Reading Assignment for November 13
Sections 11.5 and 11.6

11.5 - Heat Engines

- Heat engine - a device that uses the transfer of heat from a hot object to a cold object in order to do work.
- The whole point of a heat engine is to get work out of it, so we define the efficiency to be how much work versus how heat needed to be absorbed, $e = W_{out}/Q_H$.
- The fact that there is a maximum efficiency for a heat engine comes from the Second Law of Thermodynamics (which we'll get to later).

11.6 - Heat Pumps, Refrigerators, and Air Conditioners

- Heat pump - a device that does work in order to move heat from a hot object to a colder one. (Refrigerators and Air conditioners are heat pumps.)
- The book also discusses heat pumps that are used for heating. I will not do this; I'll just talk about refrigeration. You should ignore any equation in this section for heat pumps used for heating.
- Heat pumps have a "Coefficient of Performance", COP.
- COP's can be larger than one.
- The whole point of a heat pump is to move heat in a non-spontaneous way, so we define the COP to be how much heat got moved versus how much work was done, $COP = Q_C/Q_{in}$.
- There is a maximum COP value due to the Second Law of Thermodynamics.