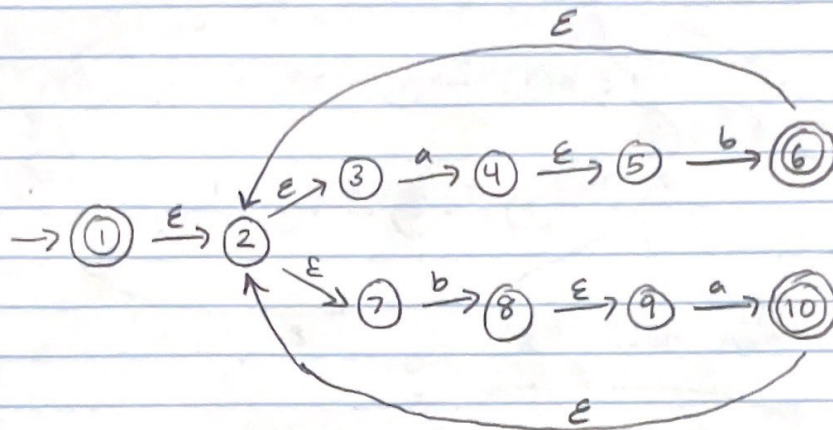
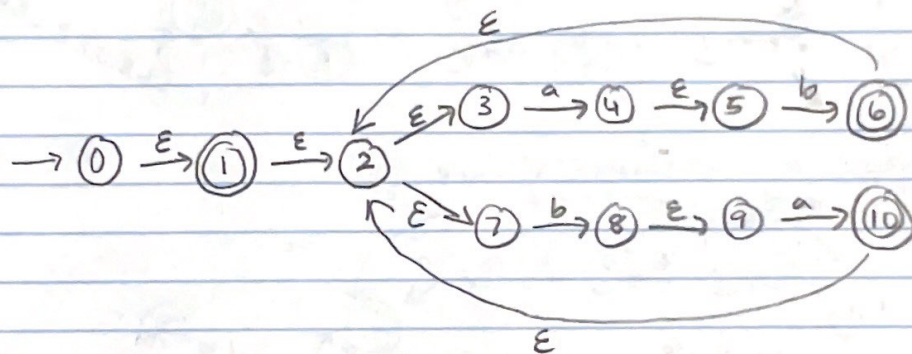


