Problem E. Shield Block

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	256 megabytes

Little Q is playing **Hearthstone**, and his opponent is a Warrior who is skilled at getting armor.

Initially, there are n cards in Little Q's deck, and he will play them **from top to bottom**. The i-th card deals a_i damage to the Warrior.

Each turn, the Warrior will **reset** his armor to D points (note that it is "reset", not "increase"). Then, Little Q will play k cards in order. If the total damage of these k cards (called S) exceeds D, the Warrior will take $S - D$ damage; otherwise, the Warrior will take no damage. The game ends when all the cards in Little Q's deck have been played.

Little Q has a special ability: he can remove any cards from his deck at the beginning, without changing the relative position of the remaining cards. He wants to know, for each $k = 1, 2, ..., n$, the maximum damage he can deal to the Warrior.

Input

The first line contains two integers n, D ($1 \le n \le 10^6, 1 \le D \le 10^9$), representing the number of cards in Little Q's deck and the Warrior's armor.

The next line contains n integers a_i ($1 \le a_i \le 10^{12}$), representing the damage of each card in the deck **from top to bottom**.

Output

Output n lines. The i-th line contains an integer, denoting the maximum damage Little Q can deal to the Warrior when $k = i$.

Example

standard input	standard output
5 5 2 1 5 4 3	0 4 7 9 10

Note

In the example, when $k = 1$, since only one card can be played per turn, it is impossible to deal any damage to the Warrior anyway.

When $k = 2$, by removing the 2nd card, the damage in the first round is $2 + 5 - 5 = 2$, and in the second round, the damage is $4 + 3 - 5 = 2$.

When $k = 3$, by removing the 1st and 2nd cards, the damage in the first round is $5 + 4 + 3 - 5 = 7$.

When $k = 4$, by removing the 2nd card, the damage in the first round is $2 + 5 + 4 + 3 - 5 = 9$.

When $k = 5$, no cards are removed, and the damage in the first round is $2 + 1 + 5 + 4 + 3 - 5 = 10$.