What is a markov process and how is it specified? Derive the expression for the distribution of the tth state.

What is a limiting distribution? What is a stationary distribution and the conditions for existence and uniqueness? Prove that a symmetric process has the uniform distribution as a stationary distribution. What is time-reversibility?

How can MCs be used for simulation? What is the Metropolis-Hastings Algorithm?

Example Problem: Let say we have two randomly chosen groups of students who are undergoing the same summer math course - one group sees a positive subliminal message while the other sees a neutral message. We have a before and after test score for each student. Our general question is whether the positive subliminal message has an effect compared to the neutral one. Cast this into a full Bayesian analysis utilizing Python's PyMC module for MCMC.