430   Swamp County Supervisors

The smell of rebellion is rising over Swamp County. The county is geographically split into various bogs, each represented by a supervisor on the Board of Supervisors. Since the bogs have varying populations, each supervisor has votes in proportion to the total population of the county, with a majority of the total votes needed for an ordinance to pass. The smaller bogs feel that they have no say on the Board because, in fact, the votes of the largest bogs completely determine the outcome of a vote. The smaller bogs might as well have zero votes.

Your team's job is to write some software to aid in finding a fairer voting plan. The Board has agreed to consider a charter amendment that would make the number of votes needed to pass an ordinance a total other than that needed for a simple majority. Given the number of votes each bog holds, and the number of votes necessary to win (which could be more or less than a majority of the total votes), your program is to calculate the Banzhaf power index for each bog.

Given the set of all possible votes, the Banzhaf power index for a bog is the number of times it could change the outcome of the vote on an ordinance from failure to passage.

Input

Input to your program consists of a series of lines of at most 80 characters. Each line consists of a series of numbers separated from each other by at least one space. The first number in a line is the minimum number of votes needed for passage of an ordinance. The rest of the numbers are the votes held by each bog. (For example, in the first line of the sample input below, the number of votes needed to pass an ordinance is 17. There are six bogs, with votes of 1, 7, 3, 12, 9, and 1 respectively.)

Output

For each case represented by an input line, your program is to print the power index of each bog.

Output for each case should appear on a separate line, starting in the first column, with each power index separated from the others by single spaces. The order of the power indexes on each line must correspond to the input order of the votes for each bog.

Swamp County will never be divided into more than 27 bogs–there's a limit to the number of lunches the lobbyists will buy.

Sample Input

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17 1 7 3 12 9 1
2000 214 306 298 274 270 261 246 404 241 240 240 238 224 333 210
12 1 7 3 12 9 1
2200 214 306 298 274 270 261 246 404 241 240 240 238 224 333 210
```

Sample Output

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2 14 2 18 14 2
2666 3934 3806 3474 3418 3218 3094 4734 3022 3006 3006 2978 2798 4402 2622
1 5 5 19 11 1
2453 3593 3493 3183 3137 3051 2841 4817 2777 2763 2763 2741 2527 4035 2395
```