YOUR HOMEWORK NO. 2: Due Sep 27, 2016 in class

- 1. Work out fully an expression for the Debye specific heat for a 1-dimensional solid at temperature T. Show all your steps so it will be clear you have understood the Debye derivation. Show what limits the expression you get has at high and low temperatures. What does high and low mean here precisely?
- 2. Calculate the energy density of states for a 2-dimensional system that is otherwise similar to a free electron of mass m confined to a square side of L but is different in that the energy momentum relationship is that the energy is proportional to the CUBE rather than the square of momentum. Calculate the (temperature dependence of the) specific heat of a collection of N such noninteracting electrons in thermal equilibrium at temperature T.
- 3. By reading your favorite book on thermodynamics learn and state the first law of thermodynamics about conservation of energy and state how free energy and entropy are related to the internal energy.