

### **Q9. Extraction of Chemical Formula (15 marks):**

A chemical formula **X** is provided, and the symbols of the elements need to be extracted.

To show the extracted elements, the symbols of elements must be printed in the same order as how they appear in the chemical formula in a single line (1st line), where the symbols of two elements must be separated by an empty space. Make sure that the symbols of elements do not repeat while printing.

The number of elements in the formula must also be counted and printed in the 2nd line.

For example, for chemical formula NaHCO<sub>3</sub>, the elements are Na H C O. Here Na is a single element and thus “N” and “a” must not be printed separately. Furthermore, there are totally 4 different elements in this chemical formula.

### **Write a programme to**

**Input** chemical formula **X**, where the length of **X** should not be more than 25 characters (including numbers and symbols).

### **Output, in sequence,**

The elements in the chemical formula. Note that the elements must be output in accordance with the appearing order in the chemical formula.

The number of different elements found in the chemical formula.

**Note:** If the input **X** has a length of more than 25 characters, then output “Invalid Length”.

### **试题 9. 化学式的提取 (15 分):**

给定一个化学式 **X**，请提取其中的元素符号。

为了显示提取出来的元素，元素符号必须按照它们在化学式中出现的顺序打印在第一行中，并且每两个元素符号之间必须用空格分隔。请同时确保打印时，元素符号不重复。

此外，化学式中的元素数量也需要被计算并打印在第二行。

例如，若给定的化学式为 NaHCO<sub>3</sub>，则其包含的元素为 Na H C O。这里 Na 是单个元素符号，所以 “N 和 “a” 不得分开打印。

### **试写一程式以**

**输入** 化学式 **X**, 其中 **X** 所包含的字符（包括数字和符号）不得超过 25 个。

### **依序输出**

化学式中的元素。必须注意的是，输出元素的顺序必须依据它们在化学式里出现的顺序。

化学式中不同元素的数目

**注意:** 若是输入的 **X** 所包含的字符超过 25 个，则输出 “Invalid Length”。

**Example (例子)**

Input (输入)	Output (输出)
NaHCO <sub>3</sub>	Na H C O 4
Ni(C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> ) <sub>2</sub>	Ni C H O 4
CCCCHHHHOOOOOOKNaH <sub>2</sub> OH <sub>2</sub> OH <sub>2</sub> OH <sub>2</sub> O	Invalid Length
Al <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub> ·16H <sub>2</sub> O	Al S O H 4

All Test Cases (所有测试用的例子):

Input (输入)	Output (输出)
NaHCO <sub>3</sub>	Na H C O <sub>4</sub>
Ni(C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> ) <sub>2</sub>	Ni C H O <sub>4</sub>
CCCCHHHHOOOOOOKNaH <sub>2</sub> OH <sub>2</sub> OH <sub>2</sub> OH <sub>2</sub> O	Invalid Length
Al <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub> ·16H <sub>2</sub> O	Al S O H <sub>4</sub>
(Ca <sub>4</sub> Si <sub>2</sub> O <sub>6</sub> (CO <sub>3</sub> )(OH,F)) <sub>2</sub>	Ca Si O C H F <sub>6</sub>
ZnCH <sub>3</sub> COOCH <sub>3</sub> COOH <sub>2</sub> OH <sub>2</sub> O	Zn C H O <sub>4</sub>
((Mg,Fe <sup>2+</sup> ) <sub>2</sub> (Mg,Fe <sup>2+</sup> ) <sub>5</sub> Si <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub> )	Invalid Length