Presentation problem for 2/01/13

Let $X_1, \ldots, X_n$ be spaces with the topologies $\mathcal{T}_1, \ldots, \mathcal{T}_n$, respectively. Formulate a reasonable definition of the product topology on the space $X_1 \times \cdots \times X_n$, and prove that your defintion is a topology. (I realize that this problem is fairly open ended, but the goal here is to prove that our definition of a product topology when $n = 2$ extends perfectly well to any finite product).