Frisco FirstBytes

Novice Problem Set

2018

H. Digraphs

Data File: H.txt

English, like many other languages, has more phonemes (distinct sounds in spoken language) than it has letters to represent them. Therefore, digraphs are used.

Some examples of digraphs are sc, ng, ck, ph, sh, th, wh, and qu.

A teacher is instructing her students in the use of digraphs. Your job is to create worksheets that her students can fill in with digraphs. That's where you come in.

Write a program that will remove the following digraphs (sc, ng, ck, ph, sh, th, wh, qu) from a sentence and replace each digraph with two underscores.

Input

The first line contains an integer T which is the number of test cases. The following T lines each contain the word or words to be modified. The test cases may contain mixed case characters and punctuation.

Output

For each test case, print the word or words with each digraph removed and replaced with two underscore characters regardless of case.

Sample Input

`2`
`Life is what happens when you're busy making other plans.`
`The important thing is not to stop questioning.`

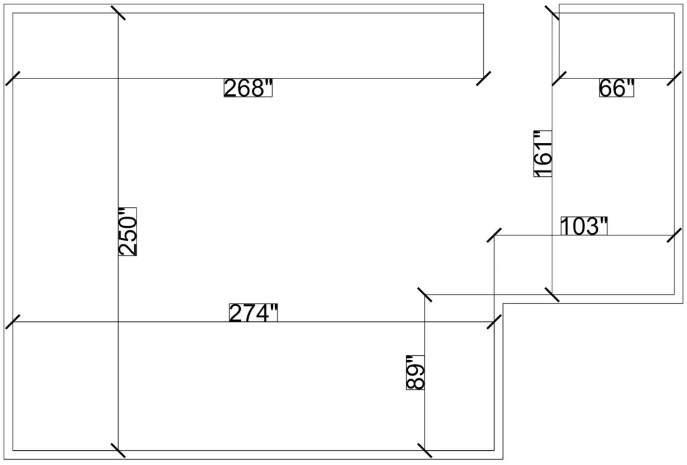
Output for Sample Input
`Life is __at happens __en you're busy maki__ o__er plans.` `__e important __i__ is not to stop __estioni__.`

I. Painting Rooms

Data File: I.txt

Brenna is painting rooms in her house. All of the walls in her house have the same wall height of 10 feet. Her rooms however are different shapes. So for each color paint, Brenna counted the number of wall segments for that color, then she took a measuring tape and measured the length of each wall segment in inches, and wrote down each number until all the walls of that color had been measured. Then she did the same with the next color and so on.

If a gallon of paint can cover 400 sq. ft., how many gallons must she purchase of each color?



Input

The first line contains an integer C, the number of colors. For each color, there is one line that contains the name of the color and a line that contains the wall measurements.

The first integer on the line of measurements S is the number of wall segments to be painted. The following S integers on the line are the measure of each segment in inches.

Output

For each color, print an integer for the minimum number of gallons to purchase to cover all the wall segments.

Sample Input	Output for Sample Input
2 Sky Blue 4 100 80 100 80 Honey Bee Yellow 7 66 161 103 89 274 250 268	1 gallon(s) of Sky Blue 3 gallon(s) of Honey Bee Yellow

J. Treasure Hunt

Data File: J.txt

You are given a representative map of a rectangular piece of land where treasure has been buried. Each space on the grid represents a square meter of land. The square where the treasure is buried is marked with an X. You will start in the center of the square marked with an asterisk. Describe how many meters you must walk north or south, then how many meters you must walk east or west to find the spot to dig.

Input

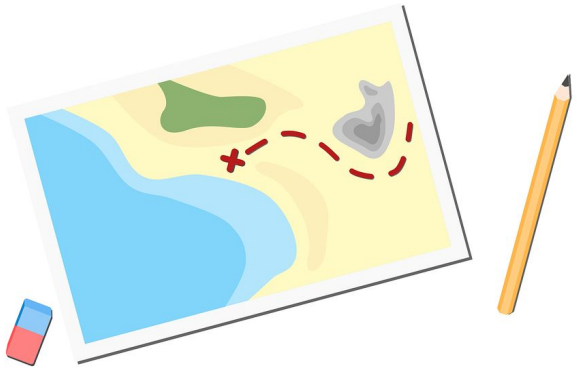
The first line will contain a single integer N, the number of test cases. The N test cases follow.

Each test case starts with a line containing 2 integers R and C, rows and columns respectively. This is followed by R lines, each containing C characters, which is the treasure map.

Output

For each test case, print the number of meters north or south, a single space, and then the number of meters east or west to the treasure. If ever there are zero steps in a direction, do not print it. All numbers must be positive.

