The log-loss framework

- Algorithm A predicts a sequence $c^1, c^2, \ldots, c^T$ over alphabet $\Sigma = \{1, 2, \ldots, k\}$
- The prediction for the c^tth is a distribution over Σ: $\mathbf{p}_A^t = \langle p_A^t(1), p_A^t(2), \ldots, p_A^t(k) \rangle$
- When c^t is revealed, the loss we suffer is $-\log p_A^t(c^t)$
- The cumulative log loss, which we wish to minimize, is $L_A{}^T = -\sum_{t=1}^{T} \log p_A^t(c^t)$