# MCMT Homework 8

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## Exercise 8.1

For any non-negative constant $c$, define $\{\tau \leq t\} = 1_{|\{X_0,\cdots,X_t\}|=c}$. Then $\tau = c$ is a stopping time.

Suppose there are two stopping times $\tau_1$ and $\tau_2$. We can make $\{X_0, \cdots, X_s\}$ satisfy $\{s \leq \tau_1\}$ and $\{X_s, \cdots, X_t\}$ satisfy $\{t - s \leq \tau_2\}$. That is, $\{\tau_1 + \tau_2 \leq t\} = \{\tau_1 \leq s\} \wedge \{\tau_2 \leq t - s, X_0 = y\}$, where $y$ is the state when $\{\tau_1 \leq s\}$ is true. So $\tau_1 + \tau_2$ is a stopping time.