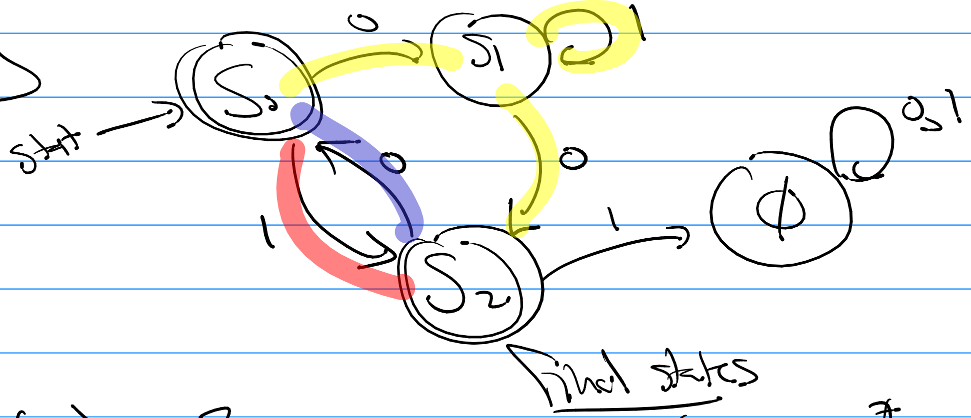
Math 322

13.3 F.S.A.

$L(M) = \{ x \mid$ x is a string of input symbols that take S_0 to a final state $\}$

ex



$L(M) = ?$

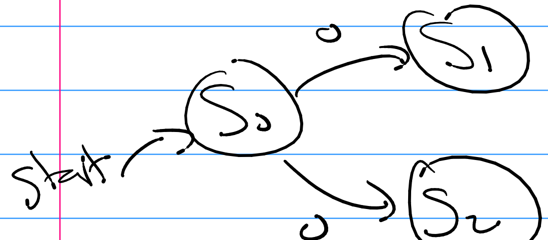
S_0 $\quad ((01^*00)^*, (10)^*)^*$

S_2 $\quad (1, 01^*0)[0(1, 01^*0)]^*$

$$L(M) = ((01^*00)^*, (10)^*)^*, (1,01^*0)[0(1,01^*0)]^*$$

Note: $A^* = \{ \underset{\overset{\uparrow}{A^0}}{\lambda}, A, A^2, A^3, \ldots \}$

Non-deterministic FSA.



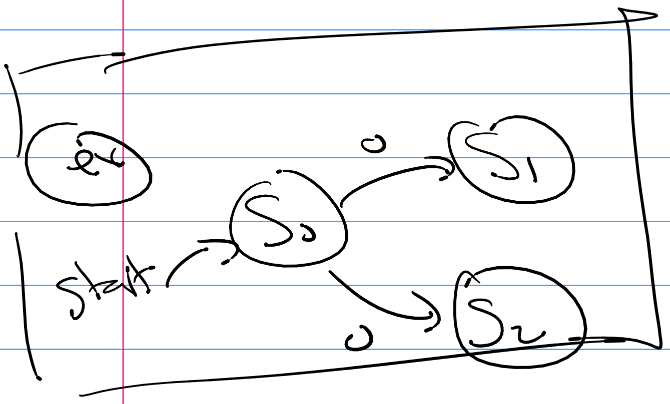
$\cancel{f}$

$$\boxed{(s_0,0) \to s_1 \atop \quad\ \ \to s_2}$$

not a function!

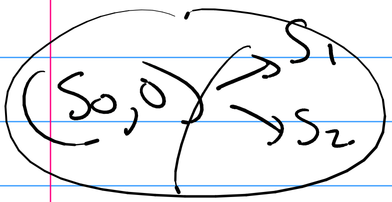
Modify the transition function $\underline{f: S \times I} \rightarrow \underline{P(S)}$

Domain codomain



$S = \{S_0, S_1, S_2\}$

$P(S) = \{\emptyset, \{S_1\}, \{S_2\}, \{S_3\}, \{S_1, S_2\}, \{S_1, S_3\}, \{S_2, S_3\}, \{S_1, S_2, S_3\}\}$



not a function

f.

$(S_0, 0) \rightarrow \{S_1, S_2\}$

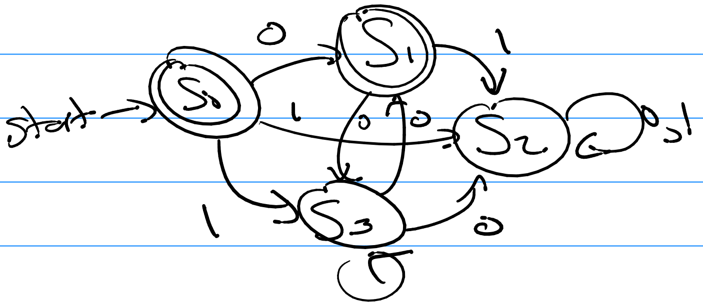
is a function

If L(M) of a non-Det. F.S.A is found

there exists a Det. F.S.A that recog. the same language.

