

3865 The Dog Days of Programming Contests

Dr. Hain and Dr. White have decided to retire from judging the regional programming contest and instead want to become dog show judges. Unfortunately, dog shows use different criteria from programming contests (dogs very seldom have compiler errors, although some may have wrong output), so they need a way to ensure they are judging the dogs consistently. Since they are still the chief judges of this contest, they have asked you to write a program to check the consistency of their dog judging.

Your program should create charts showing the consistency between the two judges. The rows will represent the scores given by Dr. Hain and the columns will represent the scores given by Dr. White. Suppose the maximum score for a dog is 3 and the judges give the following scores:

Dog number	Dr. Hain's score	Dr. White's score
1	0	0
23	0	3
14	0	0
5	3	0
19	2	3
18	1	1
12	3	2
204	1	1
6	0	0
25	3	3

The consistency chart resulting from these scores is:

		Dr. White's Score			
		0	1	2	3
Dr. Hain's Score	0	3	0	0	1
	1	0	2	0	0
	2	0	0	0	1
	3	1	0	1	1

The 3 in the upper left hand corner indicates there were 3 dogs that Dr. Hain gave a 0 to that Dr. White also gave a 0 to (dogs 1, 14, and 6). The 1 in row 0, column 1 indicates there was 1 dog that Dr. Hain scored as a 0 while Dr. White scored it as a 3 (dog 23). Ideally, the only nonzero entries in this table would be along the diagonal, indicating perfect consistency.

Your program should take a group of scores and build the corresponding consistency table.

Input

The input to the program will consist of one or more data sets. Each data set will begin with a single integer, max , $0 < max \leq 20$, the maximum score a dog may receive. There will then be 1 or more lines representing the scores given by the judges. They will be in the following format:

judge dog score

where:

- *judge* is a single letter, ‘H’, ‘W’, or ‘E’ with ‘H’ representing Dr. Hain’s judgment, ‘W’ representing Dr. White’s judgment, and ‘E’ marking the end of scores for this data set.
- *dog* is a positive integer representing the dog number.
- *score* is an integer, $0 \leq \text{score} \leq \text{max}$

The end of input will be indicated by data set with $\text{max} \leq 0$. This set should not be processed.

Output

The output for each data set should start with a single line indicating the set number, starting at 1 and formatted as in the sample output. The consistency matrix should then be printed in row major order, one row per line, with one blank between each pair of consecutive entries. Only dogs which have been scored by both judges should be included in the consistency matrix.

There should be a blank line after the consistency matrix for each data set.

Sample Input

```
3
H 1 0
H 19 2
W 25 3
H 12 3
H 204 1
H 6 0
W 1 0
H 5 3
H 25 3
W 23 3
W 14 0
W 5 0
W 19 3
H 23 0
W 18 1
H 14 0
H 18 1
W 12 2
W 204 1
W 6 0
H 10 2
W 100 2
E 0 0
2
H 1000 1
W 1000 0
H 1001 1
W 1001 0
H 99 1
H 5 1
H 1002 1
W 1002 0
```

```
H 1003 1
W 1003 0
H 1004 1
W 1004 0
H 1005 1
W 1005 0
H 1007 1
W 1007 0
H 1008 1
W 1008 0
H 1009 1
W 1009 0
E 1 1
-55
```

Sample Output

Show 1:

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

Show 2:

```
0 0 0
9 0 0
0 0 0
```