Today

I. Your Feedback About the Class
II. Carnot Engine
III. Entropy

I. Tomorrow let's meet as a whole group for the lab session.
This week: Antu Antu will be providing homework support. Hours are: Tu 8-9pm, Th 8-9pm.

II.

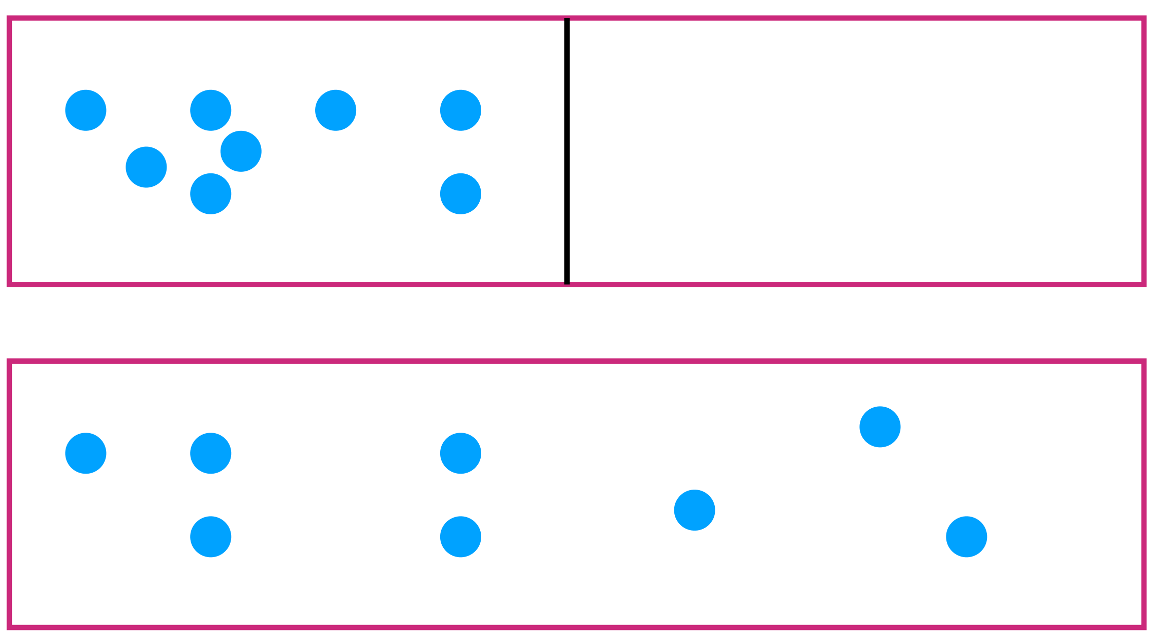
II. (1) The 2nd law of Thermo: The entropy of a system only ever increases or stays the same, it can't decrease. "Heat flows spontaneously from hot to cold."

(2) Reversible & Irreversible Processes:

Reversible: these are processes that can run backwards— at any moment you can change your mind and retrace your steps.

Irreversible: You can't retrace your steps.

Example of irreversible: "Free expansion" of a gas.



Free expansion: We can't undo this process.

Most real world processes are irreversible.

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The essence of a reversible process is that it proceeds by a succession of equilibrium states.

During an irreversible process Thermodynamic variables lose their meaning. (P, V, T all not well defined.)

Most cleanly defined in terms of entropy: irreversible process creat entropy.

It turns out that a Carnot engine saturates the efficiency bound.

Building off the Carnot cycle, we'll be able to quantify entropy more generally. In particular, we'll be able to show that entropy is "state variable". A state variable is something that only depends on the current state of the system.

So, on Wed, we'll prove that entropy is a state variable.

$$W = -\int P dV$$