Invaluable Assets

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	256 megabytes

Lucid waters and lush mountains are invaluable assets. Guided by this conviction, Little Horse starts to plant trees. Little Horse has n trees. In the beginning, the i-th tree has a height of h_i. To make the trees grow higher, Little Horse needs to buy fertilizers. The fertilizer which can make a tree's height increase by x has a cost of $x^2 + c$ (c is a given const, and x must be an integer).

Now, Little Horse wants to know what's the minimum cost to make all trees' heights no less than k. There are q queries about it. Please note that buying only one fertilizer for a tree is not necessarily the best solution. For example, to make a tree's height increse by 3, one method is to spend $3^2 + c$, another method is to spend $(1^2 + c) + (2^2 + c)$.

Input

The first line of the input contains an integer T ($1 \leq T \leq 10$) — the number of test cases.

The first line of each test case contains three integers n, c, q ($1 \leq n, q \leq 10^5$, $1 \leq c \leq 10^4$) — the number of trees, the given const, and the number of queries.

Then the next line contains n integers $h_1, h_2, \ldots, h_n$ ($0 \leq h_1, h_2, \ldots, h_n \leq 10^9$) — the height of each tree in the beginning.

Then in the next q lines, each line contains an integer k ($0 \leq k \leq 10^9$), indicating the query.

It's guaranteed that $h_1, h_2, \ldots, h_n$ and k are generated uniformly and randomly within $[0, 10^9]$.

Output

The output of the x-th test case begins with *Case #x*: in a single line.

Then in the next q lines, each line contains an integer, indicating the answer to each query.

Example

standard input	standard output
2 3 2 3 3 0 2 1 2 3 4 3 5 0 2 3 4 1 2 3 4 5	Case #1: 3 6 12 Case #2: 4 7 15 25 40