Sample Input	Output for Sample Input
2 5 10 ########## #######x## ########## ###*###### ########## 4 8 ##*###x# ######## ######## ########	2 north 4 east 4 east



K. Financial Forensics

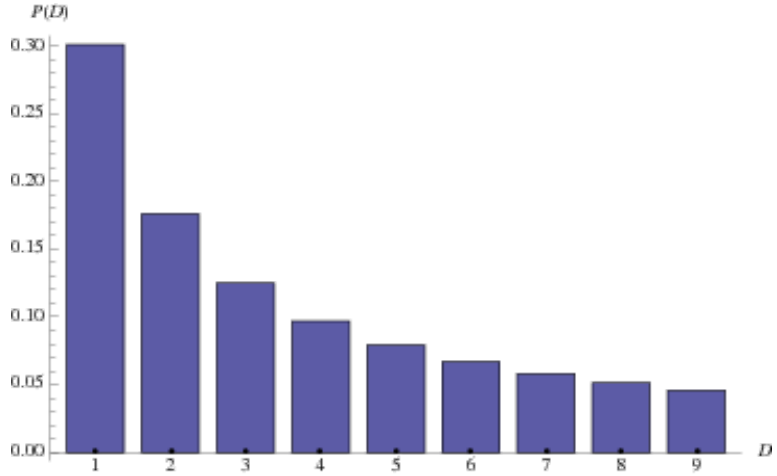
Data File: K.txt

Forensic accountants can sometimes spot fraud by looking at the frequency of the first significant digit in a series of transactions. According to Benford's law, the number 1 appears as the most frequently occurring significant digit about 30% of the time, while 9 appears less than 5% of the time.

See a typical distribution for a data set that follows Benford's Law in the chart below.

Often fraudsters embezzle by selecting amounts just under a threshold that would invite scrutiny, For example, all petty cash transactions of $100.00 or more require additional approval by management. So the fraudsters may select amounts in the $90-$99 range in an attempt to maximize their theft without detection.

Given a set of financial transactions under audit, state whether the forensic accountant should investigate further.



Input

The first line contains T the number of test cases. Each test case consists of two lines. The first is the label of the batch of transactions by month, year, and type. The second line is a an unknown number of transactions in dollars which must be evaluated.

Output

If the percentage of leading 1's dips below 25% or the number of leading 9's creeps above 10%, print that the forensic accountant should investigate further. Print the test cases in order of input.

Sample Input

`2`
`March 2018 Petty Cash`
`99.00 95.25 12.15 35.48 18.13 10.98 12.84`
`April 2018 Accounts Receivable`
`98.00 23.00 64.00 15.00 12.50 2.35 19.00 33.75 88.12 56.79`

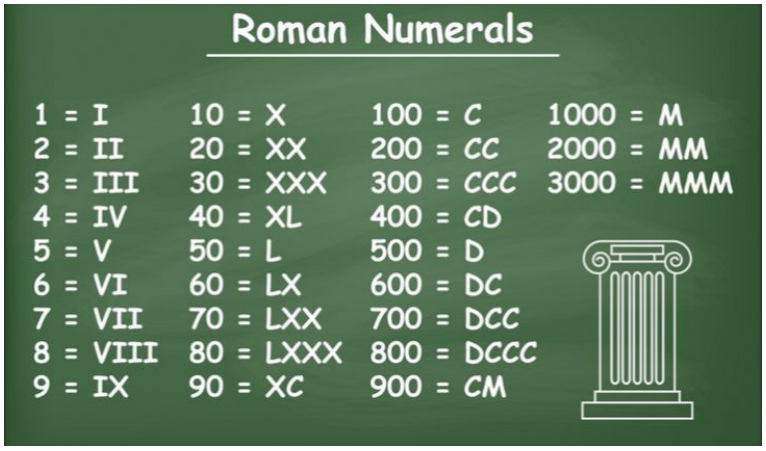
Output for Sample Input
`March 2018 Petty Cash MUST BE INVESTIGATED FURTHER.` `April 2018 Accounts Receivable MEETS BENFORD'S LAW.`

L. Roman Numerals

Data File: L.txt

Roman numerals represent numbers using combinations of letters from the Latin alphabet. The **I** was used for tally marks, but larger numbers like five, could be represented by a single symbol **V**. Subtractive notation is used for number like 4 (**IV**) and 9 (**IX**) so there will never be more than three symbols in a row. See the examples below.

Symbol	I	V	X	L	C	D	M
Value	1	5	10	50	100	500	1,000



Input

Each line contains a valid Roman numeral. All values will be in the range of 1 to 3000.

Output

Print the decimal (base-ten) number.

Sample Input	Output for Sample Input
MMXVIII LXXXVII XXIV	2018 87 24

M. Alphabetizing

Data File: M.txt

You must alphabetize a series of titles. Each is in title case. Title case means that the first letter of each word is capitalized, except for certain small words, such as articles and short prepositions. To alphabetize, you must follow these rules:

1. Alphabetize letter by letter.
2. Ignore spaces, capitalization, hyphens, apostrophes, and periods.
3. Ignore the following insignificant words if they appear at the beginning: a, an, the
4. Nothing comes before something. Example: Maria comes before Marian.

