DATA STRUCTURES

BATCH – A
[TUESDAY JANUARY 31, 2017: 2:00 PM – 5:00 PM]

ASSIGNMENTS – 4 CODE: assign04

INSTRUCTIONS: [Total Marks: 25]

i) Read all assignments and each problem has to be answered in the same c file.
ii) Create a .c file following the file name convention: abc-assign04.c
Where abc is your roll number and assign04 is the assignment code
iii) Strictly follow the file name convention and do not use scanf()

PROBLEMS: (There are totally 5 problems)

1) **[Marks: 7 marks]**
Consider the following set of integers:
A = {8, 2, 70, 11, 36, 29, 67, 41, 13, 3, 6, 5, 35, 52, 96, 24, 17, 29, 37, 41, 53, 47, 61, 53, 71, 14, 11, 7, 82, 57}

Write a function to sort all prime numbers in increasing order and non-prime numbers in decreasing order. You can use any sorting algorithm.

Print both sets of numbers in two lines separately.

2) **[Marks: 10 marks]**
Consider the following list of 10 names:
   a) T V S Sundaram
   b) James Bond 007
   c) Elangovan T S
   d) Raghu Raja Pandian
   e) Uma Mageswari
   f) Kamal Talukdar
   g) Anbarasu Kannan
   h) Janaki Ramu
   i) Ishwarya Gireesh
   j) Odelu Venga Prasad

Write a function to sort the names that start with vowels in alphabetical order. Sort the rest of the names in reverse alphabetical order.

Prints these sets of names separately.
Output:
   g) Anbarasu Kannan
   c) Elangovan T S
   i) Ishwarya Gireesh
   j) Odelu Venga Prasad
   e) Uma Mageswari

   a) T V S Sundaram
   d) Raghu Raja Pandian
   f) Kamal Talukdar
   h) Janaki Ramu
   b) James Bond 007

3) **[Marks: 8 marks]**

a) Create a file namely, "abc-input.txt" where abc is your roll number. Generate a set of 500 real numbers in the range [0, 1] and write to this file. You may use rand() and srand() functions to generate unique set of 500 random numbers.

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void generateNumbers(int n)
```

Output: "abc-input.txt" that contains 500 real numbers in the range [0, 1]

b) Read these 500 real numbers from the above file and sort them in decreasing order.

Print the maximum and minimum of these numbers.

c) Open another file namely, "abc-output.txt" and write the following in this file:

   a. **The sorted elements in decreasing order**
   b. **Print all numbers in sorted order between [0.315, 0.625]**