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ECE 473 HW8 Written

Problem 0

a.

States	Single word unigrams; a single letter in the input query
Actions	Insert vowel, insert space
Cost	F_b(action)
Start State	“-BEGIN-“ keyword so we can start before index 0
End State	Last letter in query

H(s) is consistent because the cost for adding a vowel or space always <= adding a whole new word with a space.

b. BFS is a special case of UCS, which is a special case of A*.

c. Writing out potential values of n:
n = 0: length of query is 0 -> states_expanded = 0
n = 5: length of query is 5 -> start, _, _, _, end -> states_expanded = 5
…
Therefore upper-bound = O(n).

d. The two answers are not similar, as mine was not exponential. This could be because mine did not consider different options for adding vowels or spaces. I only considered either we add a vowel or space, or we don’t. But I did not consider if we could have different options for adding vowels and spaces (e.g. adding multiple vowels).

Problem 1

a. $$V_{minmax}(s, d) = \{ \begin{array}{ll} \text{Gamevalue}(s); & \text{if isend}(s) \\ \text{Eval}(s); & \text{if } d = 0 \\ \text{Max}_{a \text{ in } A(s)}\, V_{minmax}(\text{next}(s, a), d); & \text{if player}(s) == \text{max} \\ \text{Min}_{a \text{ in } A(s)}\, V_{minmax}(\text{next}(s, a), d-1); & \text{if player}(s) == \text{min} \end{array} \}$$

Problem 3

a. $$V_{minmax}(s, d) = \{ \begin{array}{ll} \text{Gamevalue}(s); & \text{if isend}(s) \\ \text{Eval}(s); & \text{if } d = 0 \\ \text{Max}_{a \text{ in } A(s)}\, V_{minmax}(\text{next}(s, a), d); & \text{if player}(s) == \text{max} \\ \sum_{a \text{ in } A(s)} \pi_{opp}(s,a)\, V_{minmax}(\text{next}(s, a), d-1); & \text{if player}(s) == \text{min} \end{array} \}$$