COI '08 #1 Izbori

Time limit: 0.6s **Memory limit:** 128M

It is election time. V voters attend the election, each casting their vote for one of N political parties. M officials will be elected into the parliament.

The conversion from votes to parliament seats is done using the D'Hondt method with a 5% threshold. More precisely, suppose that the parties are numbered 1 through N and that they receive $V_1, V_2, \ldots, V_N$ votes. Parliament seats are allocated as follows:

1. All parties that receive strictly less than 5% of V votes are **erased** from the list of parties.
2. The parliament is initially empty i.e. every party has zero seats allocated.
3. For each party P, the quotient $Q_P = \frac{V_P}{S_P+1}$ is calculated, where V_P is the total number of votes received by party P, and S_P is the number of seats already allocated to party P.
4. The party with the largest quotient Q_P is allocated one seat. If multiple parties have the same largest quotient, the lower numbered party wins the seat.
5. Repeat steps 3 and 4 until the parliament is full.

The votes are being counted and only part of the V votes has been tallied. It is known how many votes each party has received so far.

Write a program that calculates for each party, among all possible outcomes of the election after all V votes are counted, the largest and smallest number of seats the party wins.

Input Specification

The first line contains the integers V, N and M $(1 \leq V \leq 10\,000\,000, 1 \leq N \leq 100, 1 \leq M \leq 200)$, the numbers of votes, parties and seats in the parliament.

The second line contains N integers – how many votes (of those that have been counted) each party got. The sum of these numbers will be at most V.

Output Specification

On the first line output N integers separated by spaces – the largest number of seats each party can win.

On the second line output N integers separated by spaces – the smallest number of seats each party can win.

Scoring

For each test case, the two subtasks (two lines of output) are scored independently.

Solving the first subtask correctly is worth 20% of points.

Solving the second subtask correctly is worth 80% of points. It is necessary to output exactly N integers on the first line (even if they are completely wrong) for the second subtask to be graded.

Sample Input 1

```
20 4 5
4 3 6 1
```

Sample Output 1

```
3 3 3 2
1 0 1 0
```

Explanation for Sample Output 1

In the first example, 14 votes have been tallied and 6 are yet to be counted. To illustrate one possible outcome, suppose that the first party receives 2 of those 6 votes, the second none, the third 1 vote and the fourth 3 votes. The parties' totals are $6, 3, 7$ and 4 votes. All parties exceeded the 5% threshold. Seats are allocated as follows:

1. The quotients are initially $6/1, 3/1, 7/1$ and $4/1$; the largest is $7/1$ so party 3 wins a seat.
2. The quotients are $6/1, 3/1, 7/2$ and $4/1$; the largest is $6/1$ so party 1 wins a seat.
3. The quotients are $6/2, 3/1, 7/2$ and $4/1$; the largest is $4/1$ so party 4 wins a seat.
4. The quotients are $6/2, 3/1, 7/2$ and $4/2$; the largest is $7/2$ so party 3 wins a seat.
5. The quotients are $6/2, 3/1, 7/3$ and $4/2$; parties 1 and 2 are tied with quotients $6/2$ and $3/1$, but party 1 is lower numbered so it wins the last seat.

In this outcome, the numbers of seats won by the parties are $2, 0, 2$ and 1. Since it is possible for the second party not to win any seats, the second number on the second line of output is zero.

Sample Input 2

```
100 3 5
30 20 10
```

Sample Output 2

```
4 3 3
1 1 0
```