Make-up Work

- Complete all assigned readings

Complete

- Answer the reflection poll

Why is it sometimes necessary to write Monte Carlo simulations rather than completely deterministic simulations? Provide and explain at least one reason and motivate your answer using an example where it is not possible to write a completely deterministic simulation.

- Complete and submit your pre-class work up to the normal standard.

Complete
https://colab.research.google.com/drive/1Zp66PiyeAk1EKE-WnAF3PFI88MxiRaCA?usp=sharing

https://github.com/cesar-ca/cs166-modeling-and-analysis/tree/main/CS166%20Session%2010

- Watch the video recording of the class. If the video recording is unavailable for some reason (for example, a technical problem), contact your instructor. Where possible, a recording of another section of the same course will be shared with you.

Complete

- Create 2 new prep poll questions for the class. These questions should test students' readiness for class and should be based on the readings or the pre-class work. For each of the 2 poll questions, do the following.

- In 50 words or less, write the poll question.

The pre-class work had you implement a simulation for a random walk with drift. Can you describe with details how does a random walk like in the pre-class work compared to a Markov chain and make use of the appropriate analogous concepts?

The pre-class work had you implement a simulation for a random walk with drift. Can you describe with details how to implement random walks in different real-world scenarios and how can you implement them in these examples?

- In 100-200 words, explain how the poll question connects a concept from the readings and pre-class work to an activity or discussion in class. In other words, explain how the poll question assesses whether the student is prepared for what happens in class.

The poll questions makes a direct connection to the random walk with drift explored during the pre-class work and provides space for student to describe in detail not only the technical details but also real-world scenarios for the concept. The first poll question assesses whether the student engaged with the content for class deeply and sought to understand how to increase their understanding of the topic. Markov chain model/simulations are also a big part of modeling and analyzing increasingly complex systems, so it helps to provide a direct connection between more simple models and more complex ones. The second poll asks for similar yet differing ideas by asking about different implementations.

- In 50-100 words, identify which course learning outcome is targeted by the poll and explain how the LO is targeted.

The course learning outcome that is targeted by the poll questions is #modeling and it targets it by asking the student to develop an understanding of a simple model (random walks) and make informed assumptions about the ways to use the ideas at a more complex level. It provides the space for a novel perspective on where and how random walks can be implemented.

- In 50-100 words provide a high-quality answer to the poll question. Your answer should be good enough to score a 4 on the LO identified above.

Answer to Poll Question 1:

A random walk is an example of a Markov chain. A Markov chain can be best understood as a set of states with arrows connecting them that describe the likeliness of jumping from one state to the other. Some Markov chains have finitely many states, a random walk like in the pre-class work is an example of a Markov chain with infinitely many states. Each of the integers is a state and the probability transition function are given by the probability of going to the left or to the right.

Answer to Poll Question 2:

Random walks are probabilistic and randomly assigned events. A random walk can also be implemented in networks with nodes and edges with probabilities assigned to going from one node to the other. In browsing the web, you do random walks through different websites and the algorithm used by Google's search algorithm is also powered by random walk model. Modifying a random walk by requiring it to stop at a certain lower or upper boundary essentially models a gambler's ruin which models a simple gambling game. Random walks can also help model the stock market.