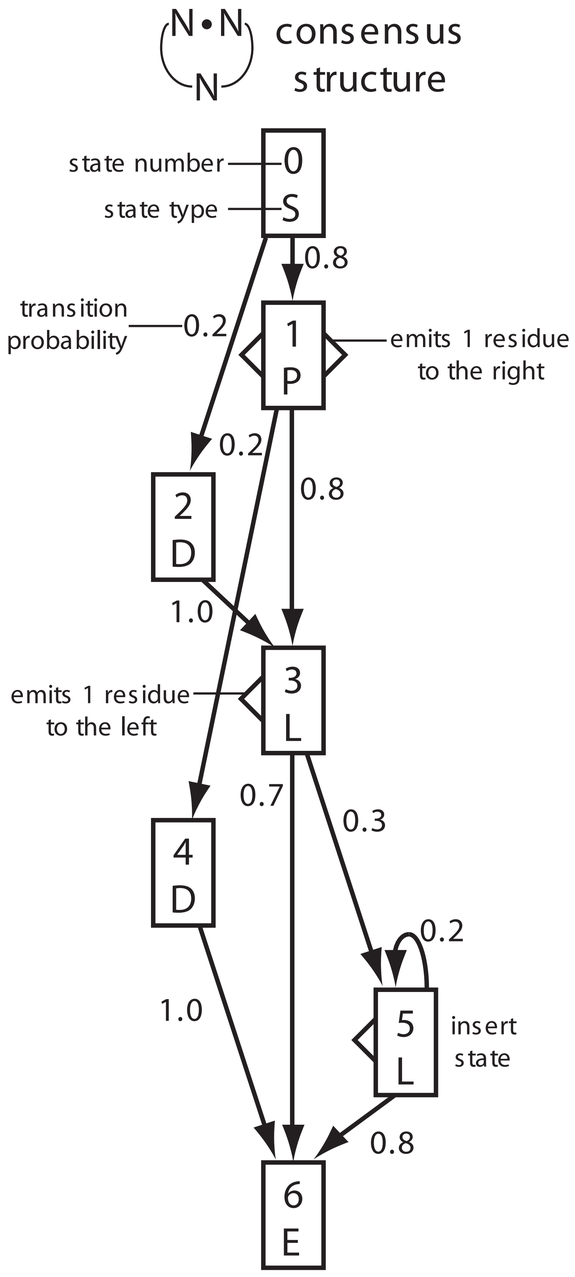
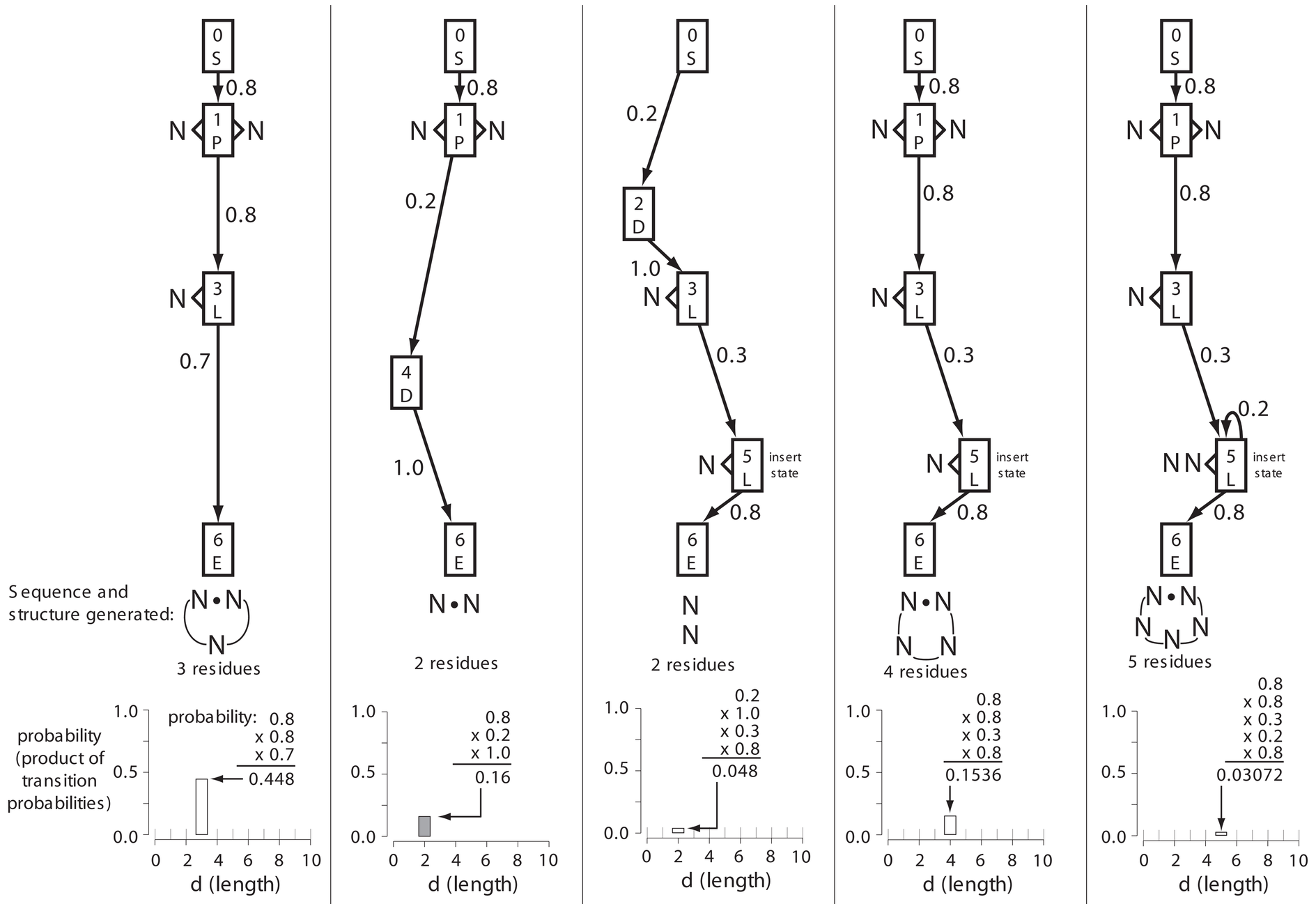
(A) A simplified, traceable CM:



(B) Sequences generated from the CM with different probabilities:



(C) BOTTOM UP band calculation algorithm:

For all states v and lengths d, calculate the probability of generating a sequence of length d from v ($\gamma_v(d)$).

For v = 6 to 0; d = 0 to 10:

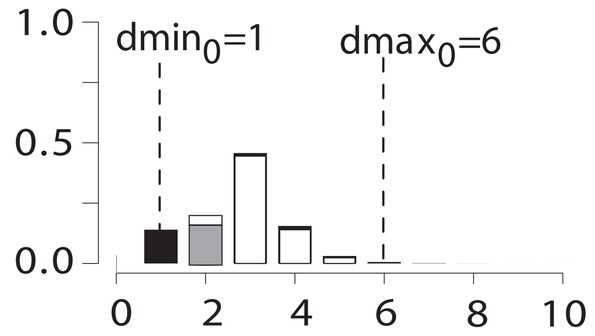
			transition probabilities	# residues emitted	# possible transitions	d (length)
step 1	6 E	$\gamma_6(0) = 1.0$ special case (end state)				$\gamma_6(d)$
step 2	5 L	$\gamma_5(d) = 0.2 * \gamma_5(d-1) + 0.8 * \gamma_6(d-1)$	0.2, 0.8	1	2	$\gamma_5(d)$
step 3	4 D	$\gamma_4(d) = 1.0 * \gamma_5(d-0)$	1.0	0	1	$\gamma_4(d)$
step 4	3 L	$\gamma_3(d) = 0.3 * \gamma_5(d-1) + 0.7 * \gamma_6(d-1)$	0.3, 0.7	1	2	$\gamma_3(d)$
step 5	2 D	$\gamma_2(d) = 1.0 * \gamma_3(d-0)$	1.0	0	1	$\gamma_2(d)$
step 6	1 P	$\gamma_1(d) = 0.8 * \gamma_3(d-2) + 0.2 * \gamma_4(d-2)$	0.8, 0.2	2	2	$\gamma_1(d)$
step 7	0 S	$\gamma_0(d) = 0.8 * \gamma_1(d-0) + 0.2 * \gamma_2(d-0)$	0.8, 0.2	0	2	$\gamma_0(d)$

final step

Define band (dmin and dmax) on each state (only shown for state 0), such that:

$$\sum_{d=dmin}^{dmax} \gamma_v(d) >= (1\text{-bandp})$$

bandp is 0.01 for this example
(in practice bandp <= 10^{-6})



(D) Bands for a tRNA CM: