

$$S = A \subset CGTGA$$

$$A \left\{ \begin{aligned} \pi(1, H) &= \max \{ \pi(0, H) \cdot q(H|H) \cdot e(A|H), \pi(0, L) \cdot q(H|L) \cdot e(A|H) \} = \\ &= 1 \cdot 0.5 \cdot 0.2 = 0.1 \end{aligned} \right.$$

$$\circ \left\{ \begin{aligned} \pi(1, L) &= \max \{ \pi(0, H) \cdot q(L|H) \cdot e(A|L), \pi(0, L) \cdot q(L|L) \cdot e(A|L) \} = \\ &= 1 \cdot 0.5 \cdot 0.3 = 0.15 \end{aligned} \right.$$

$$\left\{ \begin{aligned} \pi(2, H) &= \max \{ \pi(1, H) \cdot q(H|H) \cdot e(C|H), \pi(1, L) \cdot q(H|L) \cdot e(C|H) \} = \\ &= \max \{ 0.1 \cdot 0.5 \cdot 0.3, 0.15 \cdot 0.5 \cdot 0.3 \} = 0.0225 \end{aligned} \right.$$

$$\pi(2, L) = \max \{ \pi(1, H) \cdot q(L|H) \cdot e(C|L), \pi(1, L) \cdot q(L|L) \cdot e(C|L) \} = \\ = \max \{ 0.1 \cdot 0.5 \cdot 0.2, 0.15 \cdot 0.6 \cdot 0.2 \} = 0.018$$

$$\left\{ \begin{aligned} \pi(3, H) &= \max \{ \pi(2, H) \cdot q(H|H) \cdot e(C|H), \pi(2, L) \cdot q(H|L) \cdot e(C|H) \} = \\ &= \max \{ 0.00225 \cdot 0.5 \cdot 0.3, 0.018 \cdot 0.5 \cdot 0.3 \} = \max \{ 0.0003375, 0.0018 \} = 0.0027 \end{aligned} \right.$$

$$\pi(3, L) = \max \{ \pi(2, H) \cdot q(L|H) \cdot e(C|L), \pi(2, L) \cdot q(L|L) \cdot e(C|L) \} = \\ = \max \{ 0.00225 \cdot 0.5 \cdot 0.2, 0.018 \cdot 0.6 \cdot 0.2 \} = 0.00216$$

$$\left\{ \begin{aligned} \pi(4, H) &= \max \{ \pi(3, H) \cdot q(H|H) \cdot e(G|H), \pi(3, L) \cdot q(H|L) \cdot e(G|H) \} = \\ &= \max \{ 0.0027 \cdot 0.5 \cdot 0.2, 0.00216 \cdot 0.4 \cdot 0.2 \} = 0.00027 \end{aligned} \right.$$

$$\pi(4, L) = \max \{ \pi(3, H) \cdot q(L|H) \cdot e(G|L), \pi(3, L) \cdot q(L|L) \cdot e(G|L) \} = \\ = \max \{ 0.0027 \cdot 0.4 \cdot 0.2, 0.00216 \cdot 0.6 \cdot 0.2 \} = 0.000274$$

$$T \left\{ \begin{aligned} \pi(5, H) &= \max \{ \pi(4, H) \cdot q(H|H) \cdot e(T|H), \pi(4, L) \cdot q(H|L) \cdot e(T|H) \} = \\ &= \max \{ 0.00027 \cdot 0.5 \cdot 0.2, 0.00027 \cdot 0.4 \cdot 0.2 \} = 0.000027 \end{aligned} \right.$$

$$\pi(5, L) = \max \{ \pi(4, H) \cdot q(L|H) \cdot e(T|L), \pi(4, L) \cdot q(L|L) \cdot e(T|L) \} = \\ = \max \{ 0.00027 \cdot 0.4 \cdot 0.3, 0.00027 \cdot 0.6 \cdot 0.3 \} = 0.000047$$

