

Let $\{X_t\}_{t \geq 0}$ be a continuous time martingale, and let $\tau_1 < \tau_2 < \dots$ be a sequence of stopping times. Show that $\{X_{\tau_k}\}_{k \geq 0}$ is a discrete-time martingale with respect to the filtration $\mathcal{F}_{\tau_1} \subseteq \mathcal{F}_{\tau_2} \subseteq \dots$.