CATH CON 2021 Reference Questions - Junior Category

[There are a total of 5 questions in this document]

1. Word Search
   The input will be an array of words and a 2-dimensional (8 x 8) array consisting of a word search containing those words in a word search. These words will only be horizontal or vertical and can be either forwards or backwards. You have to write a code that will find the words and print the position of its first and last letter (in the same order as the words are given). You may assume that the word search already exists.
   Eg: Input: ['tree', 'flower',' 'apple, 'branch']

H	C	N	A	R	B	O	I
Z	R	T	R	E	E	W	L
P	A	L	E	W	T	R	E
R	Q	F	T	O	G	M	C
P	A	P	P	L	E	H	D
Y	F	A	G	F	N	A	U

   Output: Tree:[1][2], [1][5]
           Flower: [5][4], [0],[4]
           Apple: [4][1], [4][5]
           Branch: [0][5], [0][0]

2. Shifting Arrays
   You're given a single dimensional array as well as a value for int x.
   You need to design a method that shifts the array by x. If x is positive, the array will shift forward and if x is negative the array will shift backward. The size and value of the array will remain unchanged. You will then print this new method.

   E.g.1
   Input:
   ['5','6','3','1','5']
   3
   Output:
   [,'3','1' ,'5','5','6']

   E.g.2
   Input:
   ['5','6','3','1','5']
   -1
   Output:

['6','3','1','5','5']

3. Pre and Suffix
   Your input will be a string s. You have to find the longest string within s which is a prefix and suffix of s as well as present within s (ie. exists within s without being the prefix or suffix).
   Eg:
   Input: 'houseboathousecarhouse'
   Output:'house

   Input:aaaa
   Output:aa

4. Palindromic Substring
   A palindrome is a word,sentence or in this case a number that reads the same forward as well as backward. For example, 1881 is a palindrome.

   You will be given a string of numbers and you have to find the longest palindromic substring within the string. From the numerals of the substring, multiply all the numbers which are prime and output the result. If no palindrome exists, return -1. If no prime number exists within the substring return -2.

   Example-

   Input -
   134543222
   (The substring should be 34543)

   Output -
   45

   You can assume there will be no negative numbers within the input string.

5. To The 9
   Aryan and his friends are standing in a circle such that each of them has a number from 1 to 191 in a clockwise direction. They're playing a game such that they all call out a number from 1 to 191 starting at Person 1. When the number called out contains a 9 or is divisible by 9, the direction changes. For example the people calling out the numbers will go in such an order.

Person	1	2	3	4	5	6	7	8	9	8	7	6	5	4	3	2	1	191	1
Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

The input will be Aryans favourite number from 1-191. The output should be the position he should stand in so that he can call out his favourite number.