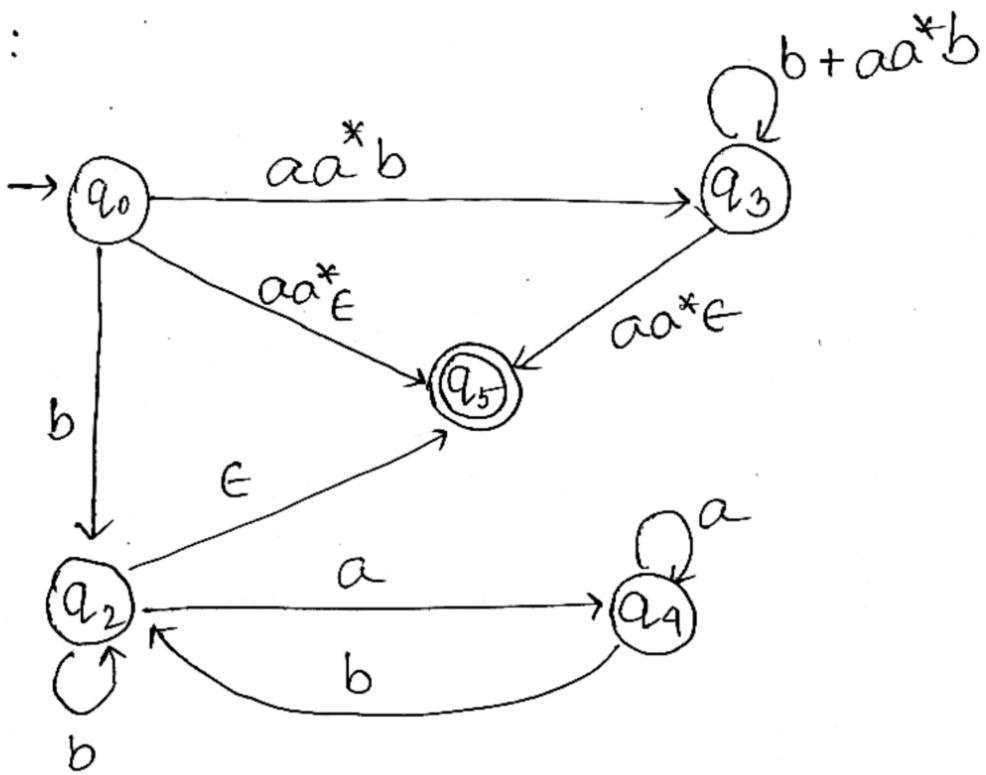
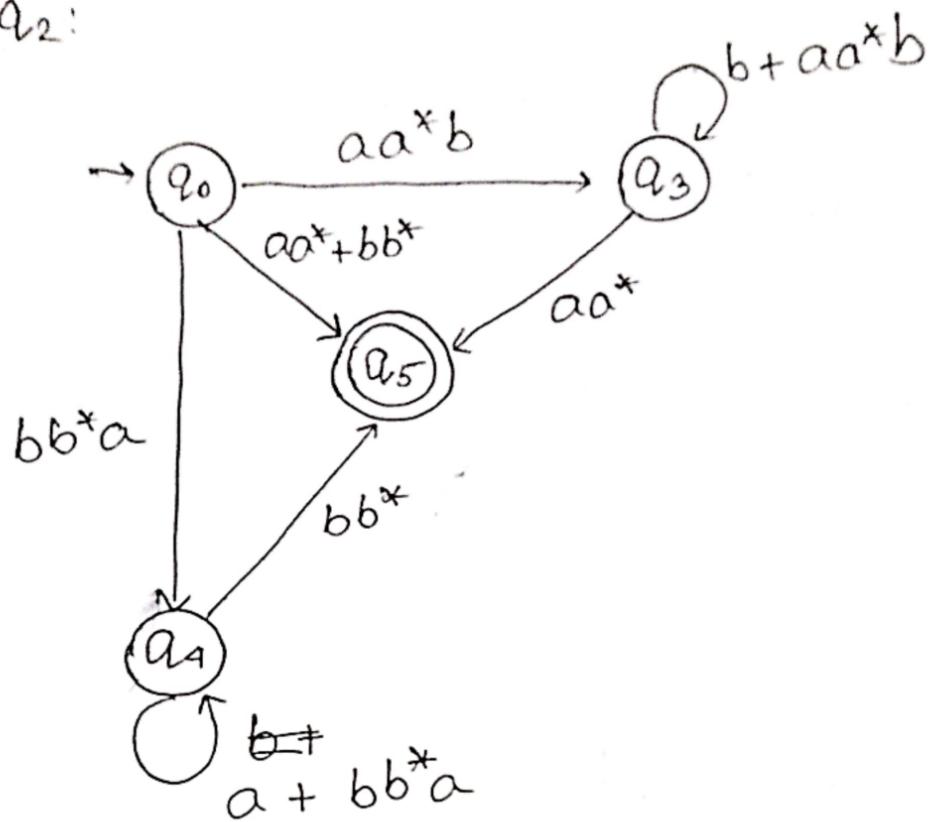


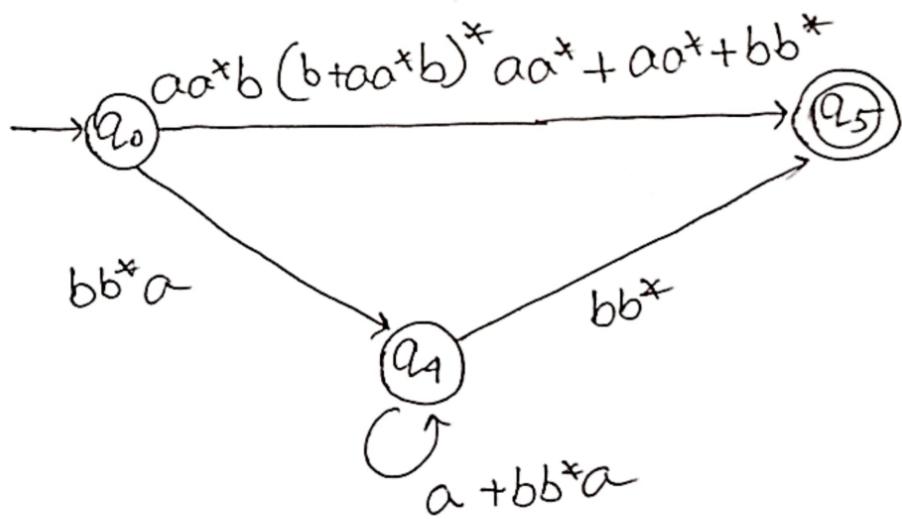
$q_1:$



