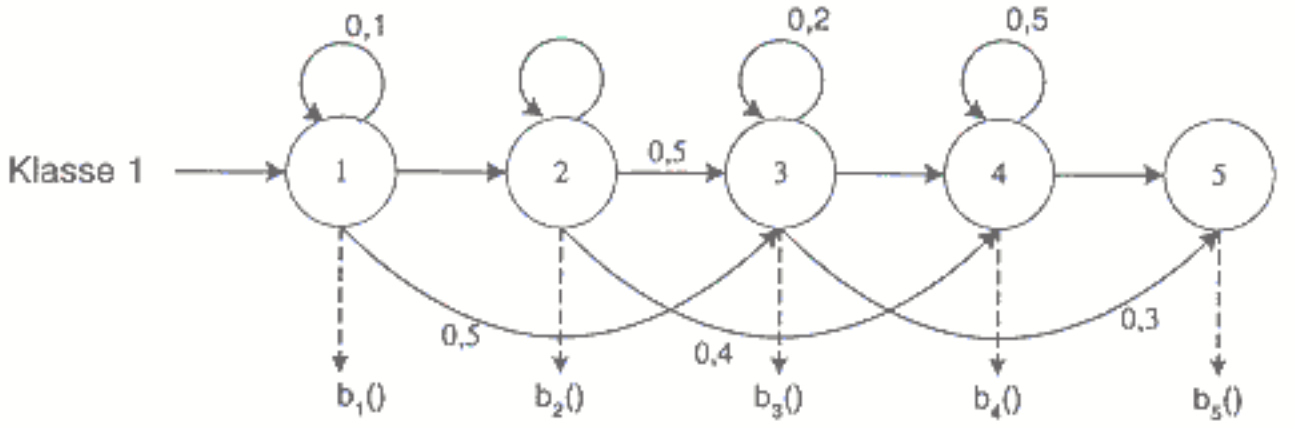
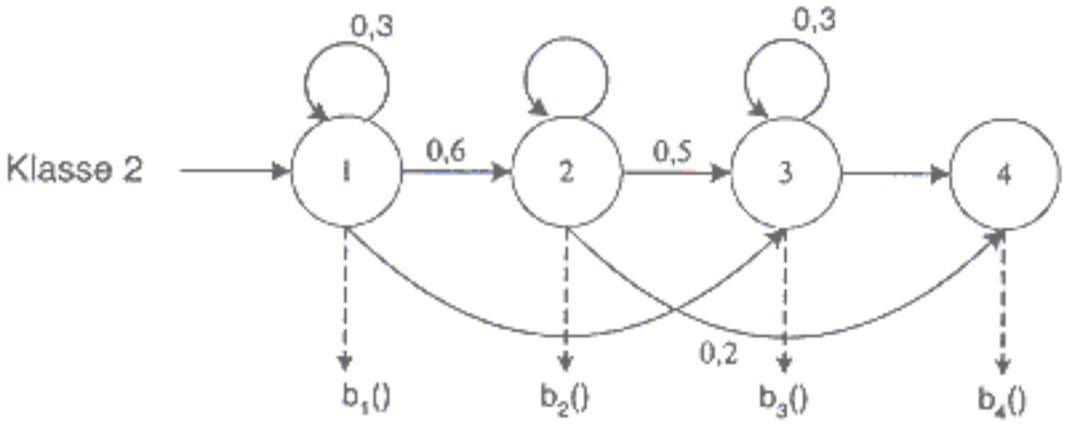
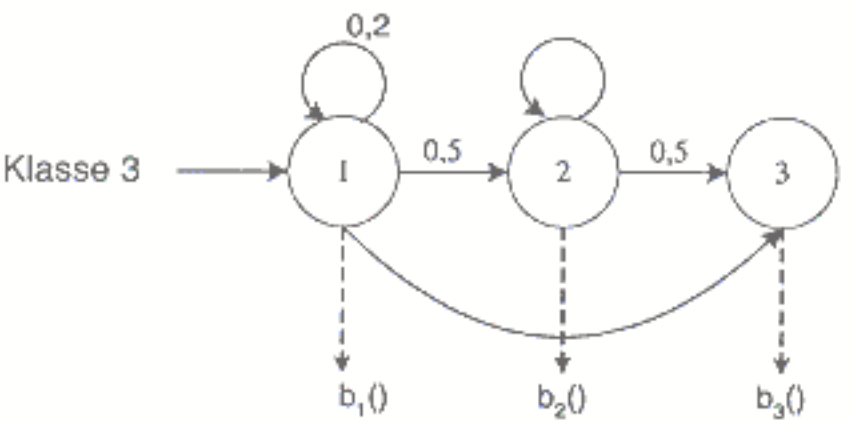
Given are three Hidden Markov Models:







Emission probabilities are given by:

$$b_i(o) = \frac{1}{\sqrt{2\pi}\,\sigma_i} \cdot e^{-\frac{1}{2}\left(\frac{o-\mu_i}{\sigma_i}\right)^2} \quad \text{with:}$$

class 1:		class 2:		class 3:	
$\mu_1 = 2$	$\sigma_1 = 2$	$\mu_1 = 1$	$\sigma_1 = 1$	$\mu_1 = 0$	$\sigma_1 = 1$
$\mu_2 = -2$	$\sigma_2 = 1$	$\mu_2 = -1$	$\sigma_2 = 2$	$\mu_2 = 0$	$\sigma_2 = 3$
$\mu_3 = 0$	$\sigma_3 = 1$	$\mu_3 = -1$	$\sigma_3 = 3$	$\mu_3 = 1$	$\sigma_3 = 2$
$\mu_4 = 1$	$\sigma_4 = 3$	$\mu_4 = 0$	$\sigma_4 = 2$		
$\mu_5 = 0$	$\sigma_5 = 2$				

The last observed sequence has to be at the last state of the model! We have $\pi_1 = 1$

a) Calculate the missing transition probabilities.

b) Given a observation sequence $O = \{o_1, o_2, o_3\} = \{1.1; -0.9; 0.3\}$. What are the possible solution paths of the HMMs?

c) Calculate $P(O|q,\lambda)$ for the possible paths.