Problem G. The Messenger

Time limit: 1 second
Memory limit: 256 megabytes

Given n integers $a_1, a_2, \ldots, a_n$. For any $k > n$, $a_k = \max\{a_i - a_j : k - n \le i, j < k\}$.

For a given integer $m > n$, output the value of a_m.

Input

There are multiple test cases in a single test file. The first line of the input contains a single integer T ($1 \le T \le 10^4$), indicating the number of test cases.

For each test case:

- The first line of the input contains two integers n and m, ($2 \le n \le 500$, $1 \le m \le 10^{18}$).
- The second line of the input contains n non-negative integers $a_1, a_2, \ldots, a_n$ ($0 \le a_i \le 10^{18}$ for all $1 \le i \le n$).

It is guaranteed that the sum of n over all test cases does not exceed 500, i.e., $\sum n \le 500$.

Output

For each test case, output a line with a single integer, indicating the answer.

Example

standard input
5 3 5 43 47 41 3 6 43 47 41 3 7 43 47 41 3 8 43 47 41 4 200 104857601998244353 1145141919810 3141592653589793 27182818284590452
standard output
41 35 35 6 377005672062684