

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 ($1 \leq t \leq 10000$) — the number of test cases. Then the test cases follow.

Each test case begins with a line containing two integers n and k ($1 \leq n \leq 30000$, $1 \leq k \leq 10^{12}$) — 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, \dots, c_n ($0 \leq c_i \leq 10^{12}$), 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
```

2019-2020 ICPC, NERC, Southern and Volga Russian Regional Contest (Online Mirror, ICPC Rules, Teams Preferred)

Finished

→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.




[Start virtual contest](#)

→ Problem tags

[binary search](#) [greedy](#) [*1900](#)

No tag edit access

→ Contest materials

- Announcement #1 (en) 
- Announcement #2 (ru) 
- Statements (en) 

```
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.

[Codeforces](#) (c) Copyright 2010-2019 Mike Mirzayanov
The only programming contests Web 2.0 platform
Server time: Nov/05/2019 10:02:50^{UTC-5} (f3).
Desktop version, switch to [mobile version](#).
[Privacy Policy](#)

Supported by



ITMO UNIVERSITY