Problem B. Baum

Input file:	baum.in
Output file:	baum.out
Time limit:	3 seconds
Memory limit:	256 mebibytes

A *cycle* is an undirected graph with n vertices and n edges, such that there are edges between 1st and 2nd vertices, between 2nd and 3rd vertices, ..., between $(n-1)$-th and n-th vertices, and finally between n-th and 1st vertices.

Two players are dividing a cycle between them. The first player starts by taking an arbitrary vertex to himself. The second player can then take any other vertex to himself. They continue making alternating turns, taking one vertex that has not been taken before at each turn. At every turn except the first one, a player may only take a vertex that is connected by an edge to at least one vertex he has taken previously. The game ends when all vertices have been taken.

Each vertex has an associated positive integer value. Each player tries to maximize the total value of the vertices he takes. If both players play optimally, what will be the total value of each player's vertices in the end?

Input

The first line of the input file contains the integers n — the number of vertices, $3 \le n \le 10^6$. The second line of the input file contains n space-separated integers — the values of the vertices in the order along the cycle, each between 1 and 10^9.

Output

Output two integers separated by a space: the total value of the vertices that the player who moves first will get, and the total value of the vertices that the player who moves second will get.

Examples

baum.in	baum.out
4 1 2 3 4	5 5