## What is the formula for:

Free energy:

Entropy:

Number of combinations of k objects out of N:

Boltzmann distribution:

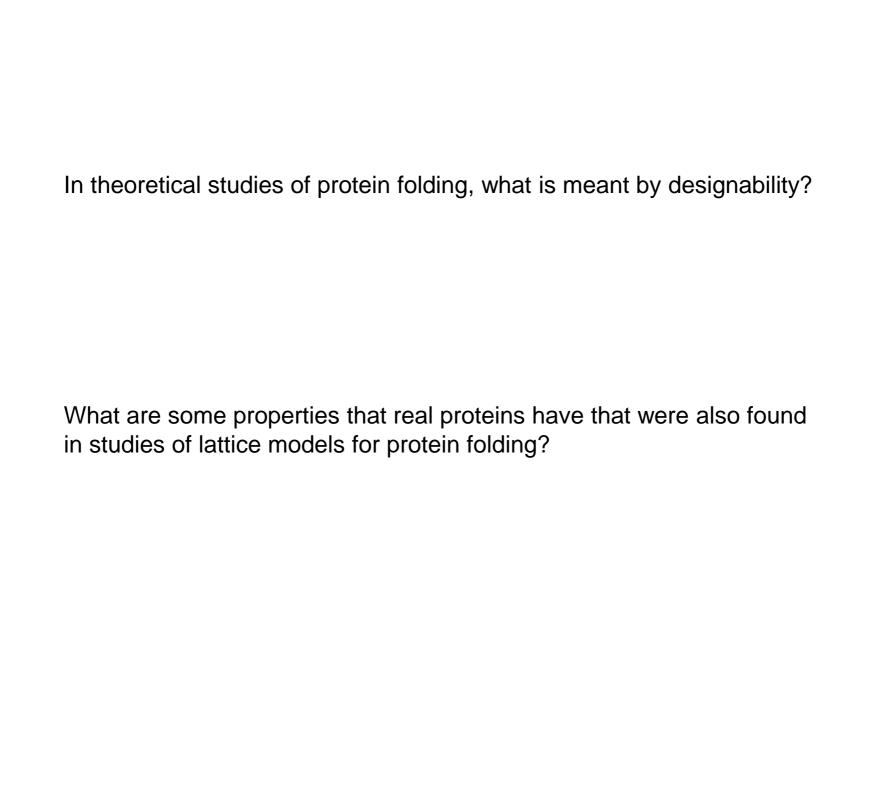
- including degeneracy:

Random polymer:  $\langle R \rangle = ?$   $\langle R^2 \rangle = ?$ 

Draw all the structures that the following sequence can form (only consider stacks) GCCGGCC

Which structure has the lowest energy?

How would you evaluate the probability of each structure at a given T?



We showed that the probability distribution of end-to-end displacements for a random polymer in 1D was a Gaussian

$$P(R) = \frac{1}{\sqrt{2\pi\sigma^2}} \exp(-\frac{R^2}{2\sigma^2})$$

where  $\sigma^2 = N \ a^2$ . What is the probability of the polymer forming a loop where the end-to-end distance falls within a distance of  $R \le \delta$ ? Use the approximation that  $\delta \ll 1$ .