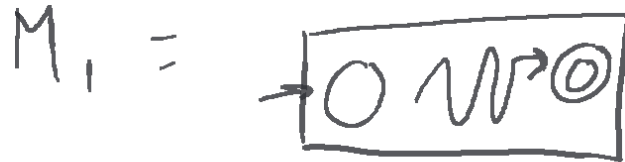
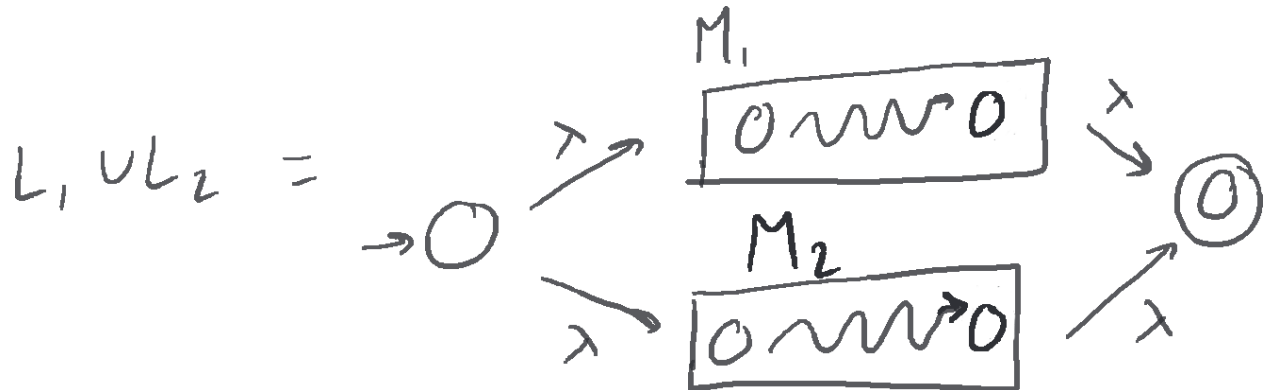


# CS 3186 --- Assignment #8

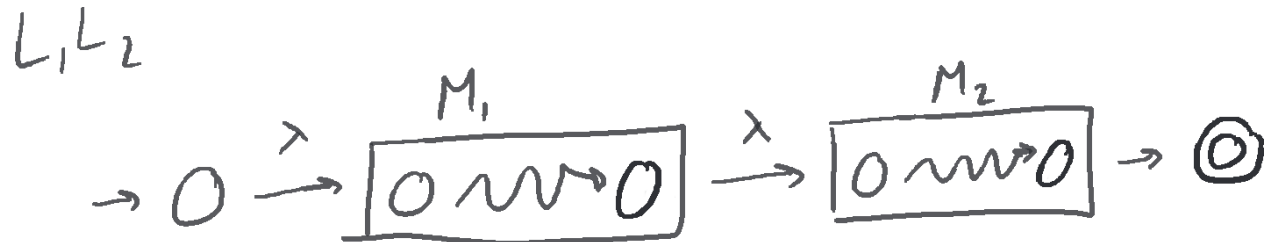
(I) Given the description of  $L_1$  and  $L_2$  as regular in the form of acceptors  $M_1$  and  $M_2$ . Show that the following languages are regular by constructing an automaton using generic descriptions of  $M$  below:



