

Xavier is Learning to Count

Xavier, a 9-year-old student, loves playing many kinds of puzzles. One of his favourites is the following:

Xerier, his classmate, has made many cards. She writes down a single positive number on each of them. No numbers written on different cards are the same. After that she writes down an equation, whose right side is a single positive number chosen by her, and the left side is the sum of p integers:

$$X_1 + X_2 + \dots + X_p = n$$

Then she asks Xavier put p cards on the corresponding X_i 's position to make this equation correct, **with an additional condition that X_i should be ordered from smaller to bigger**, i.e.

$$X_i < X_{i+1}, \forall 1 \leq i < p$$

Every time Xavier immediately comes up with many solutions. Now he wants to know how many solutions in total are there for any n given by Xerier.

Input

There are multiple test cases. The number of them is given in the beginning of the input. Then a series of input block comes one by one.

For each test case:

The first line contains two space-separated integers m and p ($1 \leq p \leq 5$). The second line contains m distinct positive integers - the numbers written on each of the cards. None of these integers exceeds 13000.

There are about 120 test cases in total, but 90% of them are relatively small. More precisely, all numbers are less than or equal to 100 in 90% of the test cases.

Output

For each test case:

For each positive integer, output the number of ways in a single line. To keep the output finite, only numbers with positive ways should be outputted.

Output a blank line after each test case. See sample for more format details.

Example

Input:

```
3
3 3
1 2 3
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5 4
1 3 5 6 7
10 3
1 2 3 4 5 6 7 8 9 10

Output:

Case #1:

6: 1

Case #2:

15: 1

16: 1

17: 1

19: 1

21: 1

Case #3:

6: 1

7: 1

8: 2

9: 3

10: 4

11: 5

12: 7

13: 8

14: 9

15: 10

16: 10

17: 10

18: 10

19: 9

20: 8

21: 7

22: 5

23: 4

24: 3

25: 2

26: 1

27: 1

This problem has 82 submissions during the onsite contest, but none of them gets Accepted.