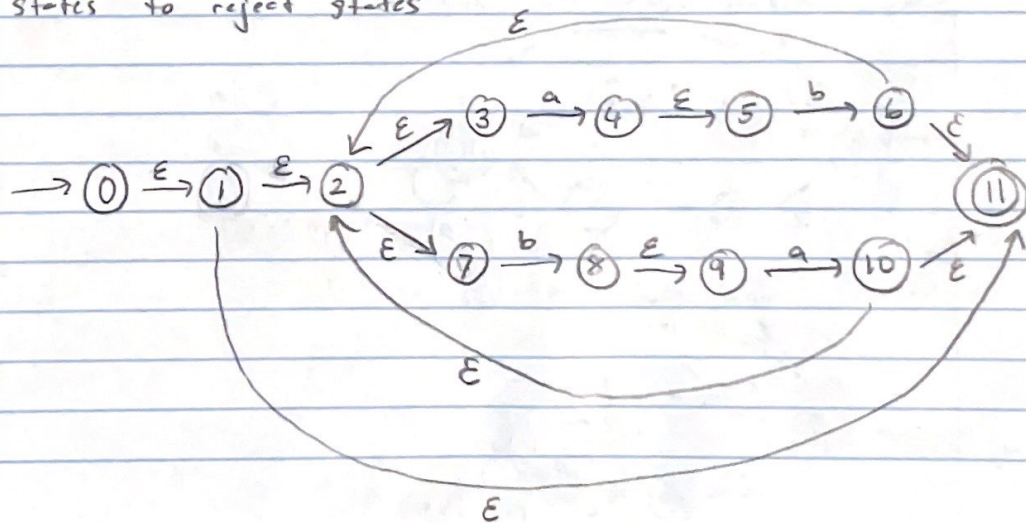
Problem 2A



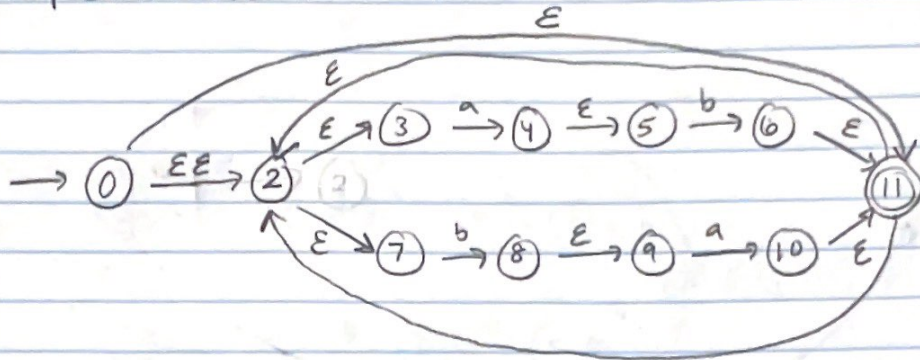
Step 1: insert new start state (state 0)



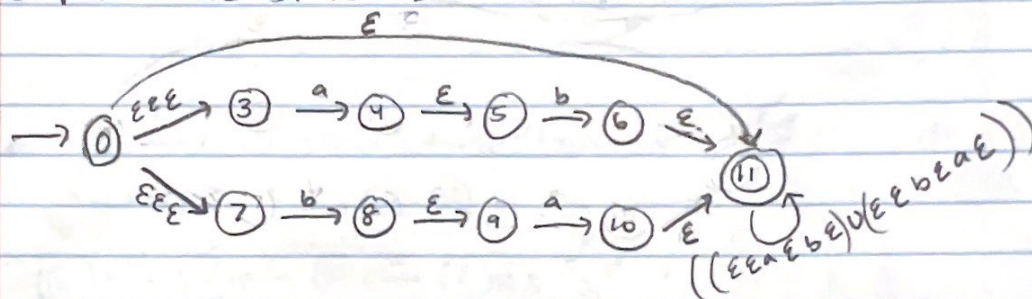
Step 2: insert a new accept state and turn all previous accept states to reject states



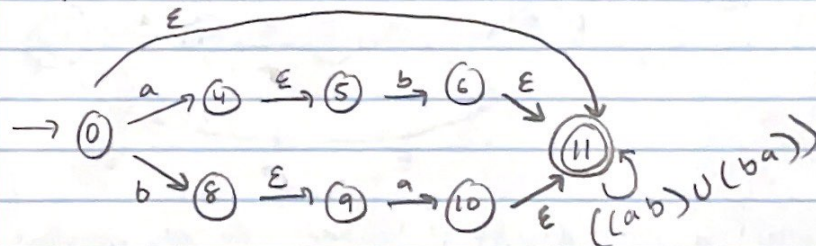
Step 3: Remove state "1"



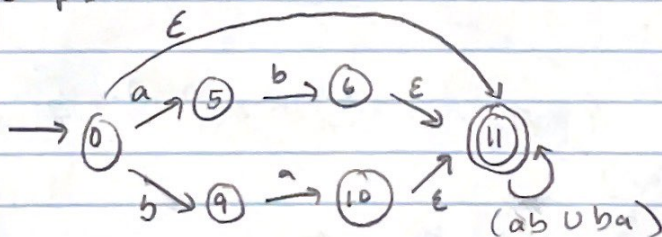
Step 4: Remove state "2"



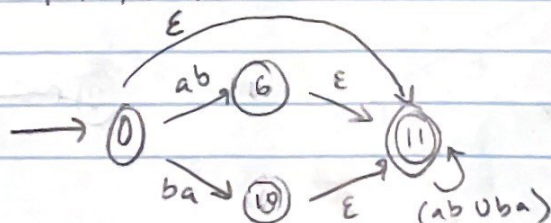
Step 5: Remove states "3" and "7"



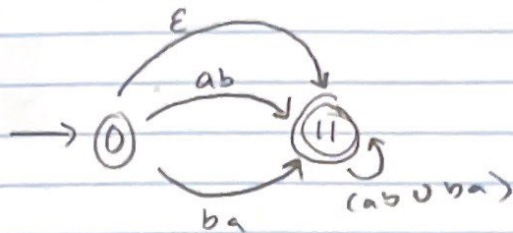
Step 6: Remove states "4" and "8"



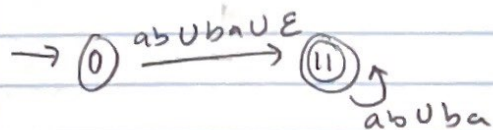
Step 7: Remove states "5" and "9"



