CSC341 Lab 8A

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Academic Honesty

Written Sources Used:

Michael Sipser - Introduction to the Theory of Computation

Help Obtained:

None

Question 1

1)

The fatal flaw is in step (b) where it requires to check an infinite set of strings Σ^* for different acceptance behavior, which is impossible to complete in finite time. This violates the fundamental requirement for decidability by giving an infinite computation process.

2)

Testing strings longer than the total possible state pairs in two DFAs, $n_1 \times n_2$, repeats the same scenarios due to the pigeon-hole principle. So, if the DFAs agree on all strings up to that max length, there is no need to go beyond since longer strings will just make the check take more time. This bound ensures we only perform a finite number of tests, which makes the problem decidable.

Question 2

To check if the language L is prefix-free we can simply add a new state that is transitioned by each symbol in Σ. This state will reject, since further inputs from the accepting states mean that L is not prefix-free.

This approach works because the extended state means that if an input rejected in the new state, it means that it has passed the accpetance state and has extended because the word in the language L is a prefix of another word in langauge L.