

D. Prefixes and Suffixes

time limit per test: 1 second

memory limit per test: 256 megabytes

input: standard input

output: standard output

You have a string $s = s_1 s_2 \dots s_{|s|}$, where $|s|$ is the length of string s , and s_i its i -th character.

Let's introduce several definitions:

- A substring $s[i..j]$ ($1 \leq i \leq j \leq |s|$) of string s is string $s_i s_{i+1} \dots s_j$.
- The prefix of string s of length l ($1 \leq l \leq |s|$) is string $s[1..l]$.
- The suffix of string s of length l ($1 \leq l \leq |s|$) is string $s[|s| - l + 1..|s|]$.

Your task is, for any prefix of string s which matches a suffix of string s , print the number of times it occurs in string s as a substring.

Input

The single line contains a sequence of characters $s_1 s_2 \dots s_{|s|}$ ($1 \leq |s| \leq 10^5$) — string s . The string only consists of uppercase English letters.

Output

In the first line, print integer k ($0 \leq k \leq |s|$) — the number of prefixes that match a suffix of string s . Next print k lines, in each line print two integers $l_i c_i$. Numbers $l_i c_i$ mean that the prefix of the length l_i matches the suffix of length l_i and occurs in string s as a substring c_i times. Print pairs $l_i c_i$ **in the order of increasing** l_i .

Examples

| | |
|------------------------|------|
| input | Copy |
| ABACABA | |
| output | Copy |
| 3 1 4 3 2 7 1 | |

| | |
|------------------------|------|
| input | Copy |
| AAA | |
| output | Copy |
| 3 1 3 2 2 3 1 | |