Definition 3.135. [071] *Given two ordered sets $(X, \leq_X)$ and $(Y, \leq_Y)$, setting $Z = X \times Y$, we define the* ***lexicographic order*** $\leq_Z$ *on Z; let $z_1 = (\!|x_1, y_1|\!) \in Z$ and $z_2 = (\!|x_2, y_2|\!) \in Z$, then:*

- *in the case $x_1 \neq x_2$, then $z_1 \leq_Z z_2$ if and only if $x_1 \leq_X x_2$;*
- *in the case $x_1 = x_2$, then $z_1 \leq_Z z_2$ if and only if $y_1 \leq_Y y_2$.*

This definition is then extended to products of more than two sets: given two vectors, if the first elements are different then we compare them, if they are equal we compare the second elements, if they are equal the thirds, etc.