

Subsequences with modulo

You are given sequence A_1, A_2, \dots, A_n and integer k . For each integer i ($0 \leq i < k$) find such **nonempty** subsequence of A so that sum of numbers in this subsequence is maximal possible and remainder of integer division of this sum by k is equal to i .

Input

In first line numbers n and k ($1 \leq n \leq 10^6, 1 \leq k \leq 200$).

In second line: n numbers representing sequence A ($1 \leq A_i \leq 10^9$).

Output

Print k numbers in one line. i th number represent sum of numbers in subsequence for number $i - 1$. If there is no such subsequence print -1.

Example

Input:

6 5
2 8 10 44 15 32

Output:

65 111 77 103 109