

# (Ungraded) Pop Quiz

CS 753 Automatic Speech Recognition

July 31, 2017

Name: \_\_\_\_\_ (Optional)

**Spelling correction system:** A spelling correction system converts misspelled strings into valid spellings of words. For example, the input letter sequence “dac” could be mapped to the English words “dab” or “dad”. This problem deals with correcting spellings of isolated words using finite state machines.

(a) Let  $A$  be the input sequence of letters (i.e. the misspelling) represented as a finite-state acceptor. The misspellings are defined over the alphabet  $\{a, b, c, d, e\}$ . Design an edit distance transducer  $E$  such that  $A \circ E$  produces exactly all letter sequences which are at an edit distance of at most 1 from the input sequence (where the edit operations are substitutions, insertions and deletions). Set each of the edit costs to be 1.

**Ans:**

(b) The composed machine  $A \circ E$  can generate spellings that do not necessarily correspond to valid English words. Design a finite-state machine  $T$  such that  $A \circ E \circ T$  only produces valid English words. For the purpose of this exercise, you can assume the only valid English words come from  $V = \{\text{"bad"}, \text{"cab"}, \text{"dad"}, \text{"bead"}, \text{"cede"}, \text{"dead"}, \text{"added"}, \text{"accede"}, \text{"decade"}\}$ .

**Ans:**