PROGRAMMING ASSESSMENT SAMPLE QUESTION SET

Test Duration – 3 Hours

Question	Marks
Next Palindrome Number	10
Morse Code	15
Hungry Fish	20
	Total: 45 Marks

Next Palindrome Number

Given a palindrome number find the next smallest number which is a palindrome. A palindrome number is a sequence of digits that reads the same forward and reverse. For e.g. 121 is a palindrome.

Input

The input number will contain 2 to 15 digits.

Output

Output should be a number which is the next palindrome.

Sample Input & Output

22	33
12321	12421
12344321	12355321

Morse Code

In Morse code, each letter of the alphabet is represented by a sequence of dots and dashes as follows:

a	.-	h	….	o	---	v	…-
b	-…	i	..	p	.--.	w	.--
c	-.-.	j	.---	q	--.-	x	-..-
d	-..	k	-.-	r	.-.	y	-.--
e	.	l	.-..	s	…	z	--..
f	..-.	m	--	t	-		
g	--.	n	-.	u	..-		

For example, “eta” would be: “. - .-“. If the spaces between letters are omitted, codes can be ambiguous. For example,”.-.-“ could be ‘eta’, ‘ent’, or ‘aet’ based on the location where a space is inserted.

Write a program which reads a word and determines how many words, *with the same number of letters as the input*, it might represent. In the above example, the answer is 3 as ‘.-.-‘ can represent ‘eta’, ‘ent’, or ‘aet’.

Input

Input is a string representing a word. The number of characters will be at most 10.

Output

Output should be the number of words with the same number of letters that can be interpreted if spaces in the Morse code of the input are removed.

Sample Input & Output

Eta	3
Infy	25

Hungry Fish

An evil scientist has developed an injection that induces insatiable hunger in a fish. On giving this injection, a fish of size **x** can eat another fish of *smaller* size **y** (y < x) and become a fish of size **x + y** retaining this hunger. An aquarium has a number of fishes of various sizes. The scientist introduces an injected fish into this aquarium with an objective that eventually only 1 fish remains. In order to achieve this, the scientist is allowed only two types of moves: either add a normal fish of any size or remove an existing normal fish from the aquarium. Given the sizes of other fishes in the aquarium and the size of injected fish, write a program to determine the *minimum* number of moves needed by the scientist to achieve his objective.

For example, suppose there are 5 fishes in the aquarium, the injected fish is of size 10 and the other fishes are of sizes 9, 20, 25, and 100. To ensure that only 1 fish remains in the aquarium the scientist needs to remove the fish of size 100 and add a fish of size 3. So the output is 2. The sequence of steps is shown below. The sizes of fishes in the aquarium at each step are shown in curly braces. The highlighted number is the size of the injected fish.

Step-0: initial state → {**10**,9,20,25,100}

Step-1: eats 9 → {**19**,20,25,100}

Step-2: add normal fish of size 3 → {**19**,3,20,25,100} [1st move]

Step-3: eats 3 → {**22**,20,25,100}

Step-4: eats 20 → {**42**,25,100}

Step-5: eats 25 →{**67**,100}

Step-6: remove fish of size 100 → {**67**} [2nd move]

Alternatively the scientist can also choose to introduce any fish of size 2 to size 18 in step 2 instead of the fish of size 3 to achieve the same objective. Similarly, adding a fish of size 36 in step 6 instead of removing fish of size 100 is also a valid solution. In all these solutions 2 moves are required.

Constraints

The sizes of the fishes in the tank can range from 1 to 1000000. No credit will be given if the problem is solved using brute force.

Input

Input is a string containing two parts separated by '#'. The first part is an integer representing the size of the injected fish and the second part is a sequence of integer sizes of the other fishes separated by comma. The sizes of the fishes need not be in sorted order.

The input to the above example would be represented as: 10#9,20,25,100.

Output

A string containing an integer representing the minimum number of moves.

Sample Input & Output

10#9,20,25,100	2
3#25,20,100,400,500	5
50#25,20,9,100	0