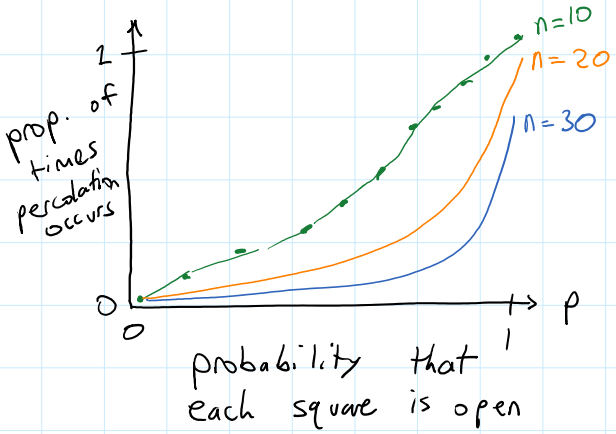
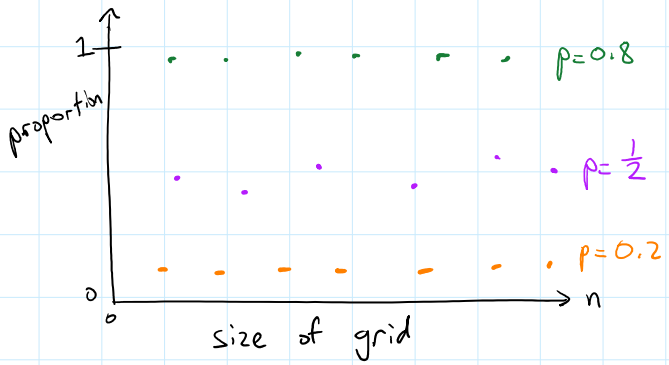
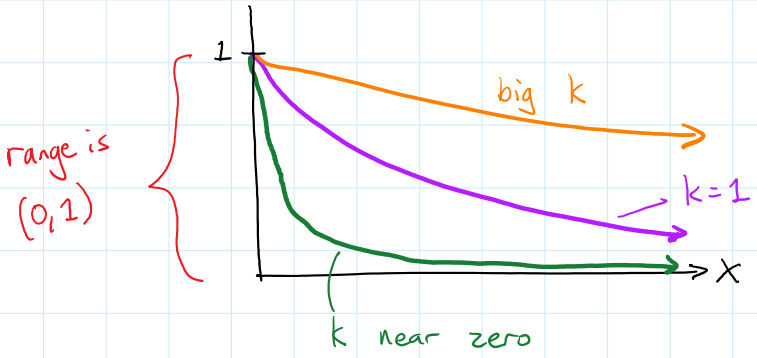
Percolation Project





`np.linspace( ... )` ← create list of evenly-spaced decimal numbers

WARM-UP: What is the shape of $e^{-x/k}$ for $x>0$, $k>0$?



PROBLEM: Suppose we have a function $f: \Omega \to \mathbb{R}$.

The domain Ω is high-dimensional and complicated.

We want to find $x \in \Omega$ that minimizes $f(x)$.

We can't draw a graph of f or use calculus.

How can we find the minimum of f?

An approximate minimum might be sufficient.

IDEA: Use a random walk on the domain Ω.

Start at a random location $x \in \Omega$.

At each time step, the walk proposes a move to a nearby location.

If the proposed move decreases f, then the walk makes the move.

If the proposed move increases f, then the walk makes the move with a probability that decreases over time.

Ideally, the random walk will become trapped at or near the global min.

This algorithm is called: Simulated Annealing

Markov Chain Monte Carlo (MCMC) method