recursive function to identify the maximum repeating substring of length k where k ∈ [2, 5] (Note: Simply move only from left to right direction)

4) **[Marks: 8]** Generate an array of n integers where n ∈ [20, 60]. Write recursive functions to do the following tasks: (a) the smallest odd number, (b) the largest even number and (c) the largest prime factor among the factors of all elements in the array

5) **[Marks: 10]** Take an array of 20 integers as given below:

2	4	7	5	1	2	7	4	4	2	6	12	21	10	2	4	4	2	6	9

Now write a recursive function to identify the following task:
a) A subarray can repeat in the same array with a constant multiplied with each element of the subarray. For example, consider the subarray: 2 4 7. Multiplying each element with a constant 3 gives 6 12 21 which is also present in the array.

b) Find all such subarrays of length 2 and 3.

6) **[Marks: 8]** Assume the following integer array of size 20 elements:

8	2	3	6	13	11	21	22	28	23	12	43	9	17	25	27	29	47	10	31

Write a recursive function to convert this into a 2-dimensional matrix where
(a) The first row will only have non-prime numbers and
(b) The second row will only have prime numbers (red colored numbers).