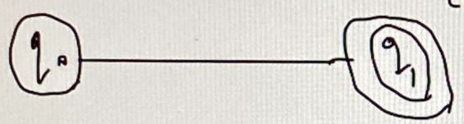
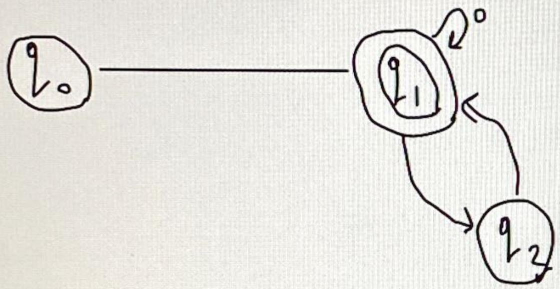
Cpts 317

DFA accepting L1

1.1





1.4

$0(0+1)^* \} 01^*$

$L_1 \cap L_2$

↓ ↓

DFA DFA

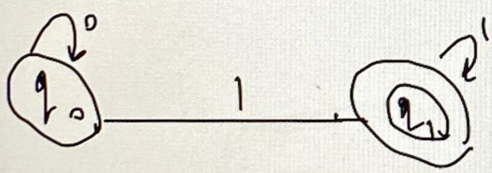
both are regular expression

$M_1 \cap M_2$

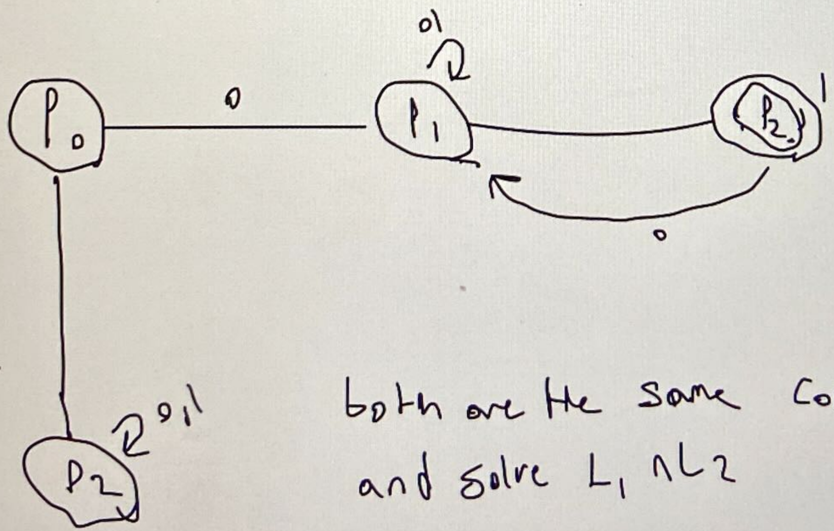
regular expression/DFA

1.2

$L_2 = 0^* 1 1^*$



1.3



both are the same condition and solve $L_1 \cap L_2$

$L_1 \cap L_2 = (L_1^c \cup L_2^c)^c$

$= \bar{L}_1 \cup \bar{L}_2$

$= \bar{\bar{L}}_1 \cap \bar{\bar{L}}_2$

$= L_1 \cap L_2$

P_1 and P_2 are both regular language

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2. $L = \{a^n b^m \mid n \bmod 3 = m \bmod 3\}$

$g \cap r\, L = \underbrace{(aaa)^*(bbb)^*}_{Rem=0} \mid \underbrace{a(aaa)^* b(bbb)^*}_{Rem=1} \mid \underbrace{aa(aaa)^* bb(bbb)^*}_{Rem=2}$

all n such that $n \bmod 3 = 1$ = Rem

Reg expression here is => $a(aaa)^* b(bbb)^*$

Reg exp = $a(aaa)^* a(aaa)^* = a(aaa)^*$

$n = \bmod 3 = 0$ or $n \bmod 4 = 2$

$(aaa)^*(bbb)^*$

$(aaa)^*(aaa)^*$

$\rightarrow (aaa)^*$

$aa(aaaa)^* bb(bbbb)^*$

$\Rightarrow aa(aaaa)^* aa(aaaa)^*$

$\Rightarrow aa(aaaa)^*$

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3.

