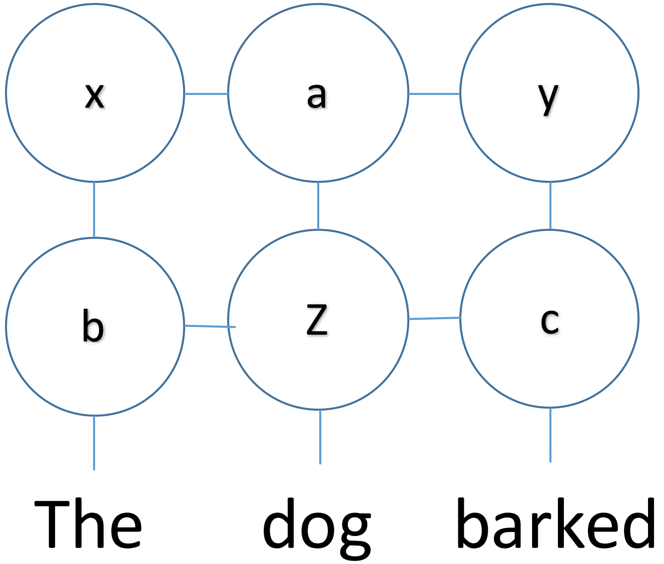

A 2-layer model (consider the case, as in class, of sampling Z conditioned on its Markov blanket of a, b, c, and dog).

This is the 2-layer case you should use in the assignment (question 3), with
_transitionTemplate =
new boolean [] {{true, false}, {false, true}};
and
_productionTemplate = new boolean [] {false, true};

One more note! Ignore any entries in mbc.sbts that are null.

The model has special structure: the potential functions are defined over only the cliques of size 2, even if larger cliques exist in the graph (although in the graph on the left, the max clique size happens to be two). *The MarkovBlanketContainer you are given in the code holds the potential functions.* So in particular: mbc.sbts[j].get(i) = $\phi_j(Z=i, X_j = x_j)$ for each variable setting x_j in the Markov blanket.

We want you to smooth the potential functions (which are counts) using the global variable _alpha. The strength of the smoothing depends on the number of distinct values for Z. So assume:

$$P(X_j = a|Z) = \frac{\phi_j(Z, X_j = a) + \alpha/|Val(Z)|}{\alpha + \#(Z)}$$

Where #(Z) are the marginal counts for variable Z, which you can find in _marginal[layer]. |Val(Z)| you can find in _NUMSTATES[layer]. If you want P(X_j, Z) with no conditioning, use the numerator only.
Final note: when “sub” is true in the sampleZ function you’re writing, when Z=curZ (the current value in the sampler) you must subtract its contribution (1.0) to the count in the numerator and denominator.