



# The 2024 ICPC Vietnam Northern Provincial Programming Contest

Hosted by: HANOI UNIVERSITY OF SCIENCE AND TECHNOLOGY

Date: October 27<sup>th</sup>, 2024

## OVERVIEW

*Note: All problems use standard input/output (STDIN/STDOUT)*

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# Problem A

## PILE

**Time limit: 0.5 seconds**

Given a sequence of  $n$  piles  $\{1, 2, \dots, n\}$  on a straight line. The pile  $i$  is located at the coordinate  $i$  and has height  $h[i]$ . We need to make a string connection between pile 1 and pile  $n$  using some intermediate piles  $i[1], i[2], \dots, i[k]$  ( $1 < i[1] < i[2] < i[3] < \dots < i[k] < n$ ). (denote  $i[0] = 1, i[k+1] = n$ ). Due to a technical constraint, two consecutive selected piles must have balanced heights and be close together. In particular, for 2 consecutive selected piles  $i[j]$  and  $i[j+1]$  ( $j = 0, 1, \dots, k$ ), we have constraints:

- $i[j+1] - i[j] \leq D$
- $|h[i[j]] - h[i[j+1]]| \leq H$

Find the subset of intermediate piles satisfying the constraint above such that the sum of heights of the selected intermediates is minimal.

### Input

- Line 1: contains 3 positive integers  $n, D, H$  ( $1 \leq n \leq 10000, 1 \leq D \leq n, 1 \leq H \leq 10000$ )
- Line 2: contains  $n$  positive integers  $h[1], h[2], \dots, h[n]$  ( $1 \leq h[i] \leq 10000$ )

### Output

Write the sum of heights of piles selected in the solution, including piles 1 and  $n$  (write -1 if no solution is found)

Sample Input	Sample Output
13 4 2 4 1 7 2 6 3 5 1 7 5 3 4 3	13

### Explanation

Piles used are 1, 4, 8, 11, 13 and the sum of heights is  $4 + 2 + 1 + 3 + 3 = 13$