CS5340-A4

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1 HMMs and Tagging

(a)

Initial (Count)	
N	3
V	0

Initial (Probability)	
N	1
V	0

(b) b

Transition (Count)

	N	V	STOP
$y_{i-1} = N$	2	1	1
$y_{i-1} = V$	0	0	1

Transition (Probability)

	N	V	STOP
$y_{i-1} = N$	0.5	0.25	0.25
$y_{i-1} = V$	0	0	1

(c) He/N raises/V my/N purses/N.
Explanation: raises has tag V and my has tag N, the transition probability from V to N is 0. So the sentence above has zero probability under this HMM.

(d) $Score_1(N)$ = P(N)P(he|N) = -1 + -2 = -3
$Score_1(V)$ = P(V)P(he|V) = -1 + -7 = -8

$$Score_2(N) = \max \begin{cases} P(\text{N—N})P(raises—N)\text{Score}_1(N) = \text{-1 + -3 + -3 = -7} \\ P(\text{N—V})P(raises—N)\text{Score}_1(V) = \text{-2 + -3 + -8 = -13} \end{cases}$$
= -7

$$Score_2(V) = \max \begin{cases} P(\text{V—N})P(raises—V)\text{Score}_1(N) = \text{-1.5 + -2 + -3 = -6.5} \\ P(\text{V—V})P(raises—V)\text{Score}_1(V) = \text{-2.5 + -2 + -8 = -12.5} \end{cases}$$
= -6.5

$$Score_3(N) = \max \begin{cases} P(\text{N—N})P(purses—N)\text{Score}_2(N) = \text{-1 + -2 + -7 = -10} \\ P(\text{N—V})P(purses—N)\text{Score}_2(V) = \text{-2 + -2 + -6.5 = -10.5} \end{cases}$$
= -10

$$Score_3(V) = \max \begin{cases} P(\text{V—N})P(purses—V)\text{Score}_2(N) = \text{-1.5 + -4 + -7 = -12.5} \\ P(\text{V—V})P(purses—V)\text{Score}_2(V) = \text{-2.5 + -4 + -6.5 = -13} \end{cases}$$
= -12.5

sequence is NNN

(e)

2

3

4