---

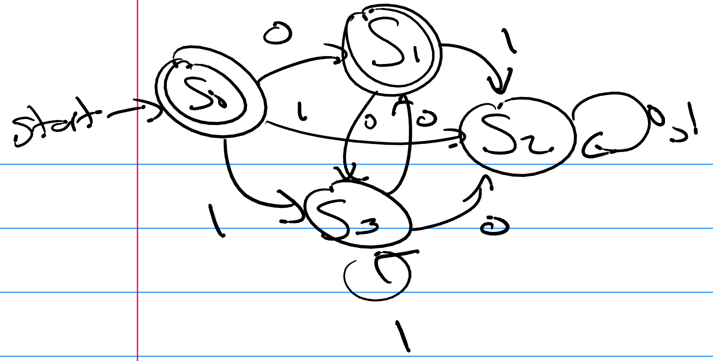
ex



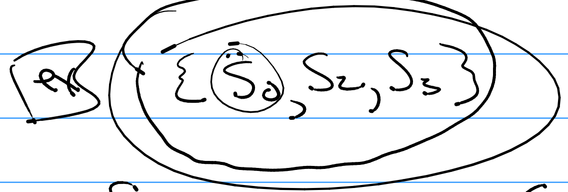
$L(M) = \lambda, (0, 1 1^{*} 0)(0 1^{*} 0)^{*}$

→ Det. F.S.A. of same language?

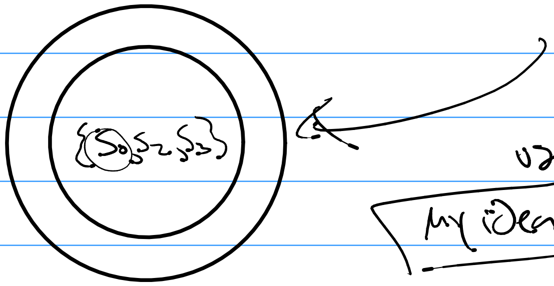
$|S| = 4 \qquad |P(S)| = 2^4 = 16$

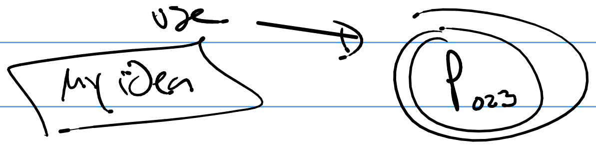


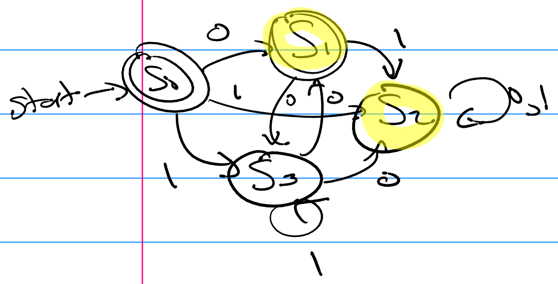
Note: P(S) has 16 states

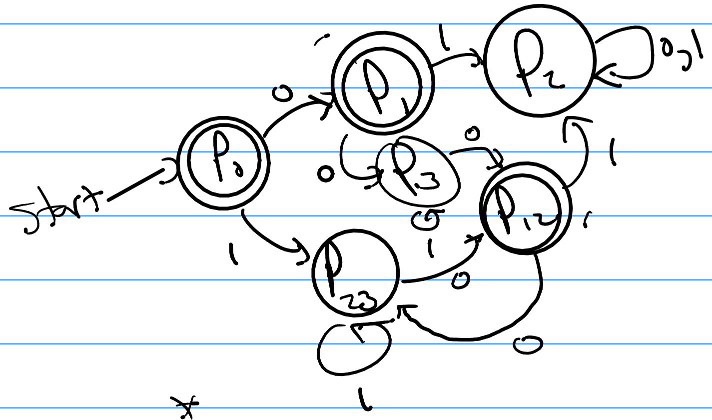


is a final state is any & its internal states are final









$$L(M) = \lambda, (0, 1^*0)(01^*0)^*$$

13.4 language recognition

Given a language → Make a F.S.A to recognize it.

(i) be creative

ex $L(M) = \lambda, 01, 0011, 0001$