COMPUTER SCIENCES

George Fox University H.S. Programming Contest Division — III April 10, 2021

General Notes

1. Do the problems in any order you like. They do not have to be done in order
(hint: the easiest problem may not be the first problem)

2. Scoring: The team who solves the most problems in the least amount of time with the least submissions wins. Each wrong submission will receive a 20 min time penalty that will only be added to the time score once the problem has been successfully solved. Time is calculated for each problem as the total time from the start of the contest to the time it was solved.

3. There is no extraneous input. All input is exactly as specified in the problem. Integer inputs will not have leading zeros.

4. Your program should not print extraneous output. Do not welcome the user. Do not prompt for input. Follow the form exactly as given in the problem.
(hint: spaces? No spaces? What does spec say!)

5. All solutions must be a single source code file.

This page intentionally left blank

N. Shrek

Shrek is cool. Let's print him.

Input
none.

Output
The Shrek exactly as shown in the output to screen.

Output to screen:

```
        c,_.--.,Y
         7 a.a(
         (    ,_Y)
         :    '---;
    ___.'\.   -  (
 .'"""S,._'--'_2..,_
 |     ':::::=:::::   \
 .      f== ;-,---.' T
 Y.     r,-,_/_      |
 |:\___.---' '---./
 |'`             )
  \             ,
   ':;,._____.;L
   /   '--------' |
   |              \
  L---'-,--.-'--,-'
   T    /  \    Y
   |  Y   ,   |
   |   \   (   |
   (   )   \,_L
   7-./     )  `,
   /   _(     '._  \
 '---'          '--'
```


Note: as a frame of reference there is no leading space on line #7

This page intentionally left blank

O. Don key

Shrek is cool. Farquaad is not cool. Donkey is okay. To annoy Donkey let's print all of Donkey's words back at him with hesitation.

Input
The first input will contain a single integer n that indicates the number of sentences that follow. Each sentence will contain one or more words to be printed. Each sentence will end with a single punctuation mark.

Output
Print out each sentence with the following hesitation. Every word longer than 3 letters should be split with a space after the 3rd letter.

Example Input:
```
3
Hey Shrek.
Look at me!
Are you looking?
```

Output to screen:
```
Hey Shr ek.
Loo k at me!
Are you loo king?
```

P. Line Squatters

Shrek has a bunch of weird dudes in his swamp and he's trying to keep track of how many arrive each day. Help him check for squatters. Squatters can only be numbers.

Input
The first input will be an integer *n* indicating how many data sets will be given. The next *n* inputs will be squatter strings. Each string will contain an unknown number of values. The values can consist of any combination of numbers, letters, and punctuation marks separated by spaces.

Output
Output `SQUATTER SUM =` the sum of all squatters on each line. Output `NONE` if there are no squatters.

Note: The sum is guaranteed to be between $-2^{65}-1$ and $2^{65}-1$

Example Input:
```
3
1 A 2 B 3 C
Dog 44 22 piggy -6
FUN
```

Output to screen:
```
SQUATTER SUM = 6
SQUATTER SUM = 60
NONE
```

This page intentionally left blank

Q. Potions

Shrek, Donkey, and Fiona are messing with potions. Find out what each potion will do to them.

Input
The first line will contain a single integer n that indicates the number of data sets that follow. Each of the following n lines will consist of a name of a person followed by a potion color.

Output
Print out each converted sentence.

	Blue Potion	**Pink Potion**	**Green Potion**	**Purple Potion**
Shrek	Human	Cat	Lizard	Donkey
Donkey	Horse	Human	Lizard	Ogre
Fiona	Cat	Horse	Lizard	Human

Example Input:
```
3
Shrek Blue
Fiona Blue
Shrek Purple
```

Output to screen:
```
Human
Cat
Donkey
```

This page intentionally left blank

R. Magic

The magic fairies of far far away are having trouble determining how much magic to use for each spell. Use the following formula to determine how much magic should be used. the variables a, b, c, d, and e are all random quantities required to determine the amount of magic to use for a spell.

$$\text{Magic Use} = (a + b)(c + d) / e$$

Input
The first line will contain a single integer n that indicates the number of data sets that follow. Each of the following n data sets will contain 5 integers, a, b, c, d, and e respectively.

