

Endless Waiting

M people are waiting at the bank to deposit money. They are planning to go to eat a delicious Injera after the banking is over. Some bankers are quick to process their work efficiently, so the desks operate at different speeds. At the k -th desk, T_k seconds are required to process the banking.

In the beginning, all desks are ready to accept the next customer, and the members are the only people in the queue. A person can only occupy an available desk when all people in front of that person in the queue have left the queue already. At that moment, the person can immediately occupy an available desk (if there is one), but can also choose to wait for another (faster) desk to become available. Our members, being computer science students, make this decision in such a way that the moment when all of them have processed the banking is as soon as possible. Your task is finding that moment in time.

Input

The input consists of an arbitrary number of records, but no more than 10.

The first line of input contains two positive integers, N ($1 \leq N \leq 100,000$), the number of desks, and M ($1 \leq M \leq 1,000,000,000$), the number of people waiting at the bank.

Each of the following N lines contains a number T_k from the problem statement ($1 \leq T_k \leq 10^9$).

The end of input is indicated by a line containing only the value -1 .

Output

For each input line, print the required minimum time in seconds.

Example

Standard input	Standard output
2 6 3 8 -1	15

* Let us describe the scenario from the first example below. There are two desks, with processing times of 5 and 8 seconds, respectively. Out of the six people, the first two immediately occupy the two desks. At time 3, 6, the first desk is freed, and the third, fourth person occupies it. At time 8, the second desk is freed again, but the fifth, sixth person decides to wait another second (time 9, 12) for the first desk to become available, and then occupy it. This way, the banking is completed by time 15. If the fifth person hadn't waited for the faster desk, the banking would have taken a total of 16 seconds.

Time Limit

1 second.