

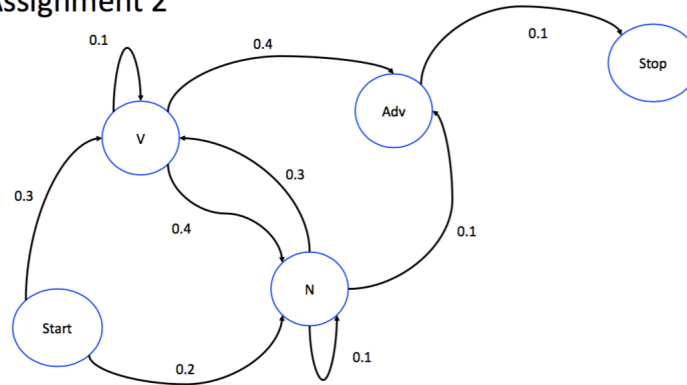
# Homework 2 - Viterbi Decoding

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## 1 Problem

### Assignment 2



For the above bigram HMM POS tagger, calculate the Viterbi Matrix for the sentence: "learning changes throughly" using the following emission probabilities:

$$P(\text{learning} - V) = 0.003$$

$$P(\text{changes} - V) = 0.004$$

$$P(\text{throughly} - Adv) = 0.002$$

$$P(\text{learning} - N) = 0.001$$

$$P(\text{changes} - N) = 0.003$$

## 2 Viterbi Matrix

| X      | 0 | 1      | 2       | 3        | 4        |
|--------|---|--------|---------|----------|----------|
| Start  | 1 | 0      | 0       | 0        | 0        |
| Verb   | 0 | 9.0e-4 | 3.6e-7  | 0        | 0        |
| Noun   | 0 | 2.0e-4 | 1.08e-6 | 0        | 0        |
| Adverb | 0 | 0      | 0       | 2.88e-10 | 0        |
| End    | 0 | 0      | 0       | 0        | 2.88e-11 |

## 3 Output

```
In [152]: runfile('/Users/alexandrapawlak/Documents/UW/UWT/TCSS590/  
hw3.py', wdir='/Users/alexandrapawlak/Documents/UW/UWT/TCSS590')
```

```
      Start learning changes thoroughly      End  
Start 1.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00  
Noun  0.00E+00 2.00E-04 1.08E-06 0.00E+00 0.00E+00  
Verb  0.00E+00 9.00E-04 3.60E-07 0.00E+00 0.00E+00  
Adverb 0.00E+00 0.00E+00 0.00E+00 2.88E-10 0.00E+00  
End    0.00E+00 0.00E+00 0.00E+00 0.00E+00 2.88E-11
```

The probability of "learning changes thoroughly" is: 2.88E-11