This miniproject asks you to work with a partial ordering on a Cartesian product.

Suppose that $(A, \preceq_1)$, $(B, \preceq_2)$, and $(C, \preceq_3)$ are posets. Show that $(A \times B \times C, \preceq)$ is a poset where $(a, b, c) \preceq (d, e, f)$ if and only if $a \preceq_1 d$, $b \preceq_2 e$, and $c \preceq_3 f$.