
Lights On The Road

Input file: *standard input*
Output file: *standard output*
Time limit: 6 seconds
Memory limit: 1024 mebibytes

The *Gyeongin Expressway*, the oldest expressway in South Korea, can be divided into N blocks of the same size. Block i ($1 \leq i \leq N$) has block $i - 1$ on the left (except for case when $i = 1$), and block $i + 1$ on the right (except for case when $i = N$).

Junwon Kim, a resident of Nambu Beltway 1119-gil, decided to install streetlights on several blocks. For each block i , Junwon Kim decides whether to install a streetlight on block i and pay W_i , or not to install it and pay nothing. After the work is finished, for each block, it must have a streetlight installed, or at least one of its neighbors must have a streetlight installed. The *total cost* of the work is the sum of the cost of installing each streetlight.

Let us consider all ways for Junwon Kim to install streetlights while satisfying the above-mentioned conditions. Two ways are considered different if there is a block i ($1 \leq i \leq N$) that has a streetlight installed in one of the ways but not in the other. Sort all these ways by total cost in non-descending order. Then, for given K , print the total cost for each of the first K ways in this sorted list. If, for some x such that $1 \leq x \leq K$, there are less than x ways overall, print -1 for that x instead.

Input

The first line contains two integers N and K , the number of blocks and the number of ways to be printed, respectively ($1 \leq N, K \leq 2.5 \cdot 10^5$).

The second line contains N integers W_1, W_2, \dots, W_N : the costs of installing a streetlight in each block ($0 \leq W_i \leq 10^9$).

Output

Print K lines. On the i -th of these lines, print the total cost of the i -th way to install streetlights in the sorted list. If the number of ways is less than i , print -1 instead.

Examples

standard input	standard output
5 3 1 3 10 3 1	4 4 5
12 1 317 448 258 208 284 248 315 367 562 500 426 390	1525
12 20 317 448 258 208 284 248 315 367 562 500 426 390	1525 1566 1602 1616 1633 1652 1697 1725 1730 1733 1747 1761 1764 1766 1773 1775 1783 1792 1811 1824
3 9 0 0 0	0 0 0 0 0 -1 -1 -1 -1