G. Hiring

time limit per test: 4 seconds
memory limit per test: 512 megabytes
input: standard input
output: standard output

The head of human resources department decided to hire a new employee. He created a test exercise for candidates which should be accomplished in at most m working days. Each candidate has to pass this test exercise. During the j-th day a candidate is allowed to be in the office for at most t_j units of time.

Overall, n candidates decided to apply for the job and sent out their resumes. Based on data received the head has defined two parameters describing every candidate: d_i and r_i. The parameter d_i is the time to get prepared for work which the i-th candidate spends each morning. This time doesn't depend on day. The parameter r_i is the total working time needed for the i-th candidate to accomplish the whole test exercise.

Thus the time spent in the office in the j-th day consists of d_i units of time to get prepared and some units of time to proceed with the exercise. A candidate can skip entire working day and do not come to the office. Obviously in this case he doesn't spend d_i units of time to prepare.

To complete the exercise a candidate should spend exactly r_i units of time working on the exercise (time to prepare is not counted here).

Find out for each candidate what is the earliest possible day when he can fully accomplish the test exercise. It is allowed to skip working days, but if candidate works during a day then he must spend d_i units of time to prepare for work before he starts progressing on the exercise.

Input

The first line contains two integer numbers $n,\ m\ (1 \le n,\ m \le 2 \cdot 10^5)$ — the number of candidates and the maximum number of working days to do the test exercise.

The second line contains m integer numbers $t_1, t_2, ..., t_m\ (1 \le t_j \le 10^6)$ — the durations of working days in time units.

The following n lines contain two integers each: $d_i,\ r_i\ (0 \le d_i \le 10^6,\ 1 \le r_i \le 10^6)$ — how much time in the beginning of a day is required for i-th candidate before he starts his work on the test exercise and how much time it is needed for him to accomplish this task.

Output

Output a sequence of n integer numbers $b_1, b_2, ..., b_n$, where b_i is the earliest day when the i-th candidate can finish the test exercise.

In case the i-th candidate cannot finish the test exercise in m days output $b_i = 0$.

Days in this problem are numbered from 1 to m in the order they are given in the input.

Examples

input
3 3 4 2 5 1 3 2 5 3 4
output
1 3 0