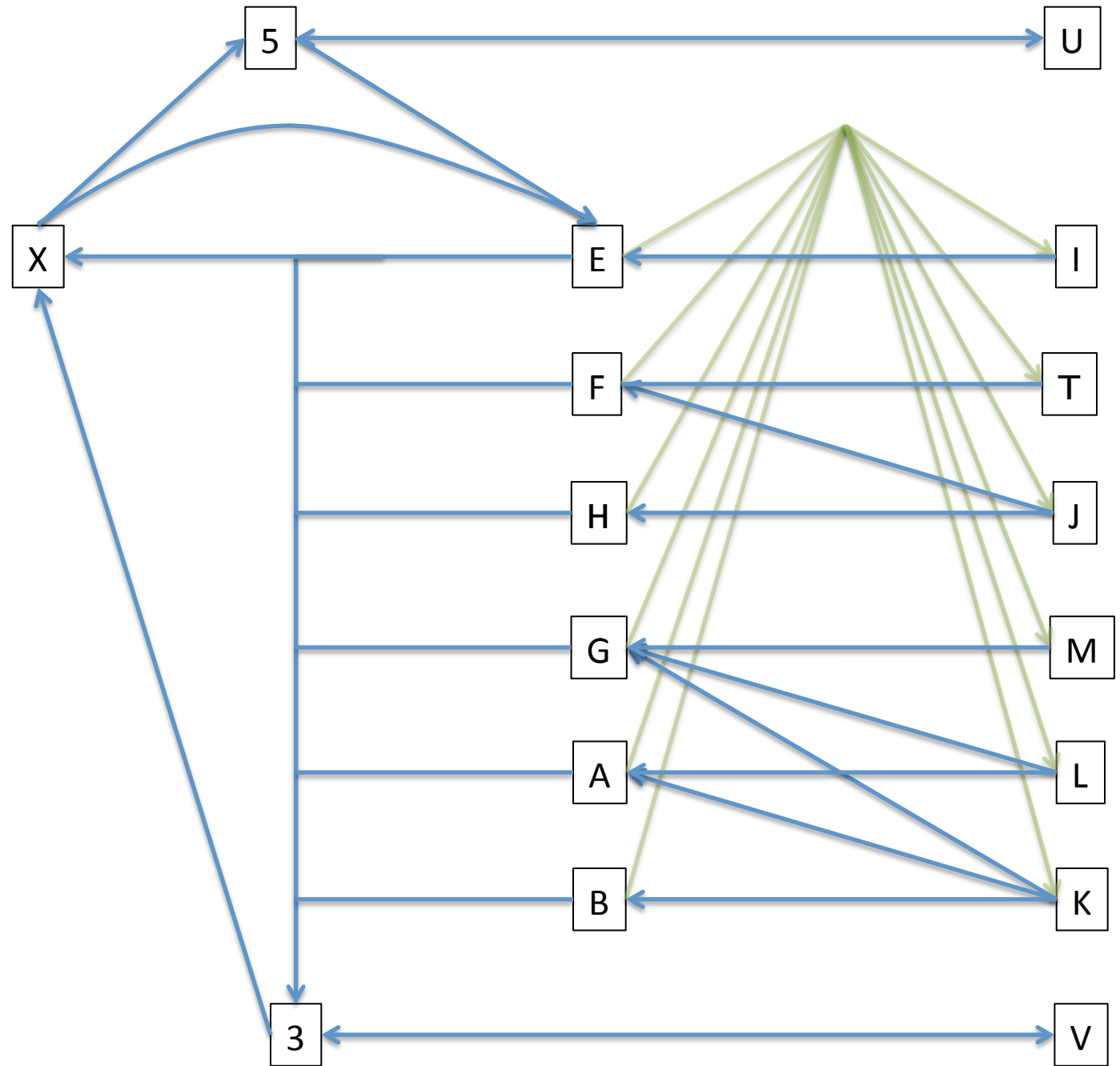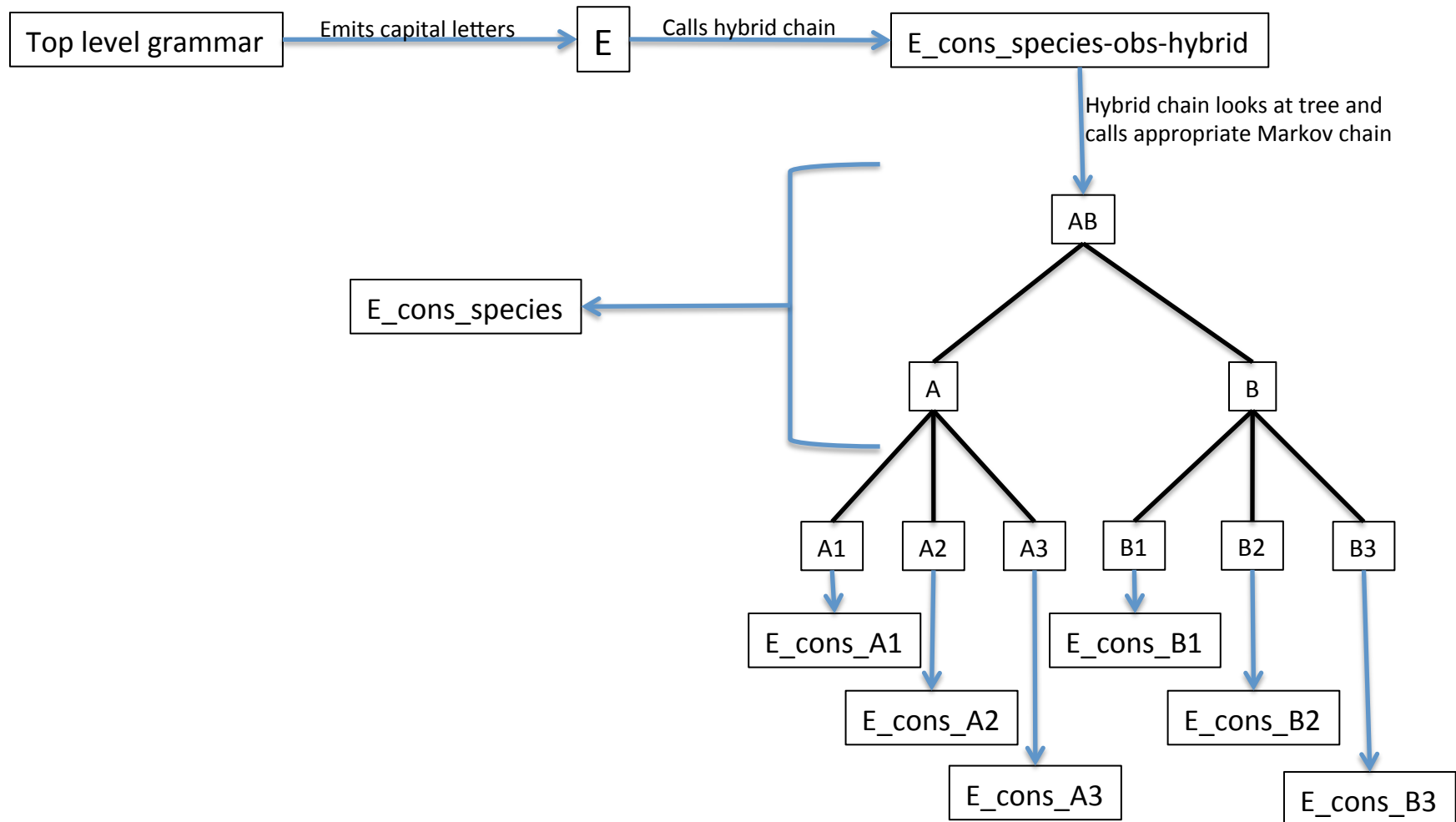Top level grammar. While all transitions are "allowed." Those which are not shown in this diagram occur with probability 0.
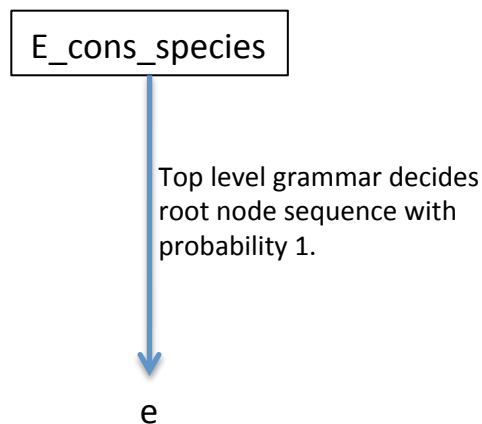
Hybrid Chains.

