CS 3530: Assignment 2e

Max Stetter

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Problem 2.44 (20 points)

Problem

If A and B are languages, define $A \diamond B = \{xy : x \in A \text{ and } y \in B \text{ and } |x| = |y|\}$. Show that if A and B are regular languages, then $A \diamond B$ is a CFL.

Note: a formal proof is not necessary; a detailed description of a suitable construction and an informal argument will suffice.

Solution

The DFA begins with a start that accepts the first item specifically a dollar sign. After that every item that is in A is pushed onto the stack. Following this, every item in B is popped from the stack. It moves to the final state when the dollar sign is seen again.