# Prefix-function to z-function

|  |  |
| --- | --- |
| Time limit | 1 second |
| Memory limit | 256Mb |
| Input | standard input or input.txt |
| Output | standard output or output.txt |

You are given preﬁx-function of some (unknown for you) string s.

Write z-function of the string s.

## Input format

The ﬁrst line contains one integer: n (1≤n≤2⋅105) — the length of string s.

The second line contains preﬁx-function — n space-separated integers.

## Output format

Write n space-separated numbers — z-function of the string s.

## Sample

| **Input** | **Output** |
| --- | --- |
| 8  0 0 1 0 1 2 3 1 | 0 0 1 0 3 0 1 1 |

## Notes

In the example s is equal to “ABACABAA”.