

"Input system for sino-computer"

The present invention relates to an input system for a Sino-computer and in particular to a method of entering Chinese characters therein and to a keyboard therefor which greatly simplify the operation and
5 input speed of the system.

Computerization of Chinese characters has been under development. The critical point is how to simplify and speed up the input operation to a satisfactory extent. There have been various suggestions made
10 in this direction, but little has been accomplished.

The primary object of the present invention is to provide a method of inputting Chinese characters into a computer by dividing each Chinese character into basic strokes, and giving each stroke a corresponding
15 designated numerical symbol. Thus by following the conventional and precise stroke writing sequence of any character, the character may be represented by a number (the "spelling number") which is made up from the numerical symbols for each stroke in
20 the sequence in which the strokes are written. Inputting this Spelling number for the Chinese character both facilitates and simplifies the input operation.

I have found that the basic strokes into which each Chinese character may be divided number only
25 six and may be termed horizontal, vertical, dot, oblique, clockwise angulated and anticlockwise angulated (—, |, ·, / or \, 7 and 7). By 'dot' is meant the standard Chinese dot stroke, a stroke of short physical length but of variable shape. By "oblique"
30 is meant a left or right leaning stroke which may be curved or substantially linear as in the words 人 and X. By clockwise and anticlockwise "angulated" is meant a stroke during the execution of which the brush or pen moves in a clockwise or anticlockwise
35 fashion relative to the already executed portion

of the stroke. Thus in the word 于 the stroke 丿 is executed with an initial downward movement followed by a clockwise deflection.

Not all strokes can be clarified as being one of these six basic strokes and I have found that such strokes, complex strokes, can be characterized as one of the six basic strokes terminating with one or more clockwise and/or anticlockwise deflections. Thus in the word 冂 the stroke 冂 may be described as a clockwise angulated stroke 冂 terminating with a clockwise deflection.

According to one aspect of the invention there is thus provided a method of entering a Chinese character into an input system of a Sino computer in a numerically encoded form, the said method comprising generating characteristic numerical signals for each stroke or radical executed in the forming of the said character and entering the said signals sequentially into the said input system, the sequential order being that of the execution of the said strokes or radicals in the formation of the said character, wherein where a stroke consists of one of six basic stroke types, horizontal, vertical, dot, oblique, clockwise angulated and anticlockwise angulated, the said signal therefor has a value characteristic of that basic stroke type and where a stroke consists of one of the said basic stroke types followed by one or more clockwise or anticlockwise deflections the said signal has as a first part a value characteristic of that basic stroke type and as second and subsequent parts values characteristic of the said deflections.

Another object of the present invention is to provide a keyboard for carrying out the input method as mentioned above.

According to the present method, characters that are accorded the same spelling number but are written differently are relatively few; only 33 pairs, 3 triads and 1 quartet. These characters having

the same spelling number but differently written can be distinguished without mistake during input by supplementing the spelling number with a further characterising signal, a selective signal.

5 According to a further aspect of the invention there is provided a keyboard for entering Chinese characters into an input system of a Sino computer, the said keyboard comprising a plurality of keys each adapted in operation to generate a characteristic
10 numerical signal and enter the said signal into the said input system, the said plurality including six keys each adapted in operation to generate and enter a signal characteristic of one of the six basic stroke types, horizontal, vertical, dot, oblique, clockwise
15 angulated and anticlockwise angulated, and two keys adapted in operation to generate and enter a signal characteristic of a clockwise or anticlockwise stroke deflection.

 The keyboard of the invention preferably includes
20 a plurality of keys, selective keys, adapted in operation to generate and enter a signal to distinguish a character from other characters having the same spelling number.

 To minimize operator time and increase input speed the keyboard may also include a plurality of
25 keys, radical keys, adapted in operation to generate and enter a signal characteristic of a radical within a character, that is to say a series, usually a commonly occurring series, of brush strokes which form part of the character being entered into the input system
30 of the Sino-computer.

 For ease of operation, the keyboard may also include keys, punctuation keys, adapted in operation to generate and enter a signal characteristic of a punctuation mark or a spacing or to separate the
35 signals for different characters (words).

An embodiment of the invention will now be described by way of example, with reference to the accompanying drawings, in which:

Fig. 1 illustrates the six basic stroke types
5 of Chinese characters;

Figs. 2 and 3 illustrate several Chinese characters and their corresponding spelling numbers;

Fig. 4 tabulates sets of Chinese characters having the same stroke sequences;

10 Fig. 5 illustrates the three Chinese characters having a particular stroke sequence; and

Fig. 6 illustrates a keyboard according to the invention.

In the embodiment of the invention illustrated
15 in the Figures the numerical signal (symbol) for each of the six basic strokes is as shown in Fig. 1.

Every Chinese character can be composed from these six strokes and given a representative spelling
20 number consisting of a series of numerical symbols appearing in the same order as that in which strokes are conventionally executed in writing the character. A Chinese character is written in a precise sequence of strokes working from top to bottom and from
25 left to right. This is shown for example in Figure 2 which illustrates the sequences of brush strokes executed in the writing of five characters and shows the spelling number derived for each character by assigning each consecutive stroke a numerical symbol.

30 With clockwise and anticlockwise angulated strokes where the actual stroke comprises two or more deflections, then a sub-symbol is shown as a superfix to the number symbol for the basic stroke. For example, if the second deflection of a stroke
35 is clockwise, then the sub-symbol "5" is affixed, and if anticlockwise then the sub-symbol "6" is affixed. A third deflection would be treated in the same manner.

Thus as is shown in Fig. 3, the strokes **L**, **J** and **7** are assigned besides their basic stroke symbols 6, 5 and 5 superfixes to designated the extra deflections: their numerical symbols are then 6⁶, 5⁵ and 5⁶⁵ respectively.

In the 9600 Chinese characters that are commonly used there are relatively few which are written differently yet with the same stroke sequence according to the method of the present invention. This is an advantageous feature of the present invention. Sets of those different characters which, following the method of the invention have the same spelling number are termed "same spelling characters" and are shown in Fig. 4.

The same spelling characters are summarized according to the number of strokes in the following table:

number of same spelling character	number of strokes														Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
pairs	0	2	6	6	6	2	3	3	2	1	0	2	0	0	33
triads	0	0	1	1	2	0	0	0	0	0	0	0	0	0	4
quartet	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1

These same spelling characters can be displayed on a Visual Display screen allowing the operator to search them by eye and then select the correct character by pushing the corresponding selective key (e.g. in the keyboard shown in Fig. 6 one of keys S₁, S₂, S₃ and S₄). The selection is quite easy due to the limited number of same spelling characters. As an example, the three characters of spelling number

121 are represented in Fig. 5. with the spelling numbers supplemented by the selective key symbols S_1 , S_2 and S_3 .

Some characters have an ambiguous stroke writing sequence, in this case two or more spelling numbers corresponding to the alternative stroke sequences can be given to one character and the input signals will thus be different. Nevertheless the Sino-computer memory may be arranged to identify these different signals as equivalent so that only one character will be output in response to any one of such input signals. Therefore, even though the stroke writing sequence may be different, an exact character output can be assured. Actually, such ambiguous characters are quite few and so are not difficult to handle.

According to reliable statistics, Chinese characters have, on average, 12 strokes: in other words characters will have an average of 12 digits in their spelling numbers, compared to an average of 9 letters in English words, 9 in French, 11 in German and 10 in Russian. With this comparison, it is apparent that the typing speed for input of these different languages may be similar.

Various radicals, that is to say stroke sequences or portions of characters, appear frequently in Chinese characters. To reduce the time spent entering individual strokes, it is possible according to the invention to provide the keyboard with a plurality of radical keys each of which generates a signal characteristic of a radical. These radical keys may be operated in conjunction with the basic stroke keys, the selective keys and the stroke deflection keys. In this case, the average number of key pushing operations for Chinese characters will be reduced below 9.

A keyboard according to the invention is shown schematically in Figure 6. The different keys are identified as follows:

key 1 is for actuating the tape punching machine to move downwards;

key 2 is for actuating the tape punching machine to move rightwards;

5 key 3 is for registering that a complete character has been entered;

 keys 4 are for various punctuation marks;

 keys 5 are selective keys (to distinguish same spelling characters);

10 keys 6 are for the six basic strokes;

 keys 7 are to signify clockwise (5) and anticlockwise (6) deflections of basic strokes; and

 keys 8 are radical keys characteristic of a plurality of radicals.

15 An inexpensive Sinotype can be made by arranging the keyboard of the invention to operate a paper tape punching machine. The paper tape may be delivered to a data processing section. The operation of the method and keyboard of the invention is very easy
20 following as it does the normal stroke writing sequence of Chinese characters and so does not require a skilled operator.

 The tape punching machine may be attached to a synchronous electric typewriter to type out the
25 entire text simultaneously during the operation of said tape punching machine for checking out whether any wrong input is being made.



claims

1. A method of entering a Chinese character into an input system of a Sino computer in a numerically encoded form, the said method comprising generating characteristic numerical signals for each stroke
5 or radical executed in the forming of the said character and entering the said signals sequentially into the input system, the sequential order being that of the execution of the said strokes or radicals in the formation of the said character, wherein where
10 a stroke consists of one of six basic stroke types, horizontal, vertical, dot, oblique, clockwise angulated and anticlockwise angulated, the said signal therefor has a value characteristic of that basic stroke type and where a stroke consists of one of the said basic
15 stroke types followed by one or more clockwise or anticlockwise deflections the said signal has as a first part a value characteristic of that basic stroke type and as second and subsequent parts values characteristic of the said deflections.
- 20 2. A method as claimed in claim 1 wherein the said numerical signals characteristic of said horizontal, vertical, dot, oblique, clockwise angulated and anticlockwise angulated strokes correspond to the numbers 1, 2, 3, 4, 5 and 6, respectively.
- 25 3. A method as claimed in claim 2 wherein the said second or subsequent parts of said numerical signal which are characteristic of deflections to a basic stroke correspond to the numbers 5 and 6 for clockwise and anticlockwise deflections respectively.
- 30 4. A method as claimed in any one of claims 1 to 3 wherein, when the sequence of the said numerical signals characteristic of the strokes executed in the formation of the said character is also characteristic of the strokes executed in the formation of one or
35 more other characters, the said sequence is supplemented by a further signal characteristic of the said character.
5. A keyboard for entering Chinese characters into an input system of a Sino-Computer, the said

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- keyboard comprising a plurality of keys each adapted in operation to generate a characteristic numerical signal and enter the said signal into the said input system, the said plurality including six keys each
- 5 adapted in operation to generate and enter a signal characteristic of one of the six basic stroke types, horizontal, vertical, dot, oblique, clockwise angulated and anticlockwise angulated, and two keys adapted in operation to generate and enter a signal characteristic
- 10 of a clockwise or anticlockwise stroke deflection.
6. A keyboard as claimed in claim 5 further comprising a plurality of selective keys each adapted in operation to generate and enter a signal characteristic of the said character.
- 15 7. A keyboard as claimed in either of claim 5 and 6 further comprising a plurality of radical keys each adapted in operation to generate and enter a signal characteristic of a radical.
8. A keyboard as claimed in any one
- 20 of claims 5 to 7 further comprising a plurality of keys each adapted in operation to generate and enter a signal characteristic of a punctuation mark.
9. A keyboard substantially as herein described with reference to Figure 6 of the accompanying drawings.

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