Decoding in HMM

$$p(\mathbf{x}, \mathbf{y}) = \prod_{t=1}^{T} p(y_t|y_{t-1})p(x_t|y_t)$$

Transition probabilities

Output probabilities

Decoding problem:

What is the most probable sequence of hidden states?

$$\mathbf{y} = \text{argmax}_{\mathbf{y}}\, p(\mathbf{y}|\mathbf{x}) = \text{argmax}_{\mathbf{y}}\, p(\mathbf{x}, \mathbf{y})$$

Solve this problem efficiently using dynamic programming!