Problem F. Fountains

Input file:	`standard input`
Output file:	`standard output`
Time limit:	6 seconds
Memory limit:	1024 megabytes

Suppose you and your teammate Mixsx will attend the Namomo Camp. The Namomo Camp will happen in n consecutive days. We name the i-th day as day i ($1 \le i \le n$). The cost of day i is s_i.

Unfortunately, the schedule of the Namomo Camp conflicts with Mixsx's final exams. Mixsx has final exams every day between day L and day R. The exact value of L and R have not been announced by his college so we assume that every pair of integers L and R satisfying $1 \le L \le R \le n$ will be chosen with probability $1/(n(n+1)/2)$. He decides to take all the exams and thus be absent from the Namomo Camp from day L to day R. His *loss* will be $\sum_{i=L}^{R} s_i$ in this case.

As Mixsx's teammate, you want Mixsx to give up his final exams and come back to the Namomo Camp. You can prepare k plans before L and R are announced. In the i-th plan ($1 \le i \le k$), you shut the electricity off to his college every day from day l_i to day r_i. You can choose the values of l_i and r_i as long as they are two integers satisfying $1 \le l_i \le r_i \le n$.

Once L and R are announced, you can choose a plan x ($1 \le x \le k$) such that $L \le l_x \le r_x \le R$. Then Mixsx will come back to the Namomo Camp on every day from day l_x to day r_x. His loss becomes $\sum_{i=L}^{R} s_i - \sum_{i=l_x}^{r_x} s_i$ in this case. You will choose a plan that minimizes Mixsx's loss. If no plan x satisfies $L \le l_x \le r_x \le R$, Mixsx will attend his final exams normally and his loss is $\sum_{i=L}^{R} s_i$.

Please calculate the minimum possible expected loss ans_k of Mixsx if you choose the k plans optimally. Output $ans_k \cdot n(n+1)/2$ for every k from 1 to $n(n+1)/2$.

Formally, given a list of n numbers s_i ($1 \le i \le n$), define a loss function $C(L, R) = \sum_{i=L}^{R} s_i$. Given an integer k ($1 \le k \le n(n+1)/2$), you should select $2k$ integers $l_1, \ldots, l_k, r_1, \ldots, r_k$ satisfying $1 \le l_i \le r_i \le n$ for all $1 \le i \le k$, such that

$$\sum_{1 \le L \le R \le n} \left[C(L, R) - \max_{1 \le i \le k, L \le l_i \le r_i \le R} C(l_i, r_i) \right]$$

is minimized. ($\max_{1 \le i \le k, L \le l_i \le r_i \le R} C(l_i, r_i)$ is defined as 0 if no i satisfies $1 \le i \le k$ and $L \le l_i \le r_i \le R$.) Output the minimized value for every integer k in $[1, n(n+1)/2]$.

Input

The first line contains an integer n ($1 \le n \le 9$). The second line contains n space separated integers s_i ($1 \le s_i \le 10^9$).

Output

The output contains $n(n+1)/2$ integers in their own lines, the expectations when $k = 1, \ldots, n(n+1)/2$ multiplied by $n(n+1)/2$. It can be shown that the results are always integers.

Examples

standard input	standard output
1 1	0
2 13 24	26 13 0
3 6 4 7	33 21 12 8 4 0

Note

For the first test case, we only need to consider the case $k = 1$. We can only choose $l_1 = r_1 = 1$. Then the expected loss is $C(1, 1) - C(1, 1) = 0$ and the result is $0 \times 1 \times (2)/2 = 0$.

For the third test case, consider the case when $k = 3$. We choose $l_1 = r_1 = 1$, $l_2 = r_2 = 3$ and $l_3 = 1, r_3 = 3$. The expected loss is 2. And the result is $2 \times 6 = 12$.