# 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 $l_1, \dots, l_k, r_1, \dots, r_k$ 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 $k = 1, \dots, n(n+1)/2$ multiplied by $n(n+1)/2$. It can be shown that the results are always integers.

## Examples

| standard input | standard output |
|---|---|
| 1<br>1 | 0 |
| 2<br>13 24 | 26<br>13<br>0 |
| 3<br>6 4 7 | 33<br>21<br>12<br>8<br>4<br>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 $2 \times 6 = 12$.