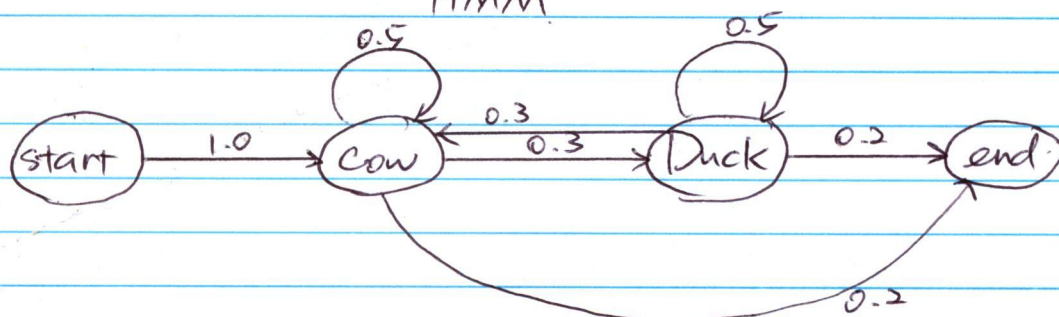


NLP Assignment #3. Question 1.

a) Based on Transition probabilities:

HMM



Emission probabilities:

$$P(\text{moo} | \text{Cow}) = 0.9$$

$$P(\text{hello} | \text{Cow}) = 0.1$$

$$P(\text{quack} | \text{Duck}) = 0.6$$

$$P(\text{hello} | \text{Duck}) = 0.4$$

'moo hello quack'

Viterbi Probabilities

	0	1	2	3	4
start	1	0	0	0	0
Cow	0	1×0.9	$0.9 \times 0.5 \times 0.1$	$0.045 \times 0.5 \times 0$ $0.108 \times 0.3 \times 0$	
Duck	0	0	$0.9 \times 0.3 \times 0.4$	$0.045 \times 0.3 \times 0.6$ $0.108 \times 0.9 \times 0.6$	
end	0	0	0		0.0081×0.2 0.0324×0.2

Decode:

The probability is $0.0324 \times 0.2 = 0.00648$

moo = Cow

hello = Duck

quack = Duck.

b) YES. Cow \rightarrow Cow \rightarrow Duck.

Total probability of emitting this sentence

$$0.00648 + 0.00162 = 0.0081$$