A True Patriot

Sameer is a huge patriot. He can do anything for his country. After graduation, he leaves all his lucrative job offers, and joins the super-secret organisation, Indian National Digital Intelligence Agency, where many like-minded geniuses work hard to intercept and decipher any secret encoded messages exchanged by enemy countries, terrorists, and the like, for the security of the country.

One day, a major breakthrough is reached, when a critical message is intercepted by the organisation. The message is really huge, and is stored on N disks (numbered 0 to N-1 serially). The amount of data stored on each disk is different. To decode the message, M of the best employees (including Sameer of course) are chosen. To avoid repetition and confusion, it is decided that 1 disk will have to be completely decoded by exactly 1 person. Also, one person can decode any number of disks, provided that all of them are contiguous in serial order (i.e. one person cannot decode disc numbers 1,4 or 2,3,5 etc.)

All the employees work in parallel and have identical decoding speeds of 1 byte per second. Now, the head of the organisation wants to assign the disks in such a way that the total time taken to decode all of them is minimised. He assigns the task of finding this minimum time to Sameer. Can you help Sameer out?

Note: It is possible that some of the M employees do not decode even a single disk.

Input

First line contains T, the number of test cases.

The first line of each test case contains 2 space separated integers, N and M (as described above).

The next line contains N space separated integers, denoting the number of bytes of data on each of the discs.

Output

For each test case, output a single integer showing the minimum time (in seconds) to complete decoding.

Example

Input:

2

3 2

1 2 3

5 3

1 2 3 4 5

Output:
3

6

Explanation: In the first Test Case, the 1st employee can decode the first 2 disks and

the 2nd employee can decode the 3rd disk.

Contraints:

1<=T<=10

1<=N <=3000

1<=M<=N

0<= Number of bytes on each disk <= 1000000000