

Magic Circle

Problem Description

The magic war is about to begin once in sixty years, and the great wizard prepares to draw magical energy from the nearby magic field.

The great wizard has m magic items, numbered $1, 2, \dots, m$. Each item has a magic value. We use X_i to represent the magic value of the magic item numbered i . Each magic value X_i is a positive integer that does not exceed n , and there may be multiple items with the same magic value.

The great wizard holds that if and only if four magic items numbered a, b, c , and d satisfy $X_a < X_b < X_c < X_d$, $X_b - X_a = 2(X_d - X_c)$ and $X_b - X_a < (X_c - X_b)/3$, these four magic items form a magic circle, and he calls these four magic items respectively item A, item B, item C, and item D of this magic circle.

Now, the wizard wants to know, for each magic item, the number of times it appears as item A in a certain magic circle, the number of times it appears as item B, the number of times it appears as item C, and the number of times it appears as item D.

Input

The first line contains two positive integers n and m separated by a space.

For the next m lines, each line has a positive integer, and the positive integer in the $i+1$ line represents X_i , that is, the magic value of the item numbered i .

It is ensured that $1 \leq n \leq 15000$, $1 \leq m \leq 40000$, $1 \leq X_i \leq n$. Each X_i is randomly generated with equal probability within the legal range.

Output

There are m lines, and each line contain 4 integers. The four integers in the i^{th} line each represents the number of times that item i appears as a, b, c and d .

Ensure that every number in the standard output does not exceed 10^9 . Two adjacent numbers in each line are separated by exactly one space.

Sample Input 1

```
30 8
1
24
7
28
5
29
26
24
```

Sample Output 1

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

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

Hint

Sample Input 2

15 15

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

Sample Output 2

5 0 0 0

4 0 0 0

3 5 0 0

2 4 0 0

1 3 0 0

0 2 0 0

0 1 0 0

0 0 0 0

0 0 0 0

0 0 1 0

0 0 2 1

0 0 3 2

0 0 4 3

0 0 5 4

0 0 0 5

[Explanation of Sample 1]

There are 5 magic circles in total, which are:
 Items 1,3,7, and 6 with magic value of 1,7,26,29.
 Items 1,5,2, and 7 with magic value of 1,5,24,26.
 Items 1,5,7, and 4 with magic value of 1,5,26,28.
 Items 1,5,8, and 7 with magic value of 1,5,24,26.
 Items 5,3,4, and 6 with magic value of 5,7,28,29.

Take item 5 for example, it appears once as item a, three times as item b, and does not appear as item c nor item d. Therefore, the four numbers in this line are 1,3,0,0.

Furthermore, if we view the output as a matrix with m rows and 4 columns, the sum of the m numbers in each column should equal the total number of magic circles. So, if your output does not satisfy this feature, then your output must be incorrect. You can check the correctness of your output to some extent by using this feature.

[Data Size]

Test Point	n	m
1	= 10	= 12
2	= 15	= 18
3	= 20	= 25
4	= 30	= 35
5	= 40	= 50
6	= 50	= 70
7	= 65	= 100
8	= 80	= 125
9	= 100	= 150
10	= 125	= 200
11	= 150	= 250
12	= 200	= 350
13	= 250	= 500
14	= 350	= 700
15	= 500	= 1000
16	= 700	= 2000
17	= 1000	= 5000
18	= 2000	= 10000
19	= 5000	= 20000
20	= 15000	= 40000