

① Prove that $\mathbb{R}^{\mathbb{R}}$ has a subspace X that is T_4 but not Lindelöf.

HW
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Hint: Start by proving $\{f_r \mid r \in \mathbb{R}\}$ where $f_r(x) = 1$ if $x = r$ else 0 is discrete.

② [Grad only] Prove that if X is a subspace of \mathbb{R}^J for some set J and X is Lindelöf, then X is T_4 . Hint: Start by adapting Munkres' proof of Theorem 32.1 to show that Lindelöf + regular \Rightarrow normal.