(i)  $L_1 \cup L_2$



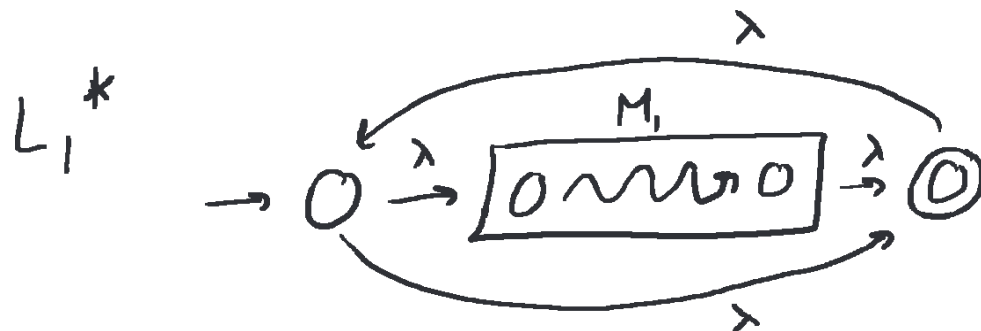
(ii)  $L_1 L_2$



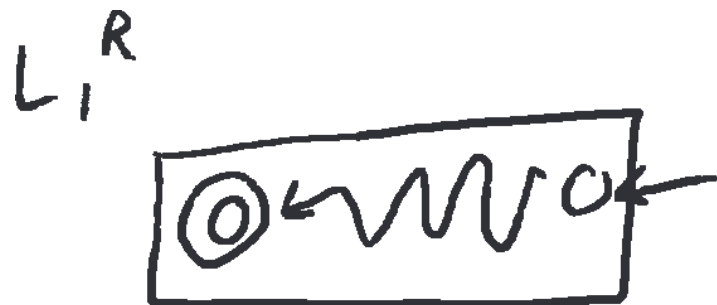
(iii)  $L_1$  complement



(iv)  $L_1^*$

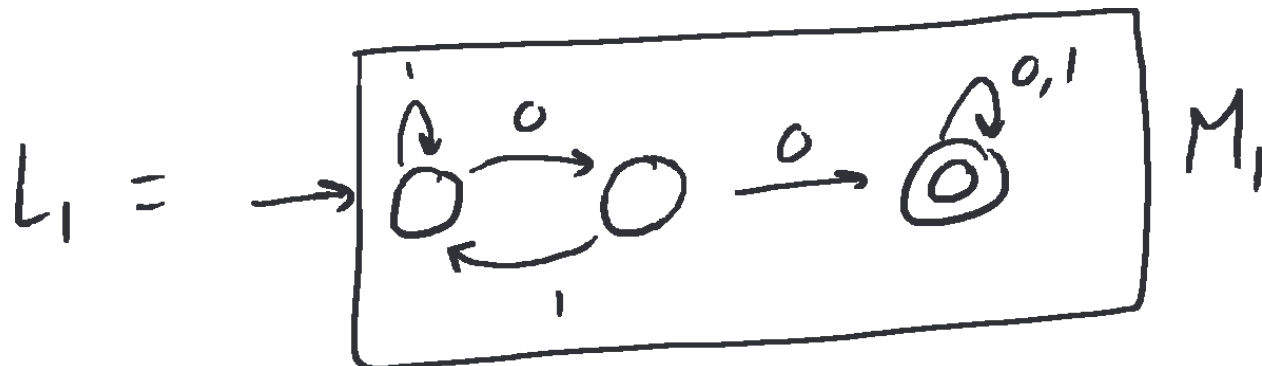


(v)  $L_1^R$

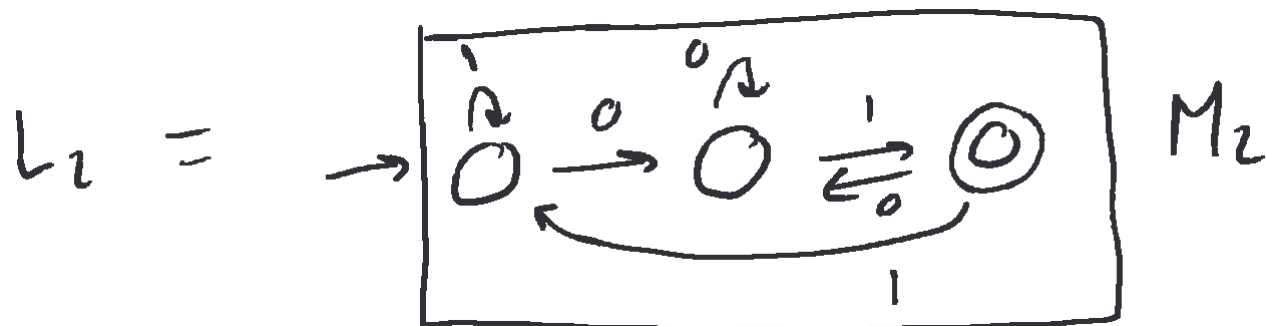


(II)  $\Sigma = \{0, 1\}$