$M = (S, \Sigma, T, S_0, S_f)$

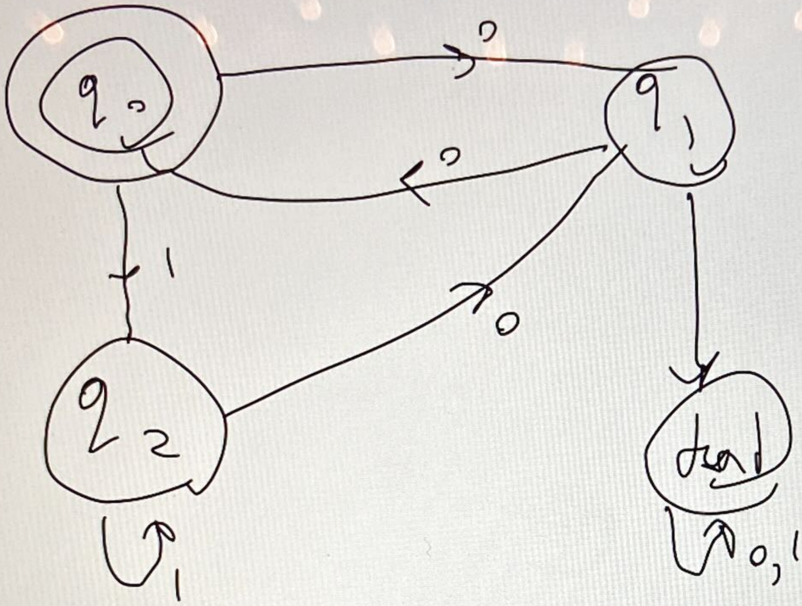
M accepts x iff $T^*(S_0, x) \in f$

M' accepts x iff $T^*(S_0, x) \notin f$

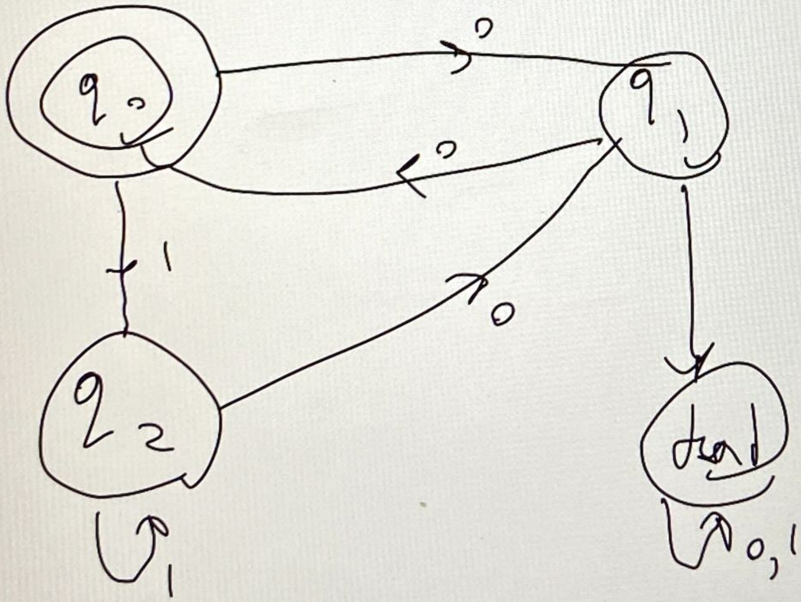
M accepts x iff M' doesn't, the regular language is closed under set complement.

4.

DFA M:



DFA M':



Reg expression:

$0(00)^* + 0(00)^* 1 (0+1)^* + 1 + 11^* 0(00)^* 1(0+1)^*$