Instructions:

- ★All questions carry equal points (2 pts per question)
- ★Write all your answers on a sheet of paper, which mentions your name, roll number, and the section on each page, scan and upload them in the google form given.
- ★The TA's for your class will grade every question according to the following scheme:
  0 - solution is incorrect
  1 - solution is partially correct
  2 - solution is completely correct

Duration: 4 days, Submit it before Wednesday (13th January 10:00 pm) in the [google form](#).

Note:

- ★Please choose the correct section otherwise you will get 0 marks.
- ★You can submit only **once** so be careful at the time of submission.
- ★Anyone from non-pec please choose section U

Problems

1. Draw a flowchart that takes as input an integer N, the size of an array, and then N integer elements of an array and print "yes" if the array is a palindrome, otherwise print "no".

2. Draw a flowchart that takes integers as input, until the value "0" is given, and prints all the integers that were given before "0" in reverse order.

   For example for the input,
      1 2 3 4 9 0
   The output should be
      9 4 3 2 1

3. Draw a flowchart that takes as input an array of size N and prints the number of occurrences of the maximum value in the array. Specifically, the inputs should be
   (i) a positive integer N
   (ii) N integers denoting the elements of the array
   and the output should be an integer that denotes the number of occurrences of the maximum value in the array.

For example for the input,

    6
    3 1 3 3 2 3

the output should be,

    4

because there are 4 values equal to 3.

4. Draw a flowchart that takes as input

    (i). a positive integer N
    (ii). N integers

and prints all the numbers in even position (numbered from 1) first, followed by all the numbers in an odd position.

For example for the input,

    5
    2 3 4 2 3

The output should be,

    3 2 2 4 3

The numbers at even positions are "3, 2" and those at odd positions are "2, 4, 3"

5. Draw a flowchart that takes as input
   (i) an integer N
   (ii) N integers denoting an array A
   (iii) N integers denoting an array B
   and prints N integers, denoting an array C, which is obtained by adding the corresponding elements of A and

B.

For example for the sample input,

    2
    1 3
    4 5

the output should be

    5 8

6. Draw a flowchart that takes as input the coefficients of a polynomial and a value x, and evaluates the value of the polynomial at x. Specifically take as input

(i) an integer N denoting the number of coefficients of the polynomial

(ii) N integers, the coefficients, $P[0]$, $P[1]$, ... $P[n-1]$

(iii) an integer x

and prints the value of

$$P[0] + P[1]x + P[2]x^2 + \dots P[n-1]x^{n-1}$$

For example for the input

    3
    1 2 3
    5

The output should be

    86

because, the polynomial given is $P(x) = 1 + 2x + 3x^2$

and $P(5) = 1 + 2 * 5 + 3 * 5^2 = 1 + 10 + 75 = 86$

7. Draw a flowchart that takes as input the coefficients of a polynomial and prints all the possible number of positive real zeros that it can have (in increasing order) as predicted by Descartes' rule of signs. (Read the rule from the wikipedia page and implement it in the flowchart).

Specifically the input should be
    (i). A positive integer N, denoting the number of coefficients
    (ii). N integers denoting the coefficients. If the numbers taken as input are $P[0], P[1], ... P[n-1]$, then the polynomial is
$P[0] + P[1]x + P[2]x^2 + ... P[n-1]x^{n-1}$

For example for the input
    4
    -1 -1 1 -1
the output should be
    0 2
because the polynomial is $-1 - x + x^2 - x^3$,
the number of changes in sign is 2, so the number of positive real roots can be either 0 or 2 according to the rule of signs, so the output should be
    0 2