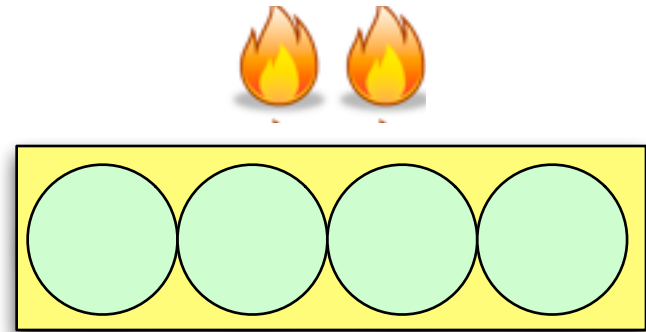


Suppose I have a block of matter with 4 two-state “Degrees of Freedom” (bins in which to place energy that can only hold 1 energy packet).



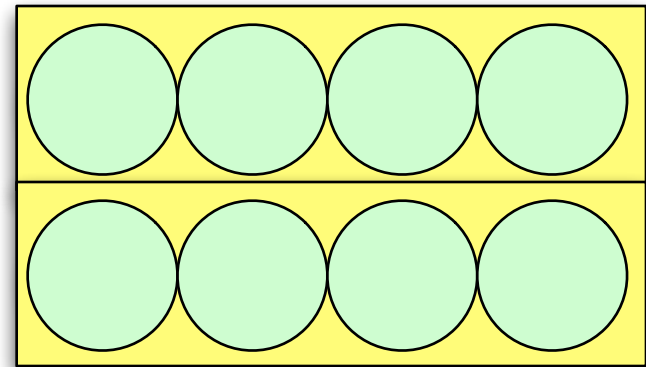
I have 2 packets of thermal energy.
How many ways are there
to distribute 2 packets?
(*i.e., How many microstates
are there?*)





Suppose I have two blocks of matter, each with 4 two-state “Degrees of Freedom” (bins in which to place energy that can only hold 1 energy packet).

I have 2 packets of thermal energy.
How many ways are there to distribute 2 packets among both blocks compared to the number of ways to distribute 2 packets to one block?



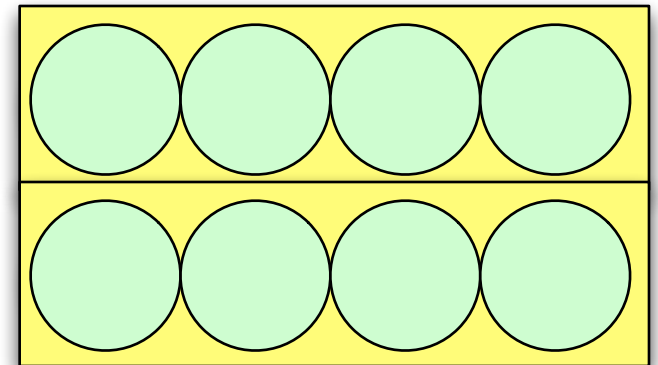
1. Twice as high
2. Four times as high
3. Eight times as high
4. More than eight times as high
5. Not enough information



Suppose I have two blocks of matter, each with 4 two-state “Degrees of Freedom” (bins in which to place energy that can only hold 1 energy packet).

I have 4 packets of thermal energy.

How many ways are there to distribute the 2 packets to each block compared to the number of ways to distribute the 4 packets to one block ?



1. Twice as many
2. Four times as many
3. Sixteen times as many
4. More than sixteen times as many
5. There is not enough information to tell

For a system to undergo a change
(chemical or thermal) spontaneously

*Multiple
response!*



1. The entropy of the system must increase.
2. The entropy of the system must decrease.
3. The entropy of the system must not change.
4. The entropy of the universe must increase.
5. The entropy of the universe must decrease.
6. The entropy of the universe must not change.