Set A

CSE440: Natural Language Processing II

Date: May 5, 2025

Name: Student ID: Section:

This is an MCQ quiz. Each question is worth 1. Write your answers serially on the other side.

Questions:

1. **Which assumption does the Markov property make?**
   - **A. Future states depend on all previous states**
   - **B. Future states are independent of the past**
   - **C. Future states depend only on the current state**
   - **D. Future states depend on observed values**
2. **In HMMs, the emission probability refers to:**
   - **A.Transition between hidden states**
   - **B. Probability of a hidden state**
   - **C. Probability of an observation given a state**
   - **D. Observing all states**
3. **What does the first row of the transition matrix stand for?**
   - **A. Probabilities of the words being the first word of a sentence**
   - **B. Probabilities of the tags being assigned to the first word of a sentence**
   - **C. Probabilities of the words being assigned to <s> tag**
   - **D. Probabilities of the tag being assigned to the last word of the previous sentence**
4. **HMMs assume (remember, observations = words, states = PoS tags):**
   - **A. Observations are not independent**
   - **B. Observations are conditionally dependent on states**
   - **C. States are fully observable**
   - **D. No temporal dependencies**
5. **The complexity of the Viterbi algorithm is (n = sentence length, T = tag count):**
   - **A. $O(n^3)$**
   - **B. $O(n^2T)$**
   - **C. O(nT)**
   - **D. $O(T^2n)$**
6. **Which is not a valid application of HMMs?**
   - **A. Speech recognition**
   - **B. Part-of-speech tagging**
   - **C. Image classification**
   - **D. Named Entity Recognition**
7. **Viterbi's backpointer table is used for:**
   - **A. Estimating likelihood**
   - **B. Parameter training**
   - **C. Backtracking most probable path**

D. Building transition probabilities

8. **Which parameter is not needed for Viterbi decoding?**
   A. Initial state probabilities
   B. Transition matrix
   C. Observation sequence
   D. Feature vectors
9. **Which of these is common to MEMMs and HMMs?**
   A. Use of latent variables
   B. Markov assumption
   C. Generative modeling
   D. No features used
10. **MEMMs solve which of the following problems better than HMMs?**
   A. Long-term dependencies
   B. Unknown words during testing
   C. Posterior estimation
   D. Efficient training

Answers:

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.