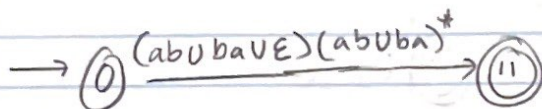
Step 8: Remove states "6" and "10"



Step 9: Union all the transitions from state "0" to state "11"

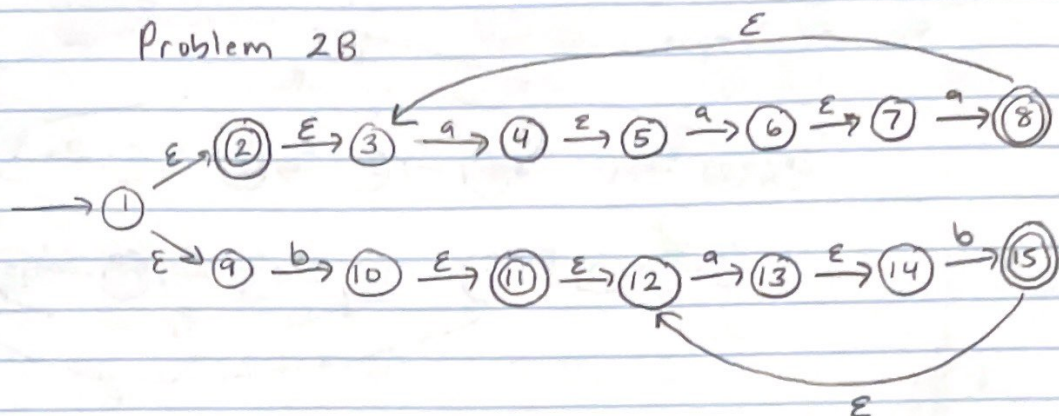


Step 10: Concatenate the transition from state "0" to "11" to the transition from state "11" to "11"

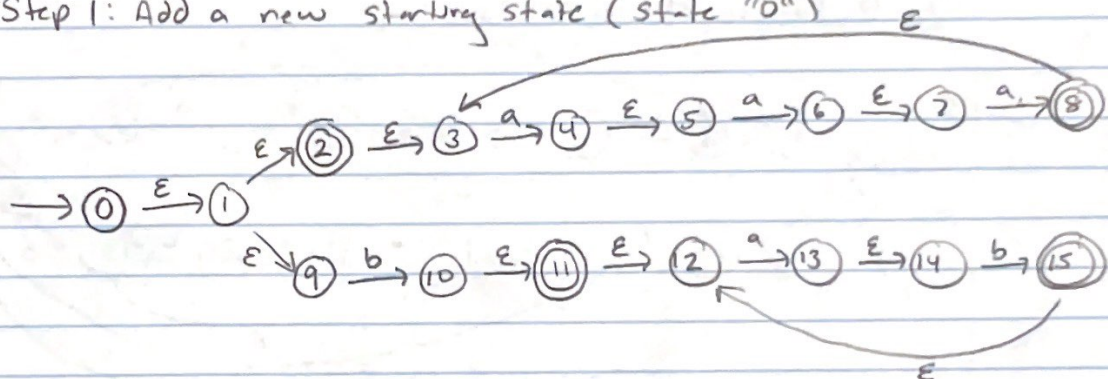


$\alpha = (ab U ba U E)(ab U ba)^*$ is equivalent to the given NFA.

