MysteryTwister C3

THE CRYPTO CHALLENGE CONTEST

Factorization Cipher – Part 3

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Here, the same cipher as in "FACTORIZATION CIPHER – PART 1" has been used to encrypt a message but the spaces have not been removed prior to the encryption process. The encryption was performed on each word of the plaintext separately.
(A word is a piece of the plaintext separated by spaces and consisting of at least one letter.)

Here is an example. The given plaintext is: "ART CAR".
According to part 1 of this challenge we know that the ciphertext of "ART" is "163810312927732 4" and of "CAR" is "16891926020 0" so the ciphertext of the whole plaintext is "1638103129277324168919260200".

Decrypting of such a ciphertext may lead to different plaintexts, because the ciphertext can be partitioned in many different ways. For example as "1638", "1031292", "7732416" and "8919260200" which consists of four ciphertext words. But as there do not exist plaintext words for all of these four ciphertext words, this partition provides no solution. If we try all possible partitions of the given ciphertext we may find out that there is only one possible solution which is "ART CAR".
But there are other ciphertexts which have more solutions.

Assignment

Please answer the following two questions:

1. How many different plaintexts can be encrypted to this ciphertext c?
   c = 729961251215009409493612549928 9
   The possible plaintexts do not have to be meaningful (e.g. something like "B BDA AFD" or "W JKZU B AJ" could be possible plaintexts).

2. Decrypt the ciphertext that can be found in the additional file ciphertext.txt.
   The plaintext is a meaningful English sentence.

The solution shall be provided in the form N,P (There is no space before or after the comma),

- N is the answer to the first question.
- P are two words from the plaintext that results from the second question: The first word is the word before the longest word, the second is the longest word itself. Separate the two words with one space and use capital letters.