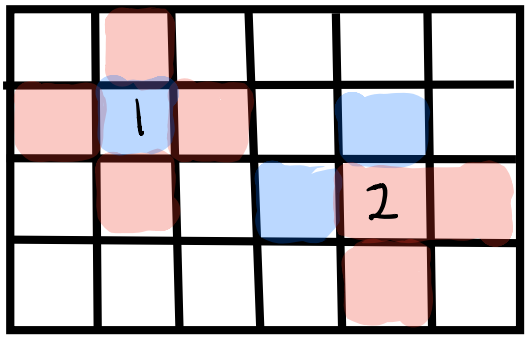

$N_A + N_B = \text{Constant}$

m_{AA} = number of A-A contacts

ε_{AA} = energy of A-A contacts

$$U = m_{AA}\varepsilon_{AA} + m_{BB}\varepsilon_{BB} + m_{AB}\varepsilon_{AB}$$

s_A = number of A sides (two sides for a contact)

$$s_A = 4N_A$$
$$s_A = 2m_{AA} + m_{AB}$$
$$\Rightarrow \quad 4N_A = 2m_{AA} + m_{AB}$$
$$4N_B = 2m_{BB} + m_{AB}$$

$$U = \frac{1}{2}\left[(4N_A - m_{AB})\varepsilon_{AA} + (4N_B - m_{AB})\varepsilon_{BB} + 2m_{AB}\varepsilon_{AB}\right]$$

$$= \frac{1}{2}\left[4N_A\varepsilon_{AA} + 4N_B\varepsilon_{BB} + m_{AB}(2\varepsilon_{AB} - \varepsilon_{AA} - \varepsilon_{BB})\right]$$

U = energy of a configuration. ΔU = the energy b/w two configurations

$$U_f - U_i = \frac{1}{2}\left(m_{AB}^f - m_{AB}^i\right)\left(2\varepsilon_{AB} - \varepsilon_{AA} - \varepsilon_{BB}\right)$$

$$\Delta U = \Delta m_{AB}\,\varepsilon$$