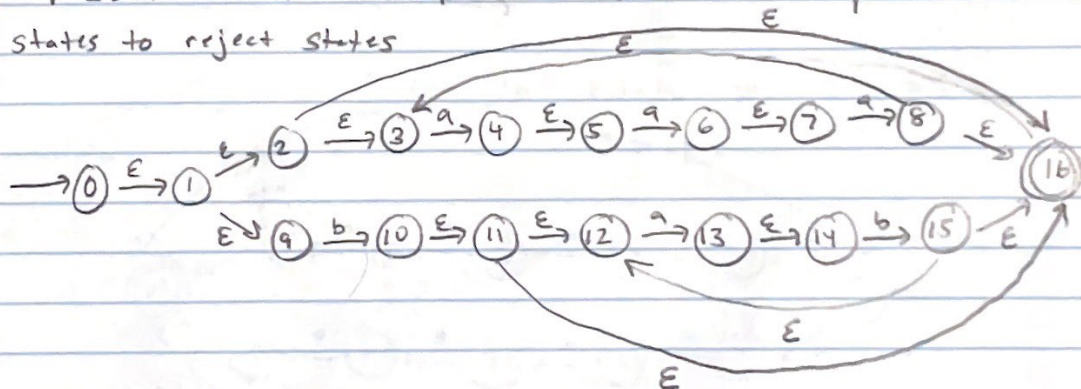
Problem 2B

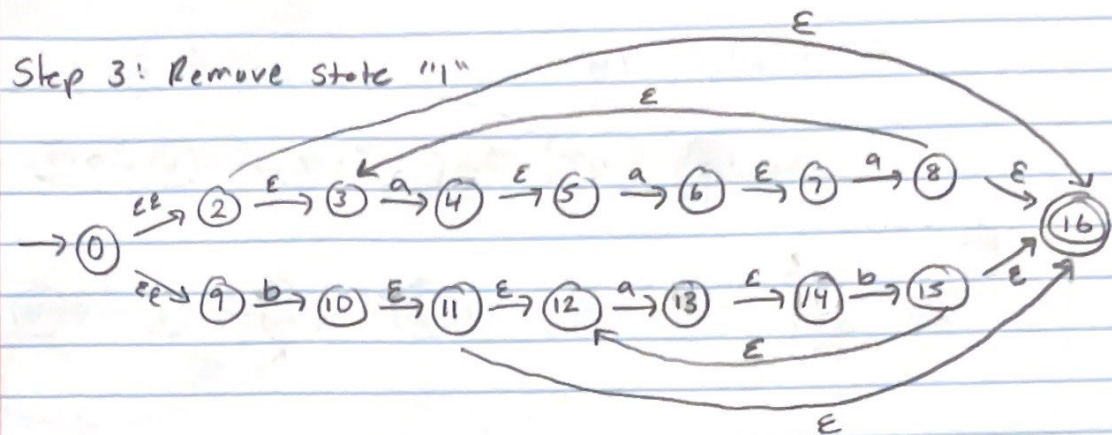


Step 1: Add a new starting state (state "0")

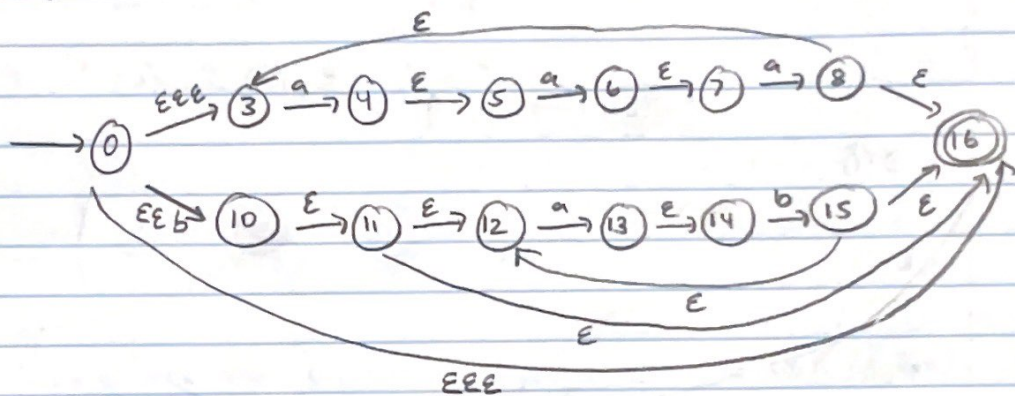


Step 2: Add a new accept state and turn all previous accept states to reject states