Output
Output the magic output required for the spell, rounded to 2 decimal places.

Example Input:
```
3
2  2  2  2  3
43  23  5  75  3
212  2  54  34  32
```

Output to Screen:
```
5.33
1760.00
588.50
```

This page intentionally left blank

S. Prime Food

Donkey has found that he loves prime food and hates non-prime food. Help Donkey determine what food he loves or hates.

Input
The first line (N) will contain the number of data sets. Each data set food name. If the sum of the letters (A=1, a=1, B=2, b=2, ..., Z=26, z=26) is prime then it is prime food.

Output
For each food print ether "love" or "hate" depending on whether it is prime food or not.

Example Input:
```
2
Apple
Soup
```

Output to Screen:
```
hate Apple
love Soup
```

This page intentionally left blank

T. Donkey yeknoD

Donkey is still being annoying even after you repeated every word back to him with hesitation. You want to up the ante and repeat every sentence he says a certain number of times and some even backwards to see if that will get him to stop talking.

Input
The first line will contain a single integer n that indicates the number of data sets that follow. Each data set will consist of an integer a, followed by an unknown number of words always ending in a single punctuation mark. Output all the words after a, a times, each on its own line assuming a is positive, otherwise repeat the words back a times, but in reverse.

Output
Output the words the number of times provided based upon the value of a. The ending punctuation always remains at the end.

Example Input:
```
3
-3 I'm making Waffles.
4 Shrek! Shrek! Shrek!
6 I like that boulder it is a nice boulder.
```

Output to Screen:
```
selffaW gnikam m'I.
selffaW gnikam m'I.
selffaW gnikam m'I.
Shrek! Shrek! Shrek!
Shrek! Shrek! Shrek!
Shrek! Shrek! Shrek!
Shrek! Shrek! Shrek!
I like that boulder it is a nice boulder.
I like that boulder it is a nice boulder.
I like that boulder it is a nice boulder.
I like that boulder it is a nice boulder.
I like that boulder it is a nice boulder.
I like that boulder it is a nice boulder.
```

This page intentionally left blank

U. Shrek's Moving

Shrek is moving and needs to call in all his friends to help. You now need to sort the helpers from Far Far Away by how much they can carry. Given a list of helper names and how much they can carry, put them in order from least to most amount of boxes they can carry.

Input
The first line will contain a single integer n that indicates the number of data sets that follow. Each data set will start with an integer i, indicating the number of entries to follow. Each entry will consist of a word, the helper's name, and an integer representing how many boxes they can carry. No two helpers can carry the same amount of boxes.

Output
Output the names of helpers sorted by their corresponding ability to carry boxes in ascending order, on one line, separated by spaces.

Example Input
```
2
3
Sammy 3
Roxanne 5
Boots 4
4
Shrek 18
Donkey 12
Farquaad 1
Bob 3
```

Example Output to Screen
```
Sammy Boots Roxanne
Farquaad Bob Donkey Shrek
```

This page intentionally left blank

V. Swamp

Help Donkey find refuge in the swamp. Unfortunately for him, Shrek's swamp is a bit of a MAZE, and we need to help him find his way to Shrek's hut. Donkey can only move up, down, right, and left, and he can only travel on dirt and lily pads.

Input
The first line will contain a single integer n that indicates the number of data sets that follow. Each data set will start with two integers, r and c, denoting the number of rows and columns in the maze. The following r rows will contain c characters:

o – represents a Lily Pad

. – represents dirt.

W – represents water, Donkey cannot walk on these

T – represents a tree, Donkey cannot walk on these

M – represents mud, Donkey cannot walk on these

D – represents Donkey's current location, or the starting point of the maze.

S – represents Shrek's hut, or the end point of the maze.

Output
The output should be "We Making Waffles!!", if it is possible for Donkey to make it to Shrek's swamp, and "Silence is a friend that never betrays", is it is not possible.

