58 (prefix order) Give axioms to define the prefix partial order on strings. String S comes before string T in this order if and only if S is an initial segment of T.

After trying the question, scroll down to the solution.

§ Use $\preceq$ for the prefix partial order. It can be defined as

$$nil \preceq S$$
$$S \preceq nil \;=\; S{=}nil$$
$$i;S \preceq j;T \;=\; i{=}j \wedge S \preceq T$$

where S and T are strings, and i and j are items. Or it can be defined as

$$S \preceq T \;=\; \leftrightarrow S \leq \leftrightarrow T \wedge S = T_{0;..\leftrightarrow S}$$

After we meet quantification it can be defined as

$$S \preceq T \;=\; \exists U{:}\ {*X}{\cdot}\ S;U = T$$

where X is the alphabet of symbols.