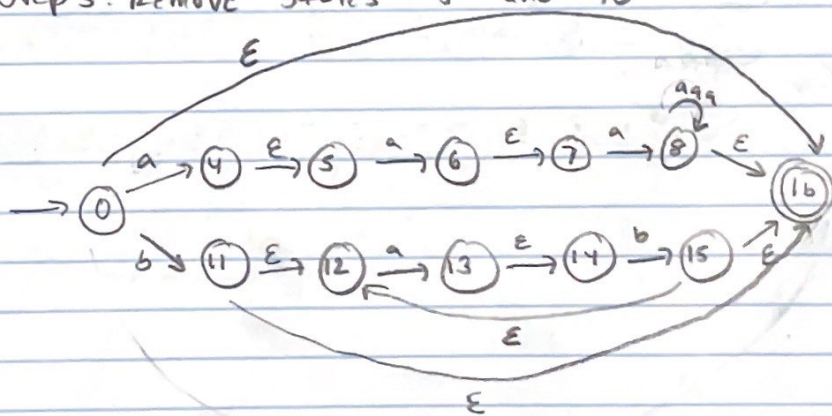




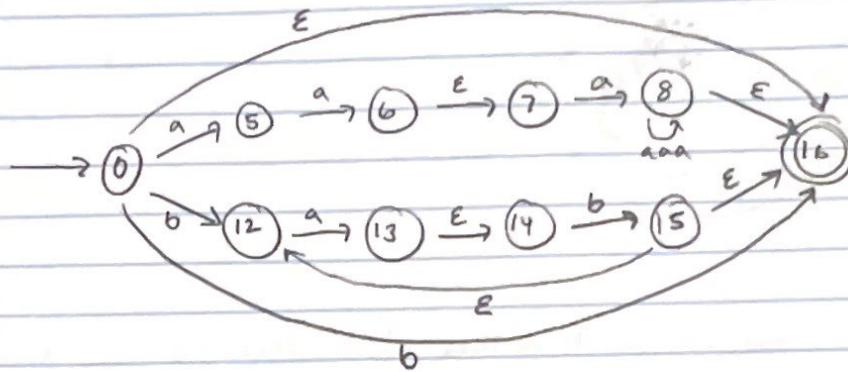
Step 4: Remove states "2" and "9"



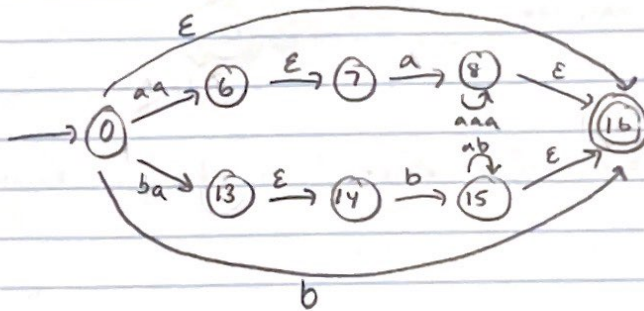
Step 5: Remove states "3" and "10"



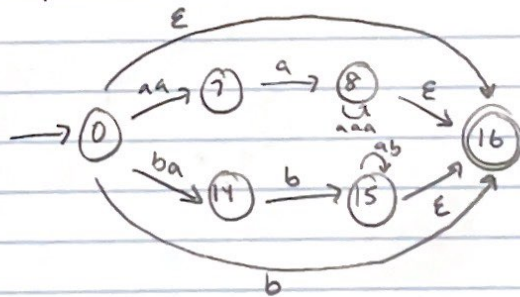
Step 6: Remove states "4" and "11"



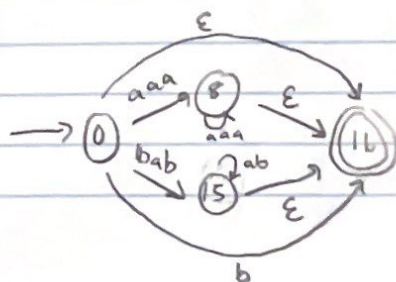
Step 7: Remove states "5" and "12"



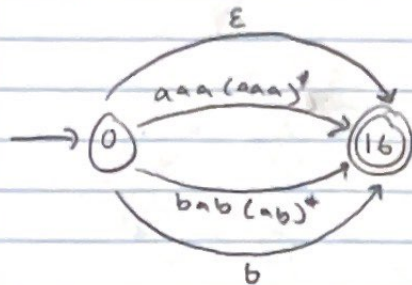
Step 8: Remove states "6" and "13"



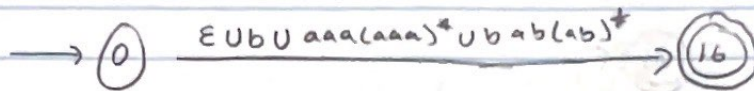
Step 9: Remove states "7" and "14"



Step 10: Remove states "8" and "15"



Step 11: Union all the transitions from state "0" to state "16"



$\alpha = \epsilon \cup b \cup aaa(aaa)^* \cup bab(ab)^*$ is equivalent to the given NFA.