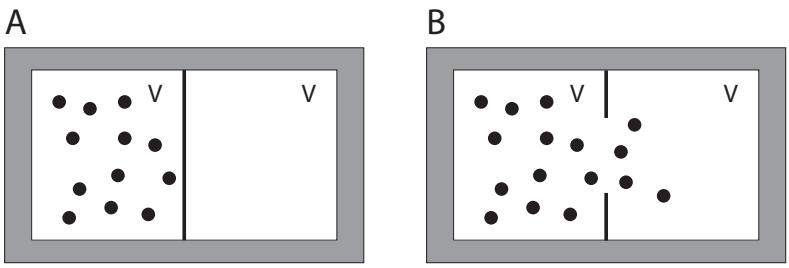
NB1140: Physics 1A - Classical mechanics and Thermodynamics
Quiz 4 - Entropy, information, and thermodynamics
Wednesday 25 January 2017
(Total time = 10 minutes)

Entropy of an ideal gas inside a box with two rooms



Suppose that a box initially has two rooms inside it. Both rooms have the same volume. Each room has volume V. The box has a total of N identical gas particles. The box is surrounded by a thick insulating wall. This means that no energy or particle can enter of leave the box. The total energy in the box thus remains E at all times.

For the box shown in the figure, derive the entropy of the system step-by-step. Carefully explain each key step of your derivation.