

**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
```

output

```
1
13
23
32
```

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
```

output

```
1
56
101
145
188
221
256
286
```