Optimizing Grad Student life

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1. Introduction
   1. This project simplifies graduate student life into a sequential decision-making problem that focuses on optimizing academic performance.
   2. In order to perform well, psets and exams should be approached with appropriate levels of energy, focus, and knowledge
   3. We simulate 5 days (mon – fri), where a student must complete their pset by the end of the week and take their exam on Friday
   4. The 5 days are continuous and do not assume a full night’s rest in between
   5. The level of performance of these tasks will depend on the choices the student (agent) makes throughout the week
   6. This is a discrete, finite horizon problem (end of week)
   7. Different actions will transition the student probabilistically to different states
2. State space
   1. Energy meter (discrete)
   2. Focus meter (discrete)
   3. Knowledge meter (discrete)
   4. Pset completion meter (discrete)
      1. Amount of contribution to fill Pset meter per unit time will vary
   5. Time (discrete)
      1. Only progresses in forward direction
   6. Exam completion (binary)
      1. Set time for occurring, agent should avoid missing this
3. Action space
   1. Short nap
   2. Medium nap
   3. Long nap (basically full sleep)
   4. Studying
   5. Eating
   6. Mental/social break
   7. Do Pset
4. Reward function
   1. Max reward for completing exam at required time and filling Pset meter by end of Friday
   2. Decline in reward for poor preparation and not maxing out Pset meter
   3. Heavy punishment for missing exam
5. Transition function
   1. Each action will have highest probability of transitioning to certain state, but variations present for transitioning to “neighboring states”
6. Approach
   1. Decision making algorithm to be determined
   2. Additional details on modeling this problem to be determined

Short nap: + 2 energy, + 2 focus, + 1 hr

Medium nap: + 4 energy, + 4 focus, + 2 hrs

Long nap (basically full sleep) – full energy, full focus, + 8 hrs

Studying: + 1 knowledge, - 3 energy, - 5 focus, + 2 hrs

Eating: +5 energy, - 1 focus, + 1 hrs

Mental/social break: + 5 focus, - 1 energy, + 1 hrs

Do Pset: + Pset dependent on knowledge, - 4 energy, - 6 focus, + 3 hrs

Rewards