

IZBORI

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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, \dots, 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 $Q_P = V_P / (S_P + 1)$ 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

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

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.

Example

Input:

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

Output:

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

Input:

```
100 3 5
```

Output:

4 3 3

1 1 0

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.