Answer on Question #42211 – Math - Topology

Show that the set $S = \{\{x\} | x \in X\}$ being a sub base generates a discrete topology on any set X.

Solution.

A subbase S generates a basis B for the topology T. A basis B consisting of all finite intersections of elements of S, together with the set X and the empty set. So a basis B consisting of the set S, set X and the empty set. Any subset of X can be written as a union of all sets that consisting of a single element from initial subset (this sets are elements of B). Hence, the topology T, generated by a basis B, consisting of all subsets of X and the topology T is discrete.