National Institute of Technology Calicut
Department of Computer Science and Engineering
Third Semester B. Tech.(CSE)
CS2092D Programming Laboratory
Modification Question for Assignment-2 (02.09.2021)

Instructions: For the question given below, write the design in the shared doc. Upload your design as a .doc file in the eduserver on or before 3.30 pm in the link provided for *submitting the design of the Modification question*. After submitting the design, implement your design using *C Language* and show the output of your program to the evaluator for the test cases given for the Modification question in eduserver. In any case, you should submit your C Program on or before 5 pm in the link provided for *submitting the C Program for the Modification question*. In case of clarifications, your evaluator will help you.

Marks (Design + Implementation): 5 + 3

Time: Design: Till 3.30 pm and Implementation: Till 5 pm. The marks for implementation will be based on the results for the test cases. The evaluator will be conducting a viva for a maximum of 5 minutes.

QUESTION

1. James Bond is on another top-secret mission for the British Intelligence Agency, MI6. A group of cyber criminals have hijacked N computers (numbered 0 to N-1) in UK's largest bank. These N computers contain all information regarding accounts, transactions and money of almost $(3/4)^{th}$ the citizens of UK. The cyber criminals have encrypted the computers and hence require passcodes to decrypt them. They are now blackmailing the government, demanding 50 Billion Pounds within 3 hours as ransom for decrypting the systems, or they would erase all the contents in these computers, putting the country in a huge economic crisis. Bond has managed to capture one of the criminals and has finished interrogating this criminal. He has passed the following information to you, the Senior Technical Analyst at MI6:

   - Each computer is encrypted with a passcode.
   - All passcodes are non-empty alphanumeric strings of length atmost 10. That is, each character in a passcode is a digit $\in [0, 9]$ or a lowercase English letter $\in$ [a-z] or an uppercase English letter $\in$ [A-Z]. There would be no occurrence of white-spaces inside any passcode.
   - Passcode X is more secure than passcode Y if X comes after Y in the lexicographic ordering of X and Y. If X is lexicographically equal to Y, then X is as secure as Y and Y is as secure as X (See the note below on Lexicographic Ordering).
   - The ith computer is encrypted with a passcode that is more secure than or as secure as the passcode with which the $(i-1)^{th}$ computer is encrypted, for $0 < i < N$. The computer numbered 0 is encrypted with the least secure passcode.
   - An array P containing the N passcodes, not necessarily in order. That is P_i may or may not be the passcode for the ith computer.
   - We say that a computer is *easier* to decrypt if the sum of ASCII codes of the characters in the passcode of that computer is divisible by N.

   Given the array P, your task is to determine the passcodes of all the computers and the list of computers that are easier to decrypt, and print the output as specified in the Output Format section below

   NOTE: Two strings S1 and S2 are lexicographically equal if they are of the same length and contain the same characters in the same positions. In this case, S1 or S2 can be considered to come first in the lexicographic order. If S1 and S2 are not lexicographically equal, to determine which string comes first in the lexicographic order, suppose that j is the first position from left where

the two strings differ. Then, S1 comes before S2 if S1[j] < S2[j]; otherwise S2 comes before S1. Characters are compared using their ASCII values. If two strings contain the same characters in the same positions, then the shortest string comes first (for instance, *abc* comes before *abcde*).

Input format:

- The first line of input contains an integer N in the range [1, 50], denoting the number of computers hijacked.
- The second line of input contains N single-space-separated alphanumeric strings, representing the array P.

Output Format:

- The first line of output should contain N single-space-separated alphanumeric strings, representing the passcodes of Computer0, Computer1, ..., ComputerN-1, in that order.
- The second line of output should contain the computer number of all those computers that are easier to decrypt, in their ascending order. These numbers should be single-space-separated. If no such computer exists, the second line should contain "-1", without the quotes.

Sample Input1:
5
123abcde abcde abcd Abcde 456

Sample Output1:
123abcde 456 Abcde abcd abcde
0 4

Sample Input2:
3
NIT Calicut 673601

Sample Output2:
673601 Calicut NIT
-1