e-Yantra Robotics Competition (eYRC-2017)
Task 1: Transporter Bot

Problem Statement 3

Problem Statement is based on C programming. Please use the *task1_code.c* file given in the Practice\Problem Statement 3 folder.

Before we Give the Problem Statement, Let us consider two sub-problems and understand the logic.

i. **Sub-problem 1: Modifying an Integer array**

- You are given an Integer array of size 4 having values from 1 to 4 in any random order. The values are not repeated. One example is given as:

  Integer array = (2, 4, 1, 3)

  Note that **Value** at 0^{th} **Position** is 2, Value at 1^{st} Position is 4 and so on as given in Table 1:

Table 1

Position	0	1	2	3
Value	2	4	1	3

- Integer array defines the order in which the Values appear. If the Position of a Value is changed, the order should not be altered. To understand this, let us consider an example.
- **Example 1:** Suppose the Integer array is (2, 4, 1, 3). If we want to change the position of Value 2 from 0^{th} to 2^{nd} Position. This is expressed in a **Tuple (x, y)** where **x** defines a Value and **y** defines a Position. Thus, you will be given a Tuple (2, 2). You need to find the **Modified Integer array.**

  Note that the **Order of the Values** is: 2 - followed by 4 - followed by 1 - followed by 3.

  (i) Let the Modified Integer array be represented as A. Let A = (- ,- ,- ,-).
  (ii) First we put Value 2 in the 2nd Position in A. Now, A = (- ,- ,2 ,-).
  (iii) Considering the Order of Values, we can fill in the rest of the Values in A. A = (- , - , 2, 4); wrapping the Values around keeping the same Order of Values, Modified Integer array A = (1, 3, 2, 4).

Note: x can be: 1, 2, 3, or 4 and y can be: 0 , 1, 2 or 3.

ii. **Sub-problem 2: Manipulating the Integer array based on a Character array**

- Character array consists characters from A to P in any random order. Characters can be repeated. The size of Character array can vary from 4 to 8. One example is given as:

  Character array: (J, D, H, C, K, O, H)

- Out of 16 characters A to P, set of 4 characters corresponds to a particular value of an Integer array as given in Table 2.

Table 2

Position				Value
0	1	2	3	
A	B	C	D	1
E	F	G	H	2
I	J	K	L	3
M	N	O	P	4

- According to Table 2, A, B, C and D correspond to Value 1 and so on
- **Example 2:** Depending on the characters given in the Character array, Integer array needs to be modified.
  Let Integer array = (2, 4, 1, 3)
- Process Character array, character by character. For each character, form a Tuple using Table 2. Table 3 lists the Characters and the corresponding Tuples.

Table 3

Character	Tuple
A	(1, 0)
B	(1, 1)
C	(1, 2)
D	(1, 3)
E	(2, 0)
F	(2, 1)
G	(2, 2)
H	(2, 3)
I	(3, 0)
J	(3, 1)
K	(3, 2)
L	(3, 3)
M	(4, 0)
N	(4, 1)
O	(4, 2)
P	(4, 3)

- For each Tuple, modify the Integer array (as shown in Example 1). In our example, the Modified Integer arrays corresponding to each Tuple is given in Table 4.

Table 4

Character	Tuple	Modified Integer array
A	(1, 0)	(1, 3, 2, 4)
B	(1, 1)	(4, 1, 3, 2)
C	(1, 2)	(2, 4, 1, 3)
D	(1, 3)	(3, 2, 4, 1)
E	(2, 0)	(2, 4, 1, 3)
F	(2, 1)	(3, 2, 4, 1)
G	(2, 2)	(1, 3, 2, 4)
H	(2, 3)	(4, 1, 3, 2)
I	(3, 0)	(3, 2, 4, 1)
J	(3, 1)	(1, 3, 2, 4)
K	(3, 2)	(4, 1, 3, 2)
L	(3, 3)	(2, 4, 1, 3)
M	(4, 0)	(4, 1, 3, 2)
N	(4, 1)	(2, 4, 1, 3)
O	(4, 2)	(3, 2, 4, 1)
P	(4, 3)	(1, 3, 2, 4)

A set of three test inputs are given at: Practice\Problem Statement 3\Test_inputs folder.
Test input is given as text file as follows:

2 4 1 3
J D H C K O H

Problem Statement:

A "snippet" of outline code is given in *task1_code.c* file.

Teams Modify the ***puzzle ()*** function in the file to process both the arrays -- Integer and Character.

Depending on the characters given in Character array, modify Integer array.

As shown in the example, if the Integer array is (2, 4, 1, 3) and Character array is (J, D, H, C, K, O, H), then the solution is given as:

(1, 3, 2, 4)-(3, 2, 4, 1)-(4, 1, 3, 2)-(2, 4, 1, 3)-(4, 1, 3, 2)-(3, 2, 4, 1)-(4, 1, 3, 2)

Submission Guideline:

Save the output of each test input in different text files and name the text files as Test_output_n.txt. Put the three text files along with the C code in one folder and name the folder as "Problem Solution 3". One example output text file (Test_output_1.txt) is given in Practice\Problem Statement 3 folder.

Note: The output should be in given format. It should not contain any extra information. Without C file output will not be evaluated.