

Algorithms in Bioinformatics 2, SoSe2007
Assignment sheet # 12

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1 Phylogeography of dusky dolphins (10 points)

Assume that the conditions that determine the activity of a certain Gene G are under investigation. For simplicity, it is assumed that the gene is either expressed (true) or not (false). The expression of the G is influenced by the presence of an Enhancer protein E and an Repressor protein R . If the Enhancer is expressed ($e = true$), and the Repressor is not ($r = false$) than G is expressed. In case that E is not expressed, but R is, then G is not expressed. Note, that if ($e = false$, $r = false$) or ($e = true$, $r = true$) G is only expressed at a certain (conditional) probability.

Furthermore, there exist activating stimuli A and C that can activate the expression of E and R , respectively; and there might be an inhibitory stimulus B that is expected to have a downregulating effect on the expression of E .

Draw the model of this gene regulatory network as a Bayesian network.

Give the equation for the computation of the marginal probability of G and reduce it by Variable Elimination as discussed in the lecture. (Note that the CPDs have to be regarded as fixed but ambiguous values).

Assignments due: **Monday, July 16, 10h**