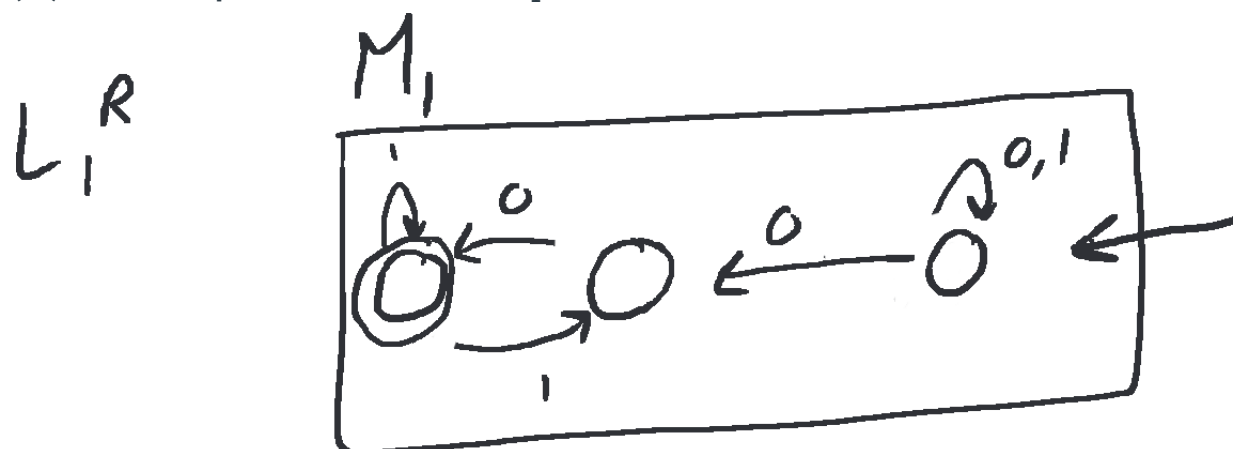
(i) Give a DFA,  $M_1$ , that accepts a Language  $L_1 = \{\text{all strings that contain } 00\}$



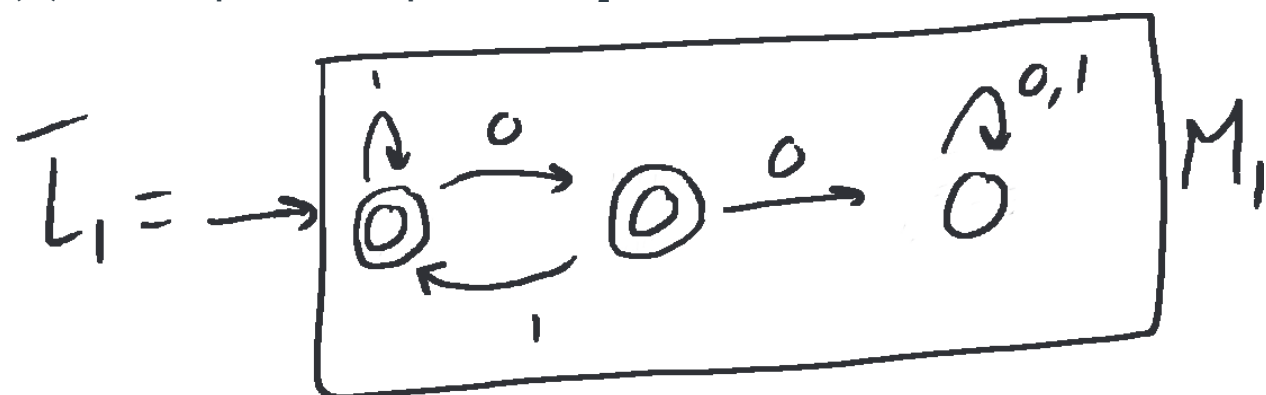
(ii) Give a DFA,  $M_2$ , that accepts a Language  $L_2 = \{\text{all strings that end with } 01\}$



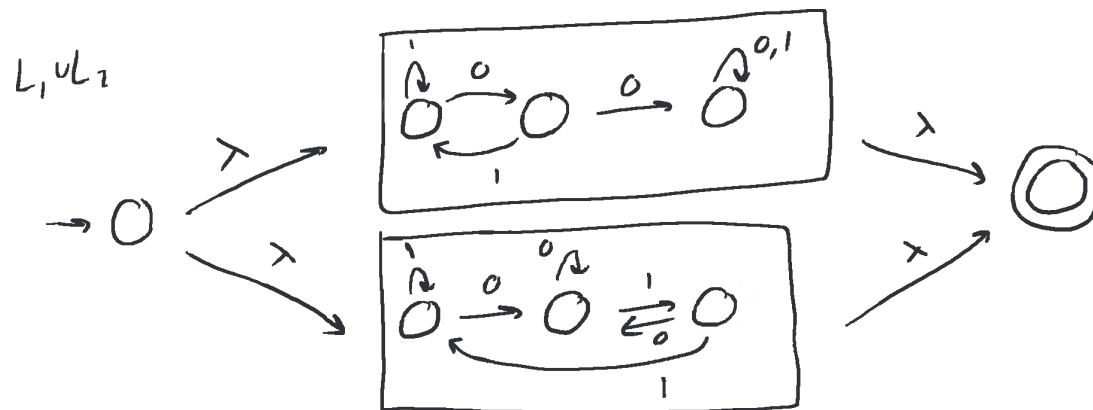
(iii) Give acceptor for Reverse of  $L_1$



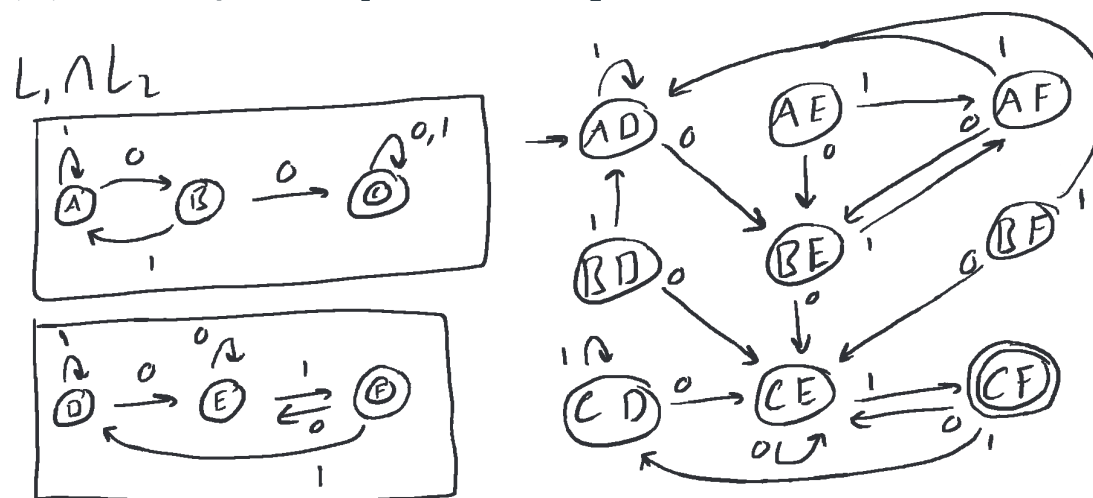
(iv) Give acceptor for complement of  $L_2$



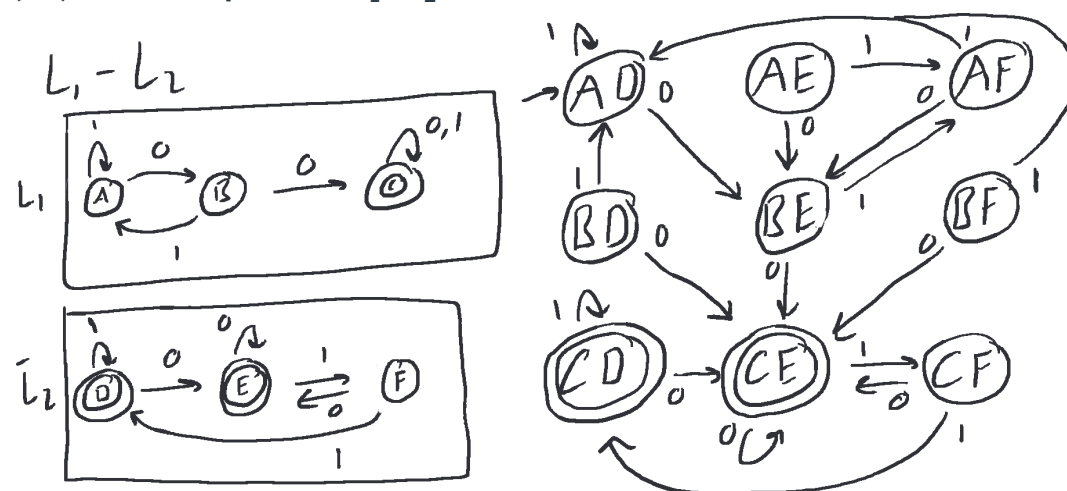
(v) Give acceptor for  $L_1$  union  $L_2$



(vi) Give acceptor for  $L_1$  intersection  $L_2$

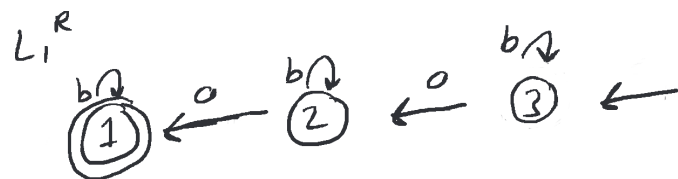


(vii) Give acceptor for  $L_1 - L_2$

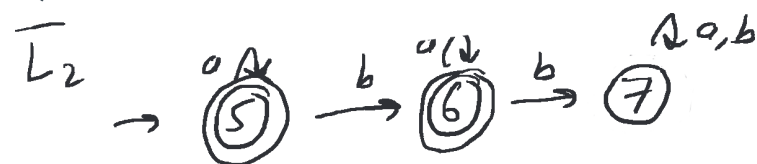


(III) Give the DFAs for the two languages  $\{w \mid w \text{ has exactly two a's}\}$  and  $\{w \mid w \text{ has at least two b's}\}$ . Redo exercises (iii) through (vii)

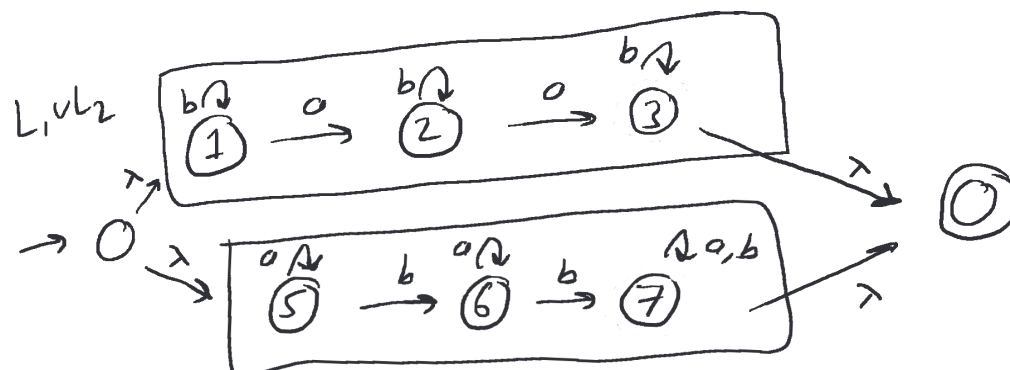
iii)



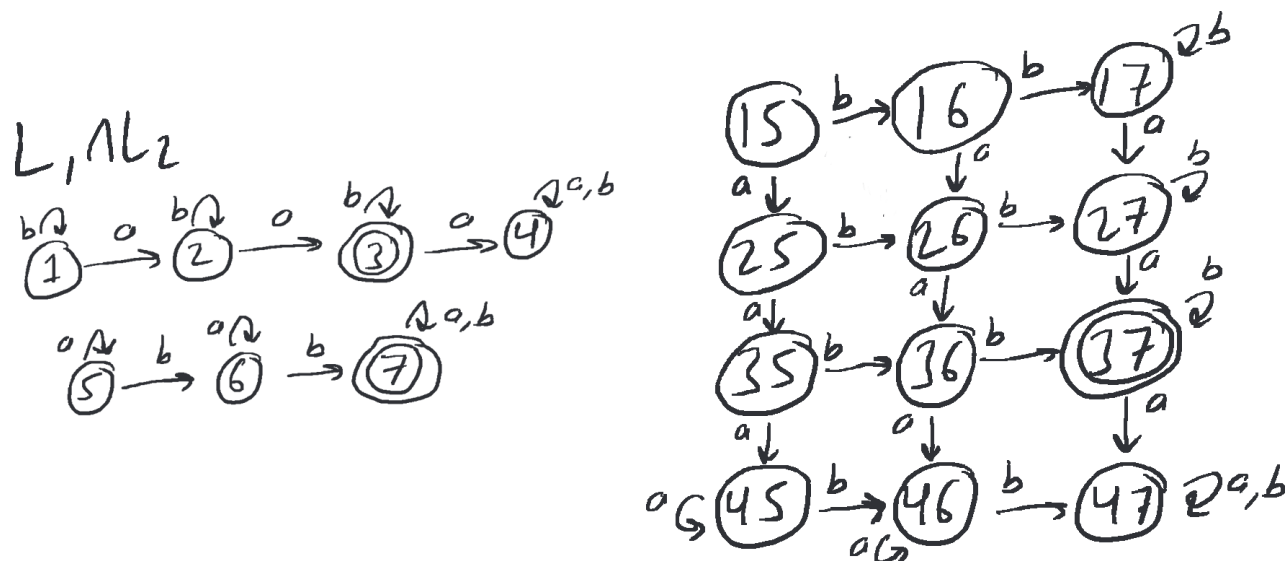
iv)



v)

