Material for Week 5
Physics 4488/6562: Statistical Mechanics
https://sethna.lassp.cornell.edu/Teaching/562/
Exercises due Wed. Mar 01
Last correction at December 22, 2022, 2:09 pm

Enjoy your break next Monday.

Monday
In-class question: 5.10 *Entropy increases: diffusion*
In-class question: 5.15 *Shannon entropy*
Wednesday
Read: Chapter 6, Sec. 6.1 (Canonical Ensemble), 6.2 (Uncoupled Systems), and 6.3 (Grand canonical ensemble)
Pre-class question: 5.14 *Information entropy*
In-class question: 6.18 *Langevin dynamics*
In-class question: 5.15 *Shannon entropy*
Friday
Read: Chapter 6, Sec. 6.4 (What is thermodynamics?) and 6.5 (Mechanics: friction and fluctuations)
Pre-class question: 6.16 *Rubber band free energy*
In-class question: 6.13 *Pollen and hard squares*
Wednesday
Read: Chapter 6, Sec. 6.6 (Chemical equilibrium) and 6.7 (Free energy density)
Pre-class question: 6.15 *Gas vs. rubber band*

Exercises for everyone

- None this week

Select one (4488) or two (6562)

N1.11 *Entropy of Mastermind^{TM}.* Inspired by Wordle, entropic strategy in a guessing game.
6.3 *Negative temperature.* Temperature can be negative in the microcanonical ensemble. See how it compares to the canonical ensemble.
5.21 *Data compression.* Using compression algorithms to estimate entropy
5.24 *Nucleosynthesis and the arrow of time.* (Astrophysics) How we understand why the stars can shine and the arrow of time.
5.26 *Phase conjugate mirror.* When the entropy increases depends on what you keep track of. It's ignorance that matters.
5.17 *Deriving entropy.* (Mathematics) How Shannon's entropy uniquely satisfies sensible axioms.