

# Problem C

## Hospitals

Input file: *testdata.in*

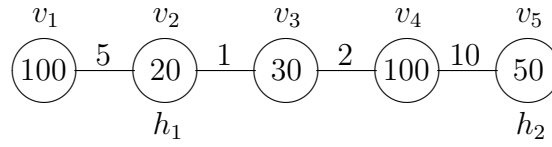
Time limit: 6 seconds

### Problem Description

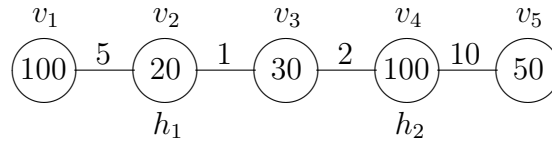
Country T is a small country on an island. Although there are some prosperous cities, many people still live in remote mountain villages. In order to improve the life qualities of their people, the government decides to build some new hospitals in a region of the mountain villages.

There are  $n$  villages in the region, and the government plans to build  $p$  hospitals. Because the villages are built around the mountains, there is only one road connecting the villages. Thus, you can regard the villages as a path with  $n$  nodes. Now, the government wants to build the  $p$  hospitals in  $p$  different villages. To balance the loads of the hospitals, the government wants to find an optimal placement of the hospitals so that the maximum load of the hospitals is minimized. You can assume that people will only go to the nearest hospital and a village won't have the same distance to two villages.

Figure 1 shows an example. There are 5 villages,  $v_1, v_2, v_3, v_4, v_5$ , and the government wants to build 2 hospitals,  $h_1, h_2$ . If we place  $h_1$  and  $h_2$  at  $v_4$  and  $v_5$ , respectively, then the people in  $v_1, v_2, v_3, v_4$  will go to  $h_1$  and the people in  $v_5$  will go to  $h_2$ . (See Figure 1(a).) The load of  $h_1$  is 250 and the load of  $h_2$  is 50. Thus, the maximum load of this placement is 250. However, if we build  $h_1$  in  $v_2$  and build  $h_2$  in  $v_4$ , the two hospitals will have equal load 150 and this is the optimal placement. (See Figure 1(b).)



(a) a placement with maximum load 250



(b) a placement with maximum load 150

Figure 1: An example of  $n = 5$  and  $p = 2$

Please write a program to help the government of the Country T.

## Technical Specification

1. The number of villages  $n$ , where  $1 \leq n \leq 100$ .
2. The number of hospitals  $p$ , where  $1 \leq p \leq n$ .
3. The number  $w_i$  of people in the  $i$ th village, where  $1 \leq w_i \leq 10^7$  and  $1 \leq i \leq n$ .
4. The distance  $d_i$  between the  $i$ th and the  $(i + 1)$ th villages, where each  $d_i$  is a nonnegative integer  $\leq 10^7$  and  $1 \leq i \leq n - 1$ .

## Input Format

There are at most 10 test cases. The first line of each case contains two integers  $n$  and  $p$ . The following  $n$  lines indicate the numbers  $w_1, w_2, \dots, w_n$ . The following  $n - 1$  lines indicate the distances  $d_1, d_2, \dots, d_{n-1}$ . The input ends with a test case with  $n = 0$  and  $p = 0$ , and this case should not be processed.

## Output Format

For each case, print the maximum load of the optimal placement in a single line.

## Sample Input

```
5 2
100
20
30
100
50
5
1
2
10
8 3
30
60
10
30
30
40
50
50
100
200
10
20
40
1
2
0 0
```

## Sample Output

150

110

**Remark:** The optimal placement of the second sample case is  $v_1, v_6$  and  $v_7$ .