CS 3530: Assignment 4c

Fall 2014

Problems

Problem 2.24 (10 points)

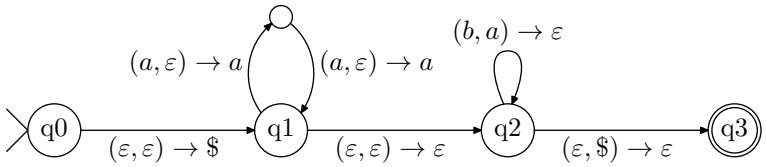
Problem

Let $E = \{a^i b^j : i \neq j \text{ and } 2i \neq j\}$. Show that E is a context-free language.

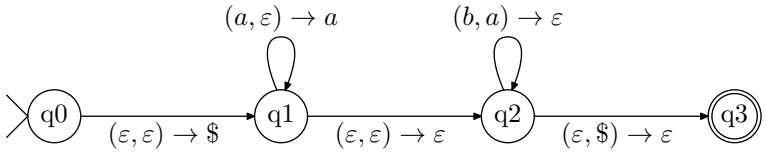
If you give a CFG, describe the role that each rule performs as well as giving the actual rule. If you give a PDA, describe how it works as well as giving the state diagram.

Solution

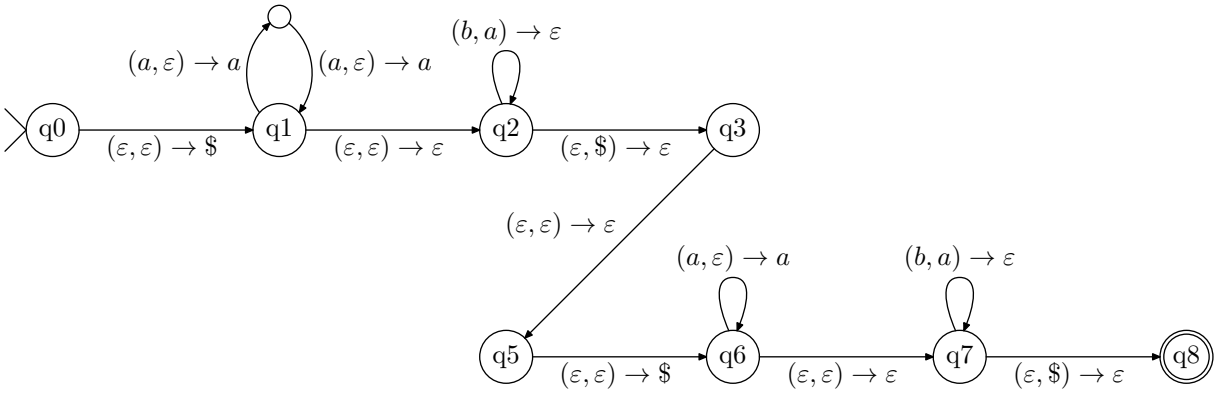
for 2i=j



for i=j



concat the two



Problem 2.44 (10 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 will suffice.

Solution