When a symbol is emitted by the top level grammar it calls the corresponding hybrid chain. For each part of the tree the hybrid chain calls the appropriate Markov chain.
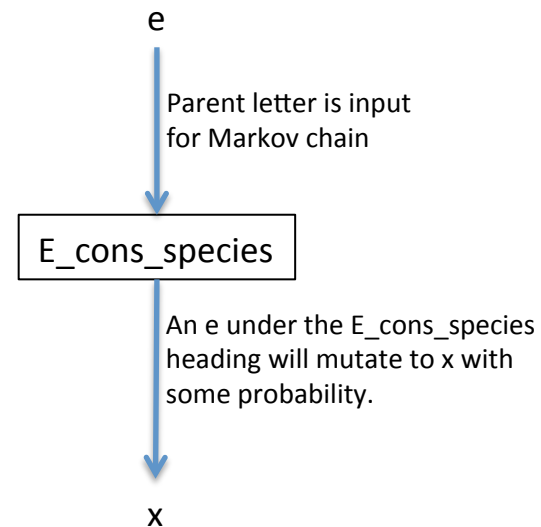
Markov chains.

Markov chains mutate the sequence across the tree, using initial probabilities and mutation rate matrices.

If a Markov chain is called on the root node it decides the character based on initial parameters.

If a Markov chain is called on a non-root nodes it decides the character based on the character of the parent node and a mutation rate matrix.

E_cons_species

Top level grammar decides root node sequence with probability 1.

e

e

Parent letter is input for Markov chain

E_cons_species

An e under the E_cons_species heading will mutate to x with some probability.

x

The result of each top level emission is an alignment column. When we combine all the emission we get a Stockholm format alignment.