



ASSUMPTION UNIVERSITY

Vincent Mary School of Science and Technology

Department of Computer Science

CS3201

Algorithm Design

Term Project Report

1573. Alchemy

Timus Online Judge

Submit to

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INTRODUCTION

Problem: 1573. Alchemy

Time limit: 1.0 second

Memory limit: 64 MB

Difficulty: 107

Description:

Lich Sandro recently became an expert in alchemy and is very glad because of it. Sure enough, because this skill allows to mix simple potions to obtain more complex ones. Any character (even not skilled in alchemy) is able to make 3 simple potions: red, blue, and yellow. A single reagent is sufficient to make any of them, but the same reagent cannot be used to make potions of different colors. All reagents can be divided into 3 groups according to this rule: yellow (sulphur, unicorn's horn, a poppy boll...), blue (a piece of a meteor, a fang of a dragon turtle...) and red (dragon's eye, ruby, gog's blood...).

Every character would like to prepare other potions. In order to achieve that it is necessary to learn alchemy and to upgrade this skill. A novice alchemist is able to mix the basic potions: yellow and red, red and blue, or blue and yellow to obtain an orange, violet or green potion, respectively. These potions are called composite. An expert alchemist is also able to mix basic and composite potions without messing up their layers (this may lead to an explosion!).

Sandro has 3 bags of reagents, and each bag contains reagents of only one color. There are B blue, R red, and Y yellow reagents. Sandro's collection of reagents is extraordinary, since all the reagents are different! K reagents of different colors are required to make a potion that makes it possible to breathe underwater. The recipe of this potion is known, and now Sandro would like to know the number of possible ways to prepare it.

Input:

The first line contains integers B , R , and Y ; $1 \leq B, R, Y \leq 100$. Then the recipe of the potion is given: the second line contains a positive integer K ; the next K lines contain the colors of the required reagents ("Blue", "Red", or "Yellow"). Each word occurs at most once.

Output:

Output the number of possible ways to choose a set of reagents to make the potion (sets differing in one or more reagent are considered different; the order of reagents in a set doesn't matter).

Problem Source: USU Junior Contest, October 2007

CODE OVERVIEW

```
1  init = input()
2  init = init.split()
3
4  for i in range(len(init)):
5      init[i] = eval(init[i])
6
7  b = init[0]
8  r = init[1]
9  y = init[2]
10
11 k = eval(input())
12
13 switcher = {
14     "Blue": b,
15     "Red": r,
16     "Yellow": y
17 }
18
19 ways = 1
20
21 for i in range(k):
22     inp = input()
23     inp = switcher[inp]
24     ways *= inp
25
26 print(ways)
```

Problem solution

Line 1-2: to get the input of 3 values for 3 types of simple potions.

Line 3-9: Allocate the value of each potion type into variables.

Line 11: Get input for number of reagents which are required for potion.

Line 13-16: Set dictionary to match the word according to type of simple potions.

Line 19: set initial value

Line 21 – 26: get recipe of potion one by one according to k along with multiplication of each, since this problem can be solved by rule of multiplication(probability). Print the result.

TEST CASE

#1

Input	Output
2 3 5 3 Red Yellow Blue	30

#2

Input	Output
8 5 3 2 Red Yellow	15

#3

Input	Output
5 11 4 1 Red	11

#4

Input	Output
56 84 32 3 Yellow Red Blue	150528

#5

Input	Output
32 74 21 2 Red Yellow	1554

SUBMISSION RESULT

Solutions judgement results

ID	Date	Author	Problem	Language	Judgement result	Test #	Execution time	Memory used
7877139	18:34:47 9 May 2018	Soravis	1573_Alchemy	Python 3.6	Accepted		0.062	304 KB