Tasks for programming contest, Kama Challenge 2021.

A. Passwords

To generate the passwords, Vasiliy uses a set of divisors of large numbers. Vasiliy divides a large number into prime divisors in ascending order and generates a password as follows:

If multiplicity of a divisor is even, Vasiliy writes a capital English letter with the number corresponding to the divisor; if multiplicity of a divisor is odd, then he writes a small letter with the number corresponding to the divisor. Program the password generation algorithm from a number.

Input Format:

The only string shows an integer which is less or equal to $2*10^9$.

Output Format:

Display the password or -1, if a password cannot be generated, in the only string.

Example of input:

335314056

Example of output

bcGkW

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B. Excavations

While excavating the ruins of the ancient lost civilization WOW-OOPS, the archeologists found a text in the language of this civilization written on a long wall.

The scientists analyzed this text and concluded that all nouns in WOW-OOPS language start with WOW letters, while all verbs start with OOPS letters. They also found that all sentences follow the orders: Noun or Noun+Verb or Noun+Verb+Verb+Noun.

Unfortunately, WOW-OOPS language lacks any punctuation marks, and the text on the wall is difficult to read. Split the text into sentences. The text is splittable all the time.

Input Format:

The only string shows an integer N – the number of words in the text on the wall. All words are separated by a space. There are no more than 10000 letters in total.

Output Format:

Display the number of sentences in the first string. In the strings that followed, display all sentences one by one in the order as they appear in the original text.

Example of input:

7 WOWa WOWab OOPSak WOWeut OOPSuy WOWed WOWes

Example of output:

5

WOWa

WOWab OOPSak

WOWeut OOPSuy

WOWed

WOWes

C. Honey

Grandfather Stepan is famous for his mouth watering honey. But as he is getting older, he finds it difficult to gather honey and to take it from the hives to his house. If the Grandfather gathers too much honey, this can affect his health. However, many people believe that they are full-blooded and could manage everything on their own.

When Vasiliy, a grandson of Grandfather Stepan, came to see his Grandfather, he noticed that his Grandfather does too much. This made him think how to optimize this Grandfather's honey gathering route so that the Grandfather takes enough honey so that he can easily manage to carry.

Grandfather Stepan always gathers the honey from the hives in their sequential order and stops when he realizes that he gathers enough, but, very often, the last hive gives more honey that the Grandfather needs, and Grandfather Stepan has to apply certain efforts to carry the gathered honey to the house.

Vasiliy made a decision to swap hives and to place stop signals so that his Grandfather does not take too much honey and the number of honey trips is the least.

Input Format:

The only string shows integers M – the perfect weight for Grandfather Stepan (1<=M<=200), N - the number of hives (1<=N<=10), and N positive integers showing the amount of the gathered honey from the hives (<=100). All numbers are separated by a space.

Output Format:

Display the number of hive swaps. If several permutations are possible, choose any permutation with the least number of swapped hives. If a swap is not possible, display -1.

Example of input:

12 6 7 3 3 9 12 2

Example of output:

2

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D. A cat

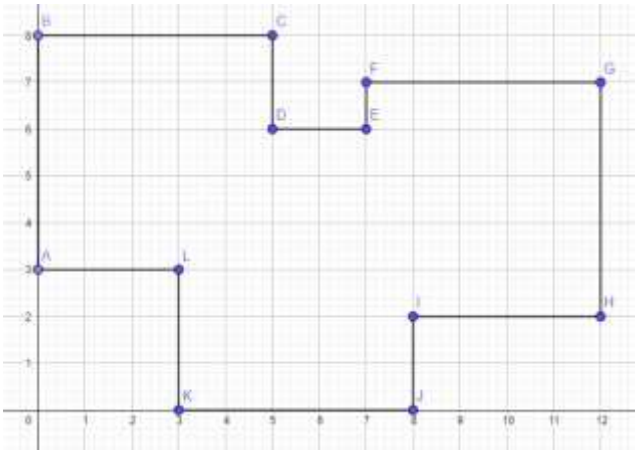
To send the invitations for a honey testing event, Vasiliy prepared a pile of 5*5 similar square envelopes. But his cat accidentally dropped several envelopes into the puddle (the origin of the puddle is unknown) on the floor while playing. The envelopes became wet, absorbed water, and stuck together.

Luckily, the envelopes fell in such a way that they positioned in the cardinal directions as a polygon with no empty slots in between, with square corners, with their vertices in the nodes of coordinate grid and the sides parallel to the axes of coordinates.

Help Vasiliy estimate the damage.

Input Format:

The only string shows the number of the polygon vertices N (1<=N<=30) and N pairs of integral coordinates of vertices x_i y_i (0<=x_i, y_i<=300) which run the clockwise boundary traversal (in an alphabetical order, see the Figure). The numbers are separated by a space.



Output Format:

Display the minimum number of spoilt envelopes in the only string.

Example of input:

12 0 3 0 8 5 8 5 6 7 6 7 7 12 7 12 2 8 2 8 0 3 0 3 3

Example of output:

4