$$\left\{ \begin{aligned} \pi(6, H) &= \max \{ \pi(5, H) \cdot q(H|H) \cdot e(G|H), \pi(5, L) \cdot q(H|L) \cdot e(G|H) \} = \\ &= \max \{ 0.000027 \cdot 0.5 \cdot 0.3, 0.000047 \cdot 0.4 \cdot 0.3 \} = 5.4 \cdot 10^{-6} \end{aligned} \right.$$

$$\left\{ \begin{aligned} \pi(6, L) &= \max \{ \pi(5, H) \cdot q(L|H) \cdot e(G|L), \pi(5, L) \cdot q(L|L) \cdot e(G|L) \} = \\ &= \max \{ 0.000027 \cdot 0.5 \cdot 0.2, 0.000047 \cdot 0.6 \cdot 0.2 \} = 5.4 \cdot 10^{-6} \end{aligned} \right.$$

$$C \left\{ \begin{aligned} \pi(7,H) &= \max \{ \pi(6,H) \cdot q(H|H) \cdot e(C|H), \pi(6,L) \cdot q(H|L) \cdot e(C|H) \} \\ &= \max \{ 5.4 \cdot 10^{-6} \cdot 0.5 \cdot 0.3, 5.4 \cdot 10^{-6} \cdot 0.4 \cdot 0.3 \} = 8.1 \cdot 10^{-7} \end{aligned} \right.$$

$$\pi(7,L) = \max \{ \pi(6,H) \cdot q(L|H) \cdot e(C|L), \pi(6,L) \cdot q(L|L) \cdot e(C|L) \}$$

$$= \max \{ 5.4 \cdot 10^{-6} \cdot 0.5 \cdot 0.2, 5.4 \cdot 10^{-6} \cdot 0.6 \cdot 0.2 \} = 6.48 \cdot 10^{-7}$$

$$A \left\{ \begin{aligned} \pi(8,H) &= \max \{ \pi(7,H) \cdot q(H|H) \cdot e(A|H), \pi(7,L) \cdot q(H|L) \cdot e(A|H) \} \\ &= \max \{ 8.1 \cdot 10^{-7} \cdot 0.5 \cdot 0.2, 6.48 \cdot 10^{-7} \cdot 0.4 \cdot 0.2 \} = 8.1 \cdot 10^{-8} \end{aligned} \right.$$

$$\pi(8,L) = \max \{ \pi(7,H) \cdot q(L|H) \cdot e(A|L), \pi(7,L) \cdot q(L|L) \cdot e(A|L) \}$$

$$= \max \{ 8.1 \cdot 10^{-7} \cdot 0.5 \cdot 0.2, 6.48 \cdot 10^{-7} \cdot 0.6 \cdot 0.2 \} = 8.1 \cdot 10^{-8}$$

הסתברות של 1/2 לכל צד, ולכן
הסתברות של 1/4 לכל צד

H L H H H L H H H

אם (1) נבדל

H L H H H L L H L

(2) נבדל

(2)

(2) W, w is a word in Σ^n with n letters. $g(w, t, u, v)$ is the probability of a word w being generated by the grammar G with parameters t, u, v . $e(x, s)$ is the probability of a word x being generated by the grammar G with parameters t, u, v . $\max_{x \in V} \{e(x, s)\}$ is the maximum probability of a word x being generated by the grammar G with parameters t, u, v .

Input: An integer n , parameters $g(w, t, u, v)$ and $e(x, s)$

Define K to be set of all possible bags, $V = \text{all words}$, $K = \{k_1, k_2, \dots, k_n\}$, $k_i = \{1, 2, \dots, n\}$

Initialization: Set $\pi(0, k, x, s) = 1$

$$\forall k \in \Sigma^n, \quad t \in K_{k-2}, \quad u \in K_{k-1}, \quad v \in K_k$$

$$\pi(k, t, u, v) = \max_{w \in K_{k-3}} \{ \pi(k-1, w, t, u) \cdot g(v, w, t, u) \cdot \max_{x \in V} \{e(x, s)\} \}$$

$$\text{return } \max_{t \in K_{k-2}, u \in K_{k-1}, v \in K_k} \{ \pi(n, t, u, v) \cdot g(\text{stop}, t, u, v) \}$$