National Institute of Technology Calicut
Department of Computer Science and Engineering
Third Semester B. Tech.(CSE)
CS2092D Programming Laboratory
Modification Question for Assignment-3 (09.09.2021)

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 4:00 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 4:45 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 + 2

Time: Design: Till 4:00 pm and Implementation: Till 4:45 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 works in a multinational company as a project manager and he has a team working under him. Each team member has an employee ID and a rank (Higher the employee id, lower is the rank). For the Christmas celebration, James bought some gifts and wanted to distribute them to his team members. Instead of simply distributing them to the team members, he wanted to play a simple game to decide which gifts go to which team member. There are n types of gifts and multiple copies of each type of gift is available. He marked all the gifts with some numbers (same type of gift is marked with same number), and put them under the Christmas tree. He noted these n distinct numbers written on the gift boxes to a long plain paper, as space separated integers in a line. Now, he tore the paper into two and distributed them to the other members as per the rules given below :

   - If the paper contains more than one number they have to tear it into two pieces such that the difference between the count of numbers in each piece should not be more than one. The person with employee ID i has to pass these two pieces of the paper to the persons with employee IDs $2i$ and $2i + 1$, assuming that James has employee ID 1.
   - If the count of numbers in the pieces are not equal, then the paper containing more numbers should be given to the person with employee ID $2i$ and the other paper to the person with the employee ID $2i + 1$.

   After the distribution of paper strips, he told the members that the number(s) present in the paper they received represent the gift numbers. For each number on the strip received by a person, he or she will get exactly one gift corresponding to that type. For example, since James had all the numbers written on his paper, he will get one box of every type of gift.

   After distributing all the gifts, James picks a random number (say X) corresponding to a gift type from the list and all the people who had number X are given a special gift.
   Your task is :

   - To print the numbers present in the piece of paper received by each employee.
   - To find who all have got the special gift.
   - Total number of gifts distributed.

   Employee ID of James is 1 and the ID of other team members are 2, 3, 4, 5....

Assumption: Higher the employee id, lower is the rank.

Input format:

- First-line contains an integer $n \in [1, 10^4]$ which is the number of types of gifts.
- The second line lists the n distinct numbers present in the paper, as space-separated integers in the range $[0, 10^4]$.
- The third line contains an element $X \in [0, 10^4]$ for the special gift.

Output Format:

- For each employee who received a gift, the output should contain a line corresponding to that employee containing the employee ID followed by a space followed by the list of gifts received by that employee as space separated numbers in the order mentioned in the paper strip. (The printing can be done in any suitable order of the employee ID).
- The next line contains the employee ids of those who won the special gift. (The printing can be done in any suitable order of the employee ID)
- The last line of the output contains the total number of gifts distributed (Including special gifts)

Sample Input1:
7
7 6 5 4 3 2 1
4

Sample Output1:
1 7 6 5 4 3 2 1
2 7 6 5 4
4 7 6
8 7
9 6
5 5 4
10 5
11 4
3 3 2 1
6 3 2
12 3
13 2
7 1
1 2 5 11
31

Sample Input2:
5
32 56 95 78 22
22

Sample Output2:
1 32 56 95 78 22
2 32 56 95
4 32 56
8 32

9 56
5 95
3 78 22
6 78
7 22
1 3 7
20