Code Jam 2010 - Qualification Round

Theme Park

Problem

Roller coasters are so much fun! It seems like everybody who visits the theme park wants to ride the roller coaster. Some people go alone; other people go in groups, and don't want to board the roller coaster unless they can all go together. And *everyone* who rides the roller coaster wants to ride again. A ride costs 1 Euro per person; your job is to figure out how much money the roller coaster will make today.

The roller coaster can hold **k** people at once. People queue for it in groups. Groups board the roller coaster, one at a time, until there are no more groups left or there is no room for the next group; then the roller coaster goes, whether it's full or not. Once the ride is over, all of its passengers re-queue in the same order. The roller coaster will run **R** times in a day.

For example, suppose **R**=4, **k**=6, and there are four groups of people with sizes: 1, 4, 2, 1. The first time the roller coaster goes, the first two groups [1, 4] will ride, leaving an empty seat (the group of 2 won't fit, and the group of 1 can't go ahead of them). Then they'll go to the back of the queue, which now looks like 2, 1, 1, 4. The second time, the coaster will hold 4 people: [2, 1, 1]. Now the queue looks like 4, 2, 1, 1. The third time, it will hold 6 people: [4, 2]. Now the queue looks like [1, 1, 4, 2]. Finally, it will hold 6 people: [1, 1, 4]. The roller coaster has made a total of 21 Euros!

Input

The first line of the input gives the number of test cases, **T**. **T** test cases follow, with each test case consisting of two lines. The first line contains three space-separated integers: **R**, **k** and **N**. The second line contains **N** space-separated integers $\mathbf{g_i}$, each of which is the size of a group that wants to ride. $\mathbf{g_0}$ is the size of the first group, $\mathbf{g_1}$ is the size of the second group, etc.

Output

For each test case, output one line containing "Case #x: y", where x is the case number (starting from 1) and y is the number of Euros made by the roller coaster.

Limits

Time limit: 30 seconds per test set.
Memory limit: 1GB.
$1 \le \mathbf{T} \le 50$.
$\mathbf{g_i} \le \mathbf{k}$.

Small dataset (Test set 1 - Visible)

$1 \le \mathbf{R} \le 1000$.
$1 \le \mathbf{k} \le 100$.
$1 \le \mathbf{N} \le 10$.
$1 \le \mathbf{g_i} \le 10$.

Large dataset (Test set 2 - Hidden)

$1 \le \mathbf{R} \le 10^8$.
$1 \le \mathbf{k} \le 10^9$.
$1 \le \mathbf{N} \le 1000$.
$1 \le \mathbf{g_i} \le 10^7$.

Sample

Sample Input

```
3
4 6 4
1 4 2 1
100 10 1
1
5 5 10
2 4 2 3 4 2 1 2 1 3
```

Sample Output

```
Case #1: 21
Case #2: 100
Case #3: 20
```