J. The Parade

time limit per test: 2 seconds
memory limit per test: 512 megabytes
input: standard input
output: standard output

The Berland Army is preparing for a large military parade. It is already decided that the soldiers participating in it will be divided into k rows, and all rows will contain *the same* number of soldiers.

Of course, not every arrangement of soldiers into k rows is suitable. Heights of all soldiers in the same row should not differ by more than 1. The height of each soldier is an integer between 1 and n.

For each possible height, you know the number of soldiers having this height. To conduct a parade, you have to choose the soldiers participating in it, and then arrange *all of the chosen soldiers* into k rows so that both of the following conditions are met:

- each row has the same number of soldiers,
- no row contains a pair of soldiers such that their heights differ by 2 or more.

Calculate the maximum number of soldiers who can participate in the parade.

Input

The first line contains one integer t ($1 \le t \le 10000$) — the number of test cases. Then the test cases follow.

Each test case begins with a line containing two integers n and k ($1 \le n \le 30000$, $1 \le k \le 10^{12}$) — the number of different heights of soldiers and the number of rows of soldiers in the parade, respectively.

The second (and final) line of each test case contains n integers $c_1, c_2, ..., c_n$ ($0 \le c_i \le 10^{12}$), where c_i is the number of soldiers having height i in the Berland Army.

It is guaranteed that the sum of n over all test cases does not exceed 30000.

Output

For each test case, print one integer — the maximum number of soldiers that can participate in the parade.

Example

input Copy

```
5
3 4
7 1 13
1 1
100
1 3
100
2 1
```

```
1000000000000 1000000000000
4 1
10 2 11 1
```

output Copy

```
16
100
99
2000000000000
13
```

Note

Explanations for the example test cases:

1. the heights of soldiers in the rows can be: $[3, 3, 3, 3]$, $[1, 2, 1, 1]$, $[1, 1, 1, 1]$, $[3, 3, 3, 3]$ (each list represents a row);
2. all soldiers can march in the same row;
3. 33 soldiers with height 1 in each of 3 rows;
4. all soldiers can march in the same row;
5. all soldiers with height 2 and 3 can march in the same row.