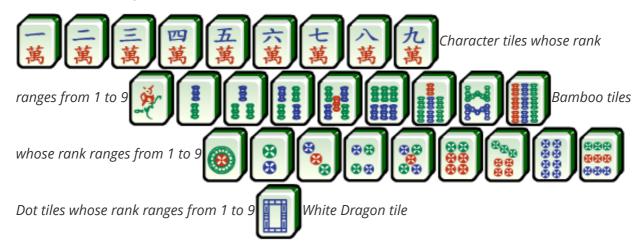DreamGrid has just found a set of Mahjong with $3M$ suited tiles and a White Dragon tile in his pocket. Each suited tile has a suit (Character, Bamboo or Dot) and a rank (ranging from 1 to M), and there is exactly one tile of each rank and suit combination.

Character tiles whose rank

ranges from 1 to 9 Bamboo tiles

whose rank ranges from 1 to 9

Dot tiles whose rank ranges from 1 to 9 White Dragon tile

As DreamGrid is bored, he decides to play with these tiles. He first selects one of the $3M$ **suited** tiles as the "lucky tile", then he picks N tiles from the set of $(3M + 1)$ tiles and sorts these N tiles with the following rules:

- The "lucky tile", if contained in the N tiles, must be placed in the leftmost position.

- For two tiles A and B such that neither of them is the "lucky tile", if

  - A is a Character tile and B is a Bamboo tile, or
  - A is a Character tile and B is a Dot tile, or
  - A is a Bamboo tile and B is a Dot tile, or
  - A and B have the same suit and the rank of A is smaller than the rank of B,

  then A must be placed to the left of B.

White Dragon tile is a special tile. If it's contained in the N tiles, it's considered as the original (not-lucky) version of the lucky tile during the sorting. For example, consider the following sorted tiles, where "3 Character" is selected as the lucky tile. White Dragon tile, in this case, is considered to be the original not-lucky version of "3 Character" and should be placed between "2 Character" and "4 Character".

As DreamGrid is quite forgetful, he immediately forgets what the lucky tile is after the sorting! Given N sorted tiles, please tell DreamGrid the number of possible lucky tiles.

Input

There are multiple test cases. The first line of the input contains an integer T, indicating the number of test cases. For each test case:

The first line contains two integers N and M ($1 \le N, M \le 10^5$, $N \le 3M + 1$), indicating the number of sorted tiles and the maximum rank of suited tiles.

For the next N lines, the i-th line describes the i-th sorted tile counting from left to right. The line begins with a capital letter s_i ($s_i \in \{C, B, D, W\}$), indicating the suit of the i-th tile:

- If $s_i = C$, then an integer r_i ($1 \le r_i \le M$) follows, indicating that it's a Character tile with rank r_i;
- If $s_i = B$, then an integer r_i ($1 \le r_i \le M$) follows, indicating that it's a Bamboo tile with rank r_i;
- If $s_i = D$, then an integer r_i ($1 \le r_i \le M$) follows, indicating that it's a Dot tile with rank r_i;
- If $s_i = W$, then it's a White Drangon tile.

It's guaranteed that there exists at least one possible lucky tile, and the sum of N in all test cases doesn't exceed 10^6.

Output

For each test case output one line containing one integer, indicating the number of possible lucky tiles.

Sample Input

```
4
3 9
C 2
W
C 4
6 9
C 2
C 7
W
B 3
B 4
D 2
3 100
C 2
W
C 9
3 9
C 1
B 2
D 3
```

Sample Output

```
2
4
7
25
```

Hint

For the first sample, "2 Character" and "3 Character" are possible lucky tiles.

For the second sample, "8 Character", "9 Character", "1 Bamboo" and "2 Bamboo" are possible lucky tiles.