Homework #6 due Friday April 29.

Note: I (MTH) will be gone on Monday, Apr 25 and Wed 27. hence the remote due date and the Friday due date. You can email your answers to me any time that Friday.

This is the first part of a two part homework. Let's return to Jack's data. I've cleaned some things up (and probably introduced several serious errors, but we aren't going to worry about that for the sake of this exercise).

The model:
This version of the data has the location information in addition to the height. There are many locations, but suppose that we are just interested in whether the height of foraging is related to the whether or not the bird just changed locations.

We could think of the data as having a discrete state space of

1. `High, Same location as previous obs.`
2. `Medium, Same location as previous obs.`
3. `Low, Same location as previous obs.`
4. `High, Different location as previous obs.`
5. `Medium, Different location as previous obs.`
6. `Low, Different location as previous obs.`

The data is in the form of starting position, waiting time, ending position for each movement.

The assignment:
Write an MCMC sampler that will approximate the posterior distrubtion for a model that treats these data as observation from first-order Markov chain. You can use a sliding window proposal, but you must also use at least one "new" proposal that you design. Turn in:

1. Describe the parameters of the model.
2. The prior probability distributions used for the priors.
3. posterior mean and 95% credible intervals for the model parameters.
4. Summaries of convergence diagnostics for your runs.
5. email your code to me.

Resources:
A template is at `http://phylo.bio.ku.edu/slides/hw6/template.py`

The data is at `http://phylo.bio.ku.edu/slides/hw6/cleaned.tsv`

If you are curious, a pre-processing script is at `http://phylo.bio.ku.edu/slides/hw6/pre-processed.py` (although I also used some `sed` commands to get rid of "PERCHED" data points and missing location data points).