Coding Test

Instructions:

- You may use any programming language for the test below
- You are required to write test cases for your answers
- Submit the source code by either uploading a zip file to google drive or provide a **private** git repository link to viko.lau@alvanon.com and stephen.sze@alvanon.com
- If you have any questions, please send to viko.lau@alvanon.com and stephen.sze@alvanon.com

Q1

Rearrange an array of integers so that the calculated value U is maximized. Among the arrangements that satisfy that test, choose the array with minimal ordering. The value of U for an array with n elements is calculated as :

U = arr[1]×arr[2]×(1÷arr[3])×arr[4]×...×arr[n-1] × (1÷arr[n]) if n is odd
or
U = arr[1]×arr[2]×(1÷arr[3])×arr[4]×...×(1÷arr[n-1]) × arr[n] if n is even

The sequence of operations is the same in either case, but the length of the array, n, determines whether the calculation ends on arr[n] or (1÷arr[n]).
Arrange the elements to maximize U and the items are in the numerically smallest possible order.

Q2

The number of goals achieved by two football teams in matches in a league is given in the form of two lists. For each match of team B, compute the total number of matches of team A where team A has scored less than or equal to the number of goals scored by team B in that match.

Example:

teamA = [1, 2, 3]
teamB = [2, 4]

Team A has played three matches and has scored teamA = [1, 2, 3] goals in each match respectively. Team B has played two matches and has scored teamB = [2, 4] goals in each match respectively. For 2 goals scored by team B in its first match, team A has 2 matches with scores 1 and 2. For 4 goals scored by team B in its second match, team A has 3 matches with scores 1, 2 and 3. Hence, the answer is [2, 3].

Q3

Implement a stack that accepts the following commands and performs the operations described:

push v: Push integer v onto the top of the stack
pop: Pop the top element from the stack
inc i v: Add v to each of the bottom i elements of the stack

After each operation, print the value at the top of the stack. If the stack is empty, print the string 'EMPTY'.