50.007 Machine Learning Homework 4

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Q1.

Transition Table,

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| u/v | X | Y | Z | STOP |
| X | 0 | 0.4 | 0.4 | 0.2 |
| Y | 0.2 | 0 | 0.2 | 0.6 |
| Z | 0.4 | 0.6 | 0 | 0 |
| START | 0.5 | 0 | 0.5 | 0 |

Emission Table,

|  |  |  |  |
| --- | --- | --- | --- |
| u/o | A | B | C |
| X | 0.4 | 0.6 | 0 |
| Y | 0.2 | 0 | 0.8 |
| Z | 0.2 | 0.6 | 0.2 |

Q2.

START, Z, Y ,STOP

From the emission table above, observation b is most likely to have the state X or Z. Observation c is most likely to have the state Y. From the transition table,

Hence it is most likely for b to have the state Z, and c to have the state Y.

Q3.

Q4.

Complexity of algorithm:

The overall time complexity is.

Each sentence has length n, and each word in the sentence has |T| possible states. Computing the forward and backwards algorithm involves |T| steps.