Let Y have the discrete topology. Show that: if $p: X \times Y \to X$ is projection on the first coordinate, then p is a covering map

let $x \in X$, $\mathcal{U}$ a neighborhood of x.

$$p^{-1}(\mathcal{U}) = \mathcal{U} \times Y = \bigcup_{y \in Y} \underbrace{\mathcal{U} \times y}$$

disjoint open sets homeomorphic to $\mathcal{U}$ ∎