Input

An integer T is on the first line indicating the number of titles. Each title appears on its own line. The titles will consist of uppercase and lowercase letters, spaces, hyphens, apostrophes, and periods.

Output

Print each title on its own line in alphabetical order following the given rules.

Sample Input	Output for Sample Input
7 Trumpeter's Pate The Trumpeter Spat The Sirens of Titan A Prayer for Owen Meany Frankenstein Another Country The Sun Also Rises	Another Country Frankenstein A Prayer for Owen Meany The Sirens of Titan The Sun Also Rises The Trumpeter Spat Trumpeter's Pate

N. Bowling Scores

Data File: N.txt

A game of bowling consists of 10 frames. During each frame the bowler has up to 2 rolls to knock down all 10 pins. The number of pins knocked over is recorded at the top of the frame. A dash, indicated by a - (hyphen, ASCII 45), means no pins were knocked over on that roll.

A strike, indicated with an X, means that all 10 pins were knocked over in the first roll of the frame. A strike earns a bonus. Do not write down the score until the next 2 balls are rolled. Once rolled, those bonus pins are added to the score and it is written down.

A spare, indicated by a / (forward slash, ASCII 47), means that all the remaining pins left over from the first roll were knocked over in the second roll. Do not write down the score until the next 1 ball is rolled. Once rolled, those bonus pins are added to the score and it is written down.

The score is accumulated and written down once all the pins and bonus pins are known for that frame.

On the tenth frame, there are possible bonus rolls if needed. If a spare occurs, only 1 single extra roll is needed. If a strike occurs the ball is rolled 2 more times, then the score is finalized. A perfect score is 300.

Input

The integer G on the first line represents the number of games. Each of the following G lines represents a game.

Each game consists of 10 frames each separated by a single space. The frames may have 1, 2 or 3 characters representing the number of pins knocked over for that roll.

Output

For each game, print the accumulating score for the points scored in each frame.

Sample Input	Output for Sample Input
3 8- 7- 53 9/ 9/ X 8- 51 3/ 9- 8/ 9- 44 72 9- X X 8- 35 9/7 X X X X X X X X X XXX	8 15 23 42 62 80 88 94 113 122 19 28 36 45 54 82 100 108 116 133 30 60 90 120 150 180 210 240 270 300

O. Simple Cypher

Data File: O.txt

You will decipher a simple cypher. In this simple cypher, all you have to do is shift the alphabet by a certain number of letters.

For example, if you wanted to encrypt the message "MEET ME AT MIDNIGHT" by a shift of 2, you would write down the alphabet and then rewrite it shifting the A to line up with the C as shown in the table. Note that the alphabet wraps. Y and Z come to represent A and B. Replacing each letter you get this encrypted message:

KCCR KC YR KGBLGEFR

To decrypt, simply reverse the process.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X

Input

The first line will contain an integer N, the number of encrypted messages. Following are N lines each containing a message. An integer S appears before the message, which represents how much the alphabet was shifted to encrypt the message. (-25 <= S <= 25) The messages consist only of capital letters and the spaces that separate the words, no punctuation.

Output

Print each decrypted message on its own line. Maintain the spaces between individual words.

Sample Input	Output for Sample Input
2 2 KCCR KC YR KGBLGEFR -3 EULQJ WKH ORFNERA	MEET ME AT MIDNIGHT BRING THE LOCKBOX

P. Happy Numbers

Data File: P.txt

Given a decimal (base-ten) number, sum the squares of its digits and repeat the process. A happy number will result in 1 (and stays there). A sad number will result in a repeating cycle that does not include 1.

For example, 65 is a sad number.

$6^2 + 5^2 = 61$
$6^2 + 1^2 = 37$
$3^2 + 7^2 = 58$
$5^2 + 8^2 = 89$
$8^2 + 9^2 = 145$
$1^2 + 4^2 + 5^2 = 42$
$4^2 + 2^2 = 20$
$2^2 + 0^2 = 4$
$4^2 = 16$
$1^2 + 6^2 = 37$
Repeats from 37 on...

For example, 23 is a happy number.

$2^2 + 3^2 = 13$
$1^2 + 3^2 = 10$
$1^2 + 0^2 = 1$

Input

The first line contains N, how many numbers to evaluate. The following N lines contains a single positive integer of 3 digits or less. The sum of the squares of any number in the sequence is guaranteed not to exceed $2^{31}-1$.

Output

Print whether a number is happy or sad.

Sample Input	Output for Sample Input
3 23 44 65	23 is happy 44 is happy 65 is sad