Example:

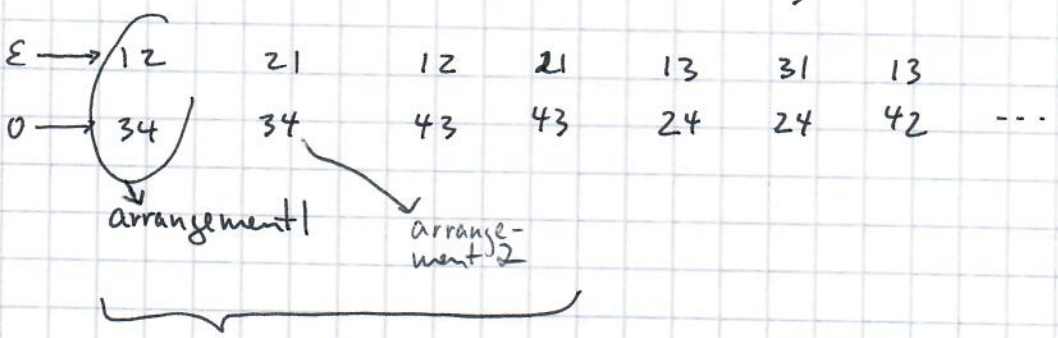
Counting microstates, assuming distinguishable particles.

Let us assume that we have 2 energy levels: one w/ energy 0 and one w/ energy ε.

Let's further say that we have $N = 4$ distinguishable particles and that the energy of the system is 2ε.

How many microstates are consistent w/ this? We require 2 particles in state "ε" and two in state "0"

Total of $4! = 24$ arrangements.



counted as one "independent arrangement"

$$\Rightarrow \Gamma(E = 2\varepsilon, N) = \frac{4!}{2!\,2!} = 6$$

What changes when $E = 3\varepsilon$?

123	134	142	234
4	2	3	1

6 ways to arrange 123

6 ways to arrange 134

$$\Gamma(E = 3\varepsilon) = \frac{4!}{1!\,3!} = 4$$

What changes when $E = 4\varepsilon$?

all particles in excited state: $\Gamma(E = 4\varepsilon) = 1$

What changes when $E = 0$?

all particles in level w/ energy 0: $\Gamma(E = 0) = 1$

Note: We are assuming discrete energy levels but the particles are distinguishable (= non-quantum)