Lecture #4: DFA Design and Verification — Part Two

Lecture Presentation

Problem To Be Solved

Let $\Sigma = \{a, b\}$ and let $L \subseteq \Sigma^\star$ be the following language:

$$L = \{w \in \Sigma^\star \mid \omega \text{ ends with } \mathtt{abb}\}.$$

A First Attempt

We first tried to design a DFA for this language, under the assumption that the only information that the DFA would need to remember, about the string that has been processed so far, is whether it belongs to the above language L.

This attempt was unsuccessful.

A Second Attempt

What Went Wrong — Which Transition was not Well Defined? Why?

What Must the DFA Remember?

Representation Using Subsets of $\Sigma^\star$

Initial Sanity Checks

Identifying Transitions

A Third Attempt

What Went Wrong — Which Transition was not Well Defined? Why?

What Must the DFA Remember?

Representation Using Subsets of $\Sigma^\star$

Initial Sanity Checks

Identifying Transitions

What We Have Now:

Reflections

Was the Middle Attempt Necessary?

How Can This Example Be Generalized?

Writing a Proof Correctness

What Result, from the Lecture Notes, is Useful?

What Things Must Be Established?

A detailed list of the properties that should be established is as follows.

Other Things to Think About, or To Do

Verification vs. Testing