

# FLATTEN

## PROBLEM

A solitaire game is played given a row of  $N$  piles where each pile contains zero or more chips. See Figure 1. Piles are identified by integers 1 through  $N$ . In a *move* of this game you point to a pile, say  $p$ , and specify a number, say  $m$ . Then  $m$  chips are transferred from the pile  $p$  to each of its neighboring piles. See Figure 2 for an example. Pile  $p$  has two neighbors,  $p-1$  and  $p+1$  if  $1 < p < N$ , and the neighbor 2 if  $p=1$ , and the neighbor  $N-1$  if  $p=N$ . Note that to be able to make such a move the pile  $p$  must have at least  $2m$  chips if it has two neighbors, and it must have at least  $m$  chips if it has only one neighbor.

The object of the game is to “flatten” all piles, that is make them have the same number of chips, by making as small as possible number of moves. In case there is more than one solution you are required to report only one of them.

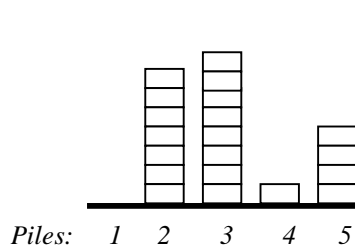


Figure 1. Five piles with 0, 7, 8, 1 and 4 chips.

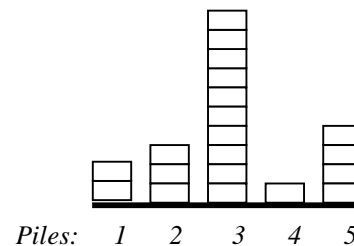


Figure 2. Same piles after a move:  $p=2, m=2$

## ASSUMPTIONS

- It is guaranteed that it is possible to flatten the given piles in at most 10,000 moves.
- $2 \leq N \leq 200$
- $0 \leq C_i \leq 2000$  where  $C_i$  is the number of chips in the pile  $i$  when the game starts ( $1 \leq i \leq N$ ).

## INPUT

The input is a text file named **flat.inp** having two lines.

- The first line:  $N$
- The second line: there will be  $N$  integers the  $i$  th of which is the value of  $C_i$ .

## OUTPUT

The output will be the text file named **flat.out**.

- The first line: number of moves. (Call this value  $M$ .)
- Each of the following  $M$  lines contains two integers representing a move:  $p, m$ .

The order of moves on the output must be the same order the moves are performed. So, your first move shall be written to the second line of the output file.

**EXAMPLE**

flat.inp:

|           |
|-----------|
| 5         |
| 0 7 8 1 4 |

flat.out:

|     |
|-----|
| 5   |
| 5 2 |
| 3 4 |
| 2 4 |
| 3 1 |
| 4 2 |

**EVALUATION**

Your program will be allowed to run 3 seconds.

To get full credit,  $A$ , for a test case, your number of moves,  $x$ , must be less than or equal to the number  $B$ , set by the evaluation program. Note that  $B$  is not necessarily minimal. In fact,  $B$  is chosen for a test case depending on the number of moves made by following a simple strategy with no redundant moves and the average number of chips in the piles. You can obtain partial credit for a test case. The points you get is calculated by rounding to the nearest integer the value obtained by the following formula:

$$\begin{array}{ll}
 A & \text{if } x \leq B \\
 2A \left( \frac{3}{2}B - x \right) / B & \text{if } B < x < \frac{3}{2}B \\
 0 & \text{if } x \geq \frac{3}{2}B
 \end{array}$$