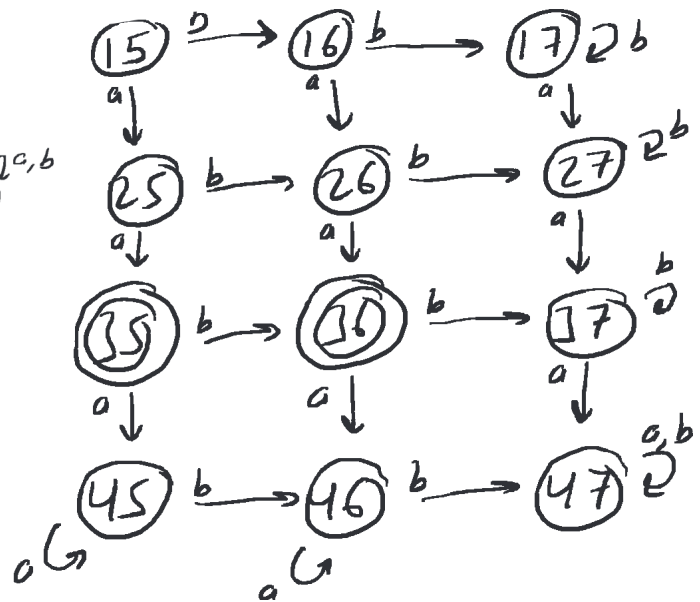
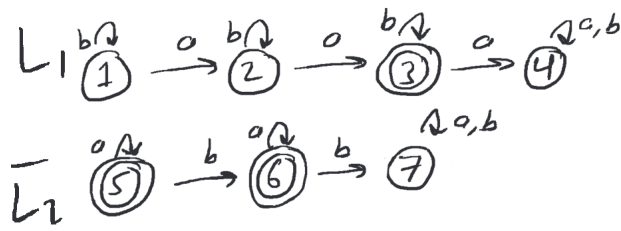


vi)

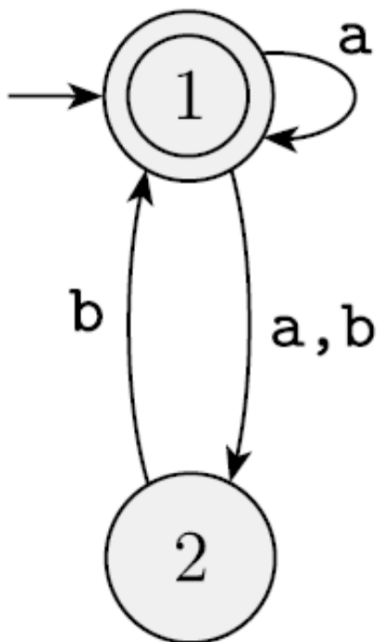


vii)

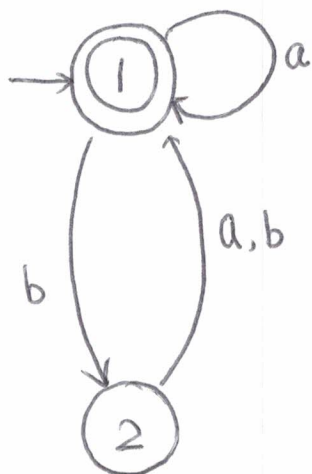
$L_1 - L_2$



(IV) Given the automaton below for a language L Construct an automaton for

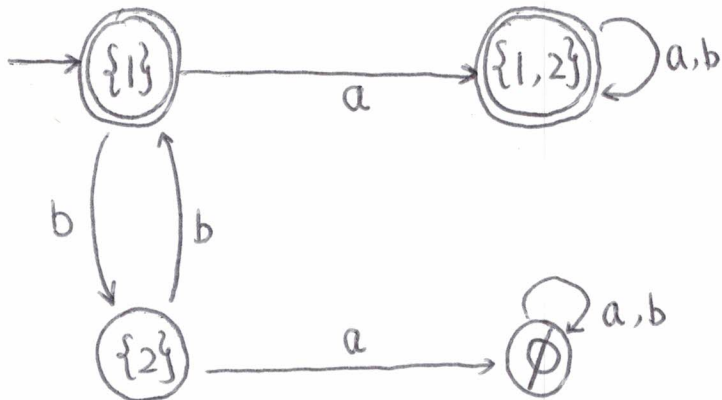


(i) Reverse of  $L$ :



(ii) Complement of  $L$ :

$L$  is a NFA, convert it to a complete DFA first:



therefore,  $\bar{L}$  is:

