Power of 2DFAs

Lemma

The class of language recognized by 2DFAs is regular.

Proof.

Let $T_x : Q \times \{\bowtie\} \to Q \times \{\bot\}$, which is defined as follows:

$T_x(p) := q$ if whenever A enters x on p it leaves x on q.

$T_x(\bowtie) := q$ q is the state in which A emerges on x the first time.

$T_x(q) := \bot$ if A loops on x forever.

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Total number of functions of the type

$T_x \leq (|Q| + 1)^{(|Q|+1)}$

$T_x = T_y \Rightarrow \forall z(xz \in F \Leftrightarrow yz \in F)$. Prove this.

$T_x = T_y \Leftrightarrow x \equiv_A y$

Pushdown automata

NFA + Stack

$$L_{a,b} = \{a^n b^n \mid n \geq 0\}.$$

$$PAL = \{w \cdot w^R \mid w \in \Sigma^*\}.$$