

# CLRS 15-5

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Thanks, Manfred Warmuth [1]. Let  $S[i, j]$  signify whether there is a path  $v_0 \dots v_i$  labeled  $\sigma_0 \dots \sigma_i$ ; then:

$$S[i, j] = \bigvee_{k: (v_k, v_i) \in E \wedge \sigma(v_k, v_i) = \sigma_j} S(k, j-1) \quad (1)$$

$$S[0, 0] = 1 \quad (2)$$

$$1 \leq i \leq n-1 \rightarrow S[i, 0] = 0 \quad (3)$$

For max probabilities, on the other hand:

$$S[i, j] = \max_{k: (v_k, v_i) \in E \wedge \sigma(v_k, v_i) = \sigma_j} p(v_k, v_k) \cdot S(k, j-1) \quad (4)$$

$$S[0, 0] = 1 \quad (5)$$

$$1 \leq i \leq n-1 \rightarrow S[i, 0] = 0 \quad (6)$$

Let  $R[i, j]$  keep track of which edges produce the maximum.

## References

- [1] Manfred Warmuth. CMPS 102 Solutions to Homework 6. <http://www.cse.ucsc.edu/classes/cmps102/Fall105/hw/hw6sol.pdf>.