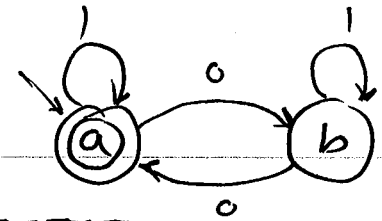
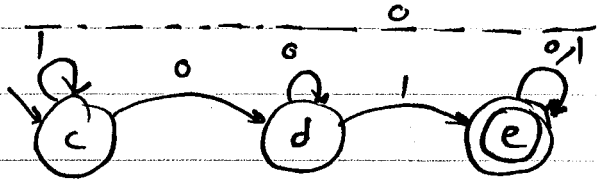
① method 1 for $L_1 \cap L_2$

1) $L_1 = \{w \mid w \text{ has even \# of 0's}\}$

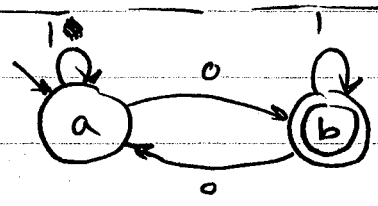


$L_2 = \{w \mid w \text{ has substring } 01\}$

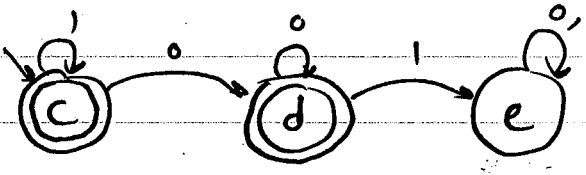


2) Is $L_1 \cap L_2$ a regular language? $\overline{(\bar{L_1} \cup \bar{L_2})} = L_1 \cap L_2$?
Can you come up with a machine that recognizes ?

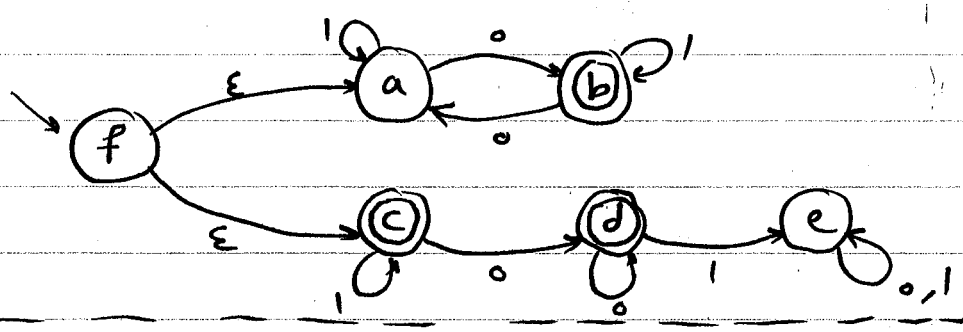
3) DFA for $\bar{L_1}$



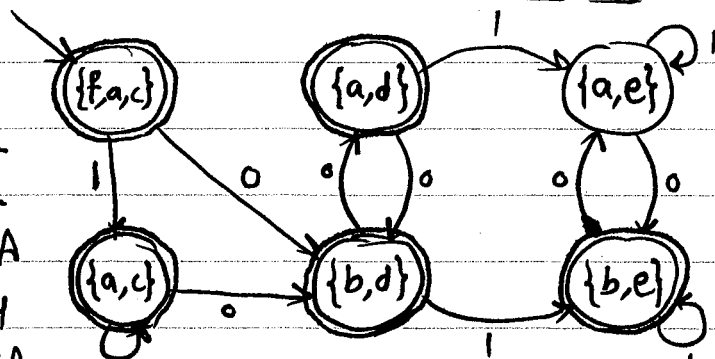
DFA for $\bar{L_2}$



4) NFA for $\bar{L_1} \cup \bar{L_2}$

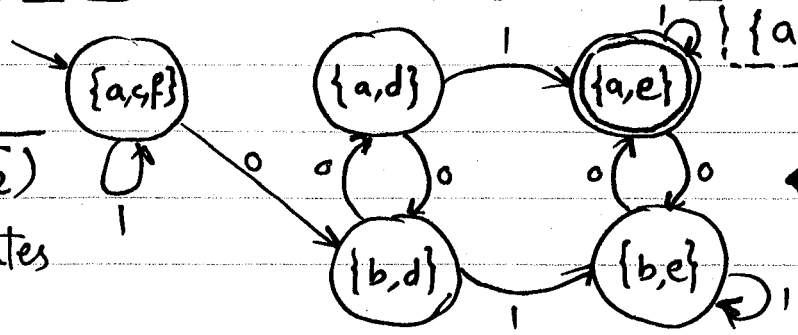


5) DFA for $\bar{L_1} \cup \bar{L_2}$ convert NFA in part 4 to a DFA



	0	1
{f,a,c}	{b,d}	{a,c}
{b,d}	{a,d}	{b,e}
{a,c}	{b,d}	{a,e}
{a,d}	{b,d}	{a,e}
{b,e}	{a,e}	{b,e}
{a,e}	{b,e}	{a,e}

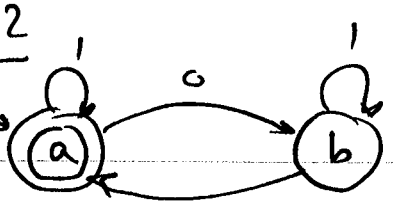
DFA to $(\bar{L_1} \cup \bar{L_2})$ flip the states



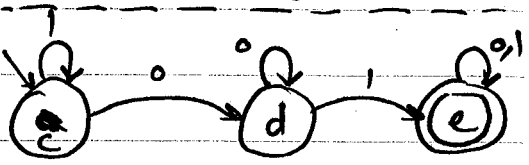
merge {a,c} and {a,c,f} into {a,c,f} ← from part 5

(2) # method 2 for $L_1 \cap L_2$

$L_1 = \{ w \mid w$ has even # of 0s$\}$

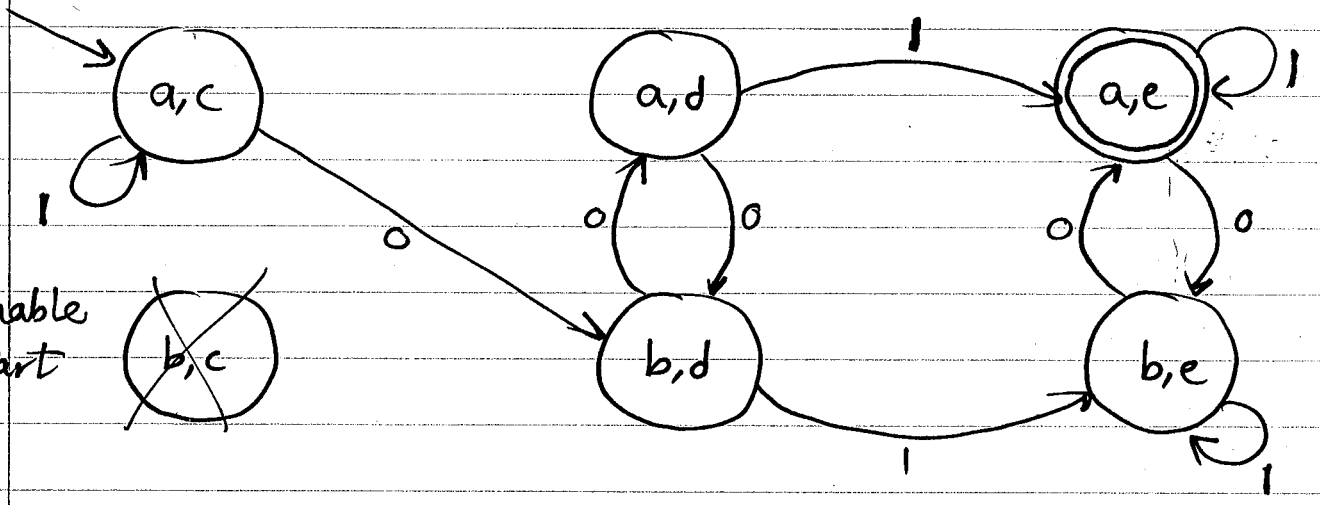


$L_2 = \{ w \mid w$ has substring 01$\}$



Is $L_1 \cap L_2$ a regular language?

Can you come up with a machine that recognizes $L_1 \cap L_2$?



	0	1
{a,c}	b,d	a,c
b,d	a,d	b,e
a,d	b,d	a,e
b,e	a,e	b,e
a,e	b,e	a,e