CSE 491/596 Lecture Fri 9/23 Fall 2022

① $L = \{ y00z : |z| \text{ is odd} \}$

Q: Is $x = 0000$ in $L$?

$x = \underbrace{0}_{y} \cdot 00 \cdot \underbrace{0}_{z}$

$L = \{ x : x$ can be broken as $x := y00z$ such that $|z|$ is odd $\}$

"Atomic set-builder defn."

Lookup "Intension Vs. Extension."

[Next Lecture: Tue 8-10pm on my Zoom]

② Myhill-Nerode: Converse Part.

First part: If $L$ has an infinite PD set, $L$ is not regular.

Contrapositive: If $L$ is regular, then $L$ has no infinite PD set
i.e. All PD sets for $L$ are finite

Converse (of Contra): If ~~L is regular then all PD~~ sets for
If All PD sets for $L$ are finite, then $L$ is regular.

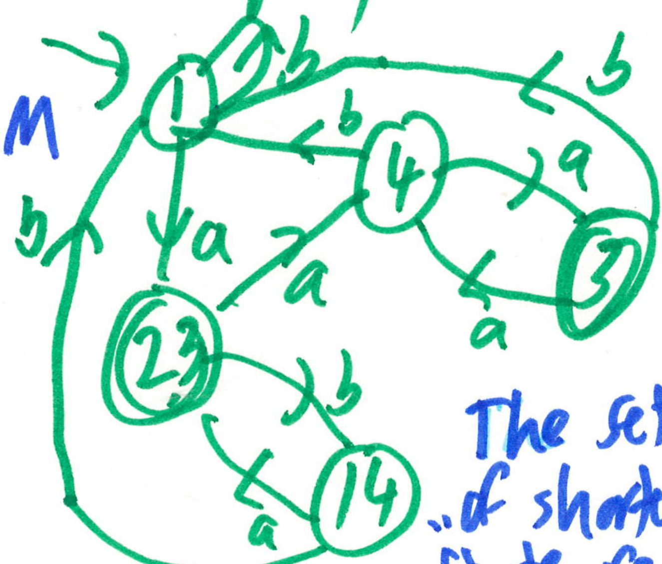
I.e. if $\sim_L$ has only finitely many equivalence classes, and:

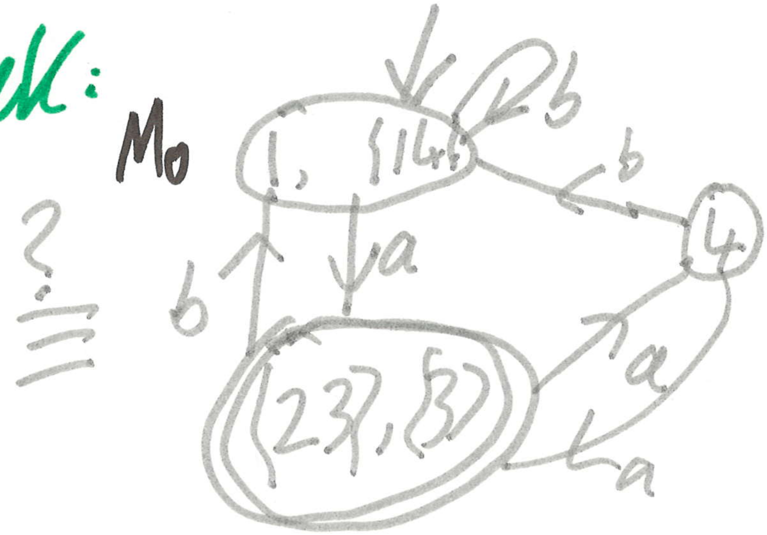
$Q = \{\text{equiv classes}\}$ $F = \{\text{equiv. classes of strings in } L\}$

$S =$ equiv class of $\varepsilon$ $\delta$ maps $([w], c)$ to $[wc]$ $\boxed{\text{well-defined}}$ the equiv class of

**Corollary:** This $M = (Q, \Sigma, \delta, s, F)$ not only is a DFA s.t. $L(M) = L$, it is <u>the</u> <u>unique</u> minimum-state DFA for $L$.

Example from last week:



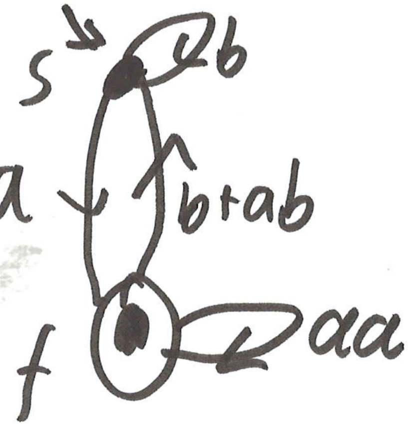




The set of "shortest state reps"

$\{\epsilon, a, aa, ab, aaa\}$ is <u>not</u> PD for $L(M)$ since $\epsilon \sim_L ab$, $a \sim_L aaa$

<u>Claim</u>: $S' = \{\epsilon, a, aa\}$ <u>is</u> PD for $L$.

GNFA $M_0$ becomes upon eliminating 4:




<u>Regexp</u>: $\left(b + \overbrace{a(aa)^*(b+ab)}^{L_{ss}}\right)^* \cdot \underbrace{a(aa)^*}_{L_{sf}}$ "once"

[In exercises, it is enough to give the label on the 2-state GNFA and then say whether the language is $L_{ss}$, $L_{sf}$, or $L_{ss} \cup L_{sf}$. It makes HW easier to grade...]