

Problem D. Catenary

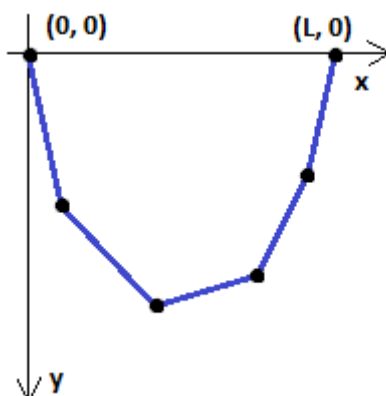
Input file: *standard input*
Output file: *standard output*
Time limit: 1 second
Memory limit: 256 mebibytes

Everyone has seen something like this a lot of times:



Have you ever thought about the curve formed by a hanging chain? No, it is not a parabola, it is a graph of the hyperbolic cosine, called a *catenary*. In this problem, you have to draw a graph of some discrete analog of the catenary.

Suppose that you have several rods connected by their ends in a line in a certain order. The connections are non-stretchable and flexible, that is, each two successive rods can join at any angle. The rods are very thin, so they can be treated as line segments. The mass is uniformly distributed along each segment. Moreover, all the segments have the same density, so their masses are proportional to their lengths.



The ends of this chain are fixed at the points $(0,0)$ and $(L,0)$, and the segments form a polyline due to gravity. The force of gravity, as well as the y -axis, is directed downwards. Determine the form of the resulting polyline.

Input

The first line contains two integers n and L ($3 \leq n \leq 10$, $200 \leq L \leq 299$). The second line contains n integers l_1, l_2, \dots, l_n ($100 \leq l_i \leq 199$), the lengths of the segments from left to right. It is not allowed to change the order of the segments.

Output

Output $n - 1$ lines. Each line must contain two real numbers, presenting x and y -coordinates of the points of the polyline from left to right. Do not output the first and the last points $(0, 0)$ and $(L, 0)$.

Please print the numbers with at least three digits after the decimal point.

Examples

standard input	standard output
3 200 100 100 100	50.0000000000 86.6025403784 150.0000000000 86.6025403784
3 241 128 105 108	76.2967704600 102.7754971643 180.4447346423 89.4262815813