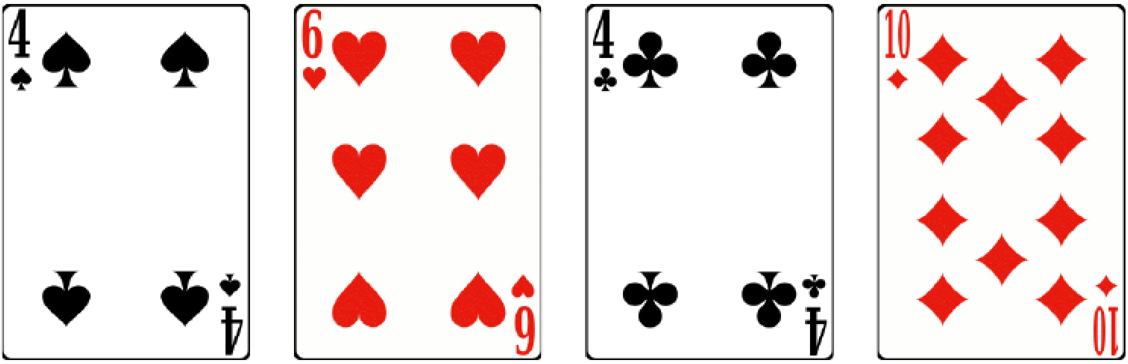
I have a set of super poker cards, consisting of an infinite number of cards. For each positive **composite** integer p, there are exactly four cards whose value is p: Spade(S), Heart(H), Club(C) and Diamond(D). There are no cards of other values. By "composite integer", we mean integers that have more than 2 divisors. For example, 6 is a composite integer, since it has 4 divisors: 1, 2, 3, 6; 7 is not a composite number, since 7 only has 2 divisors: 1 and 7. Note that 1 is not composite (it has only 1 divisor).

Given a positive integer n, how many ways can you pick up exactly one card from each suit (i.e. exactly one spade card, one heart card, one club card and one diamond card), so that the card values sum to n? For example, if $n = 24$, one way is $4S + 6H + 4C + 10D$, shown below:



Unfortunately, some of the cards are lost, but this makes the problem more interesting. To further make the problem even more interesting (and challenging!), I'll give you two other positive integers a and b, and you need to find out all the answers for $n = a$, $n = a + 1$, $\ldots$, $n = b$.

Input

The input contains at most 25 test cases. Each test case begins with 3 integers a, b and c, where c is the number of lost cards. The next line contains c strings, representing the lost cards. Each card is formatted as *valueS*, *valueH*, *valueC* or *valueD*, where value is a composite integer. No two lost cards are the same. The input is terminated by $a = b = c = 0$. There will be at most one test case where $a = 1$, $b = 50,000$ and $c \leq 10,000$. For other test cases, $1 \leq a \leq b \leq 100$, $0 \leq c \leq 10$.

Output

For each test case, print p integers, one in each line. **Print a blank line after each test case.**

Sample Input

```
12 20 2
4S 6H
0 0 0
```

Sample Output

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