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## GCD-sum

task: <code>gcds</code>	input file: <code>stdin</code>	output file: <code>stdout</code>
points: 100	time limit: 2000 ms	memory limit: 1 GB

### Task

A multi-set (i.e. a set with possible repetitions) of  $n$  integers is given. We split the set into  $k$  disjoint groups, for every group we compute the greatest common divisor of its elements, and sum all the subsets' GCDs.

For every  $k = 1, 2, \dots, n$ , determine the maximal sum which can be obtained this way.

### Input

In the first line of input there is a single integer  $n$  ( $1 \leq n \leq 500\,000$ ) – the cardinality of the set. In the second line, there are  $n$  positive integers, not exceeding  $10^{12}$  – the given sequence.

### Output

Output  $n$  line scontaining one integer each – the best sum of GCDs when partitioning into  $1, 2, \dots, n$  subsets.

### Subtasks

Subtask	Constraints	Points
1	$n \leq 7$	5
2	$n \leq 15$	5
3	$n \leq 100, a_i \leq 500$	8
4	$n \leq 2000, a_i \leq 2000, a_i$ are distinct	8
5	$n \leq 2000$	14
6	$a_i$ are distinct	25
7	no additional constraints	35

### Samples

input

4 10 9 10 3
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output

1 13 23 32
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*For  $k = 2$ , the best partition is  $(10, 10)$  and  $(9, 3)$ , giving the sum of  $10 + 3 = 13$ . For  $k = 3$ , the best partition is  $(10)$ ,  $(10)$  and  $(9, 3)$  with the sum of 23.*

input

8 15 25 29 30 43 44 45 55
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output

1 56 101 145 188 221 256 286
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