Example Input
```
2
5 5
D..T.
.WoWW
.WooW
MMM.T
MMM.S
5 5
DTT..
...MM
WWMMM
WWMMM
TSMMM
```

Example Output to Screen
```
We Making Waffles!!
Silence is a friend that never betrays
```

This page intentionally left blank

W. Simple Addition

Farquaad says he will punish anyone (& their friends) who does not know how to do Far Far Away addition. Shrek has asked you to create a simple program to quickly give him the correct answer so that none of Shrek's friends ever get punished.

Input
The first line will contain a single integer n that indicates the number of data sets that follow. Each data set will consist of one integer i, to be processed.

Output
For each data set, output the Far Far Away sum... which is just the sum of all the digits in i.

Example Input
```
3
12345
12345678
1000001
```

Example Output to Screen
```
15
36
2
```

This page intentionally left blank

X. Donkey's Logic

Donkey wants you compared the vowels in words of the same length at the same positions? You could see if the letters in both were vowels, or not, or if only one letter were a vowel and the other a consonant. Sounds like bitwise operators. Vowels are considered to be [aeiou] for this problem.

Given two words of equal length, convert the word to a binary number for the AND (&), OR(|), XOR(^) . Here is an example with the words, happy and shops:

```
happy
shops
00000 = 0 (AND — no chars are both vowels)
01100 = 12(OR — 2nd and 3rd chars are vowels)
01100 = 12(XOR is the same as OR for these words)

happy
caper
01000 = 8 (AND — 2nd char are both vowels)
01010 = 10(OR — 2nd and 4th chars are vowels)
00010 = 2 (XOR — 4th chars have only 1 vowel, but 2nd are both, not
exclusive)
```

Input
The first line (N) consists of the number of data sets used in this program. Each N following lines contains two words separated by a space. Each word is less than 32 characters and at least 1 character.

Output
Print out the bitwise &, |, and ^ value for each word pair on one line separated by a space.

Example Input:
```
4
happy shops
happy caper
somebody everyone
at in
```

Output to screen:
```
0 12 12
8 10 2
4 245 241
2 2 0
```

This page intentionally left blank

Y. Guess Who

Shrek & Fiona love playing games. They are playing a game that involves both players picking a character, and then asking questions about each other's characters to try and figure out who they are. Create a computer program to answer yes or no questions for you, given a characters profile.

Input
The first input will contain a single integer n that indicates the number of data sets that follow. Each data set will start with a line of the format "`NAME GEN HAIR EYE GLASS HAT`".
Name: A first name consisting of upper case letters
Gen: M or F for male or female
Hair: W, BR, BL, BLK, R for white, brown, blonde, black, and red
Eye: BL, BR, G for blue, brown, and green
Glass: Y or N for whether or not they wear glasses
Hat: Y or N for whether or not they wear a hat

The next line will consist of a single integer x representing the number of queries to follow.
The next x lines will all consist of queries of one of the following formats:
- "Is your person **NAME**?"
- "Is your person a **GENDER**?"
- "Does your person have **HAIR** hair?"
- "Does your person have **EYE** eyes?"
- "Does your person wear glasses?"
- "Does your person wear a hat?"

Output
For each question, output "`yes`" or "`no`" depending on whether the character does or does not match the description in the question.

Example Input
```
2
ANA F BR BL Y N
2
Does your person have brown eyes?
Is your person a female?
BOB M BL BR Y Y
4
Is your person BOB?
Does your person have brown hair?
Does your person wear a hat?
Does your person wear glasses?
```

Example Output to Screen
```
no
yes
yes
no
yes
yes
```

This page intentionally left blank

Z. Fiona loves BB8

Fiona is starting to create ASCII art and her first project is to create BB8 from Star Wars. Please help her. There is no input, and there is no data manipulation. Fiona wanted to reward you for looking at the last problem instead of doing them in order.

In this program, print out a picture of BB8, a really cool droid in the new Star Wars trilogy series starting in <u>Episode 7, The Force Awakens</u>. It has 8 lines, the picture is made of the period character '.', and the 6th and 7th lines have no spaces at the beginning. May the Force be with you!

Input
none

Output
There are 8 lines of output, consisting of the '.' period character.

Input: none

Output to screen:
```
  . .
 . . . .
 . . . .
  . .
 . . . .
. . . . . .
. . . . . .
 . . . .
```

This page intentionally left blank