canonical order and lexicographical order

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lexicographical order

Given two different sequences of the same length, $a_1 a_2 \dots a_k$ and $b_1 b_2 \dots b_k$, the first one is smaller than the second one for the lexicographical order, if $a_i < b_i$ (for the order of A), for the first i where ai and bi differ.

To compare sequences of different lengths, the shorter sequence is usually padded at the end with enough "blanks" (a special symbol that is treated as smaller than every element of A).

canonical ordering

Definition 2.3.1.10. *Let* $\Sigma = \{s_1, s_2, \ldots, s_m\}$, $m \geq 1$, *be an alphabet, and let* $s_1 < s_2 < \cdots < s_m$ *be a linear ordering on* Σ. *We define the* **canonical ordering** *on* Σ^* *as follows. For all* $u, v \in \Sigma^*$,

$$u < v \text{ if } |u| < |v|$$
$$\text{or } |u| = |v|, u = xs_iu', \text{ and } v = xs_jv'$$
$$\text{for some } x, u', v' \in \Sigma^*, \text{ and } i < j.$$

$u < v$当且仅当u模更小或

uv模相同时，从左边开始数u中第一个出现比v中小的符号

canonical ordering

examples: 假设Σ＝英语字符表，

book < boot

cat < pot

too < two

teeth < tooth

bool < fool

hat < weak

open < operator

two < three

zoo < order

tie < apple

利用这个形式体系来定义字典序

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$$
\begin{aligned}
u < v \ \text{ if } |u| < |v| \\
\text{or } |u| = |v|, u = x s_i u', \text{ and } v = x s_j v' \\
\text{for some } x, u', v' \in \Sigma^*, \text{ and } i < j.
\end{aligned}
$$

利用这个形式体系来定义字典序

$$u < v \;\; if \; |u| < |v|$$
$$or \; |u| = |v|, u = xs_i u', \;\; and \; v = xs_j v'$$
$$for \; some \; x, u', v' \in \Sigma^*, \;\; and \; i < j.$$

$$if \; |u| < |v|, u = xs_i u' \overbrace{s_0 s_0 \ldots s_0}^{|u|-|v|\text{个}}, v = xs_j v'$$

for some $x, u', v' \in \Sigma^*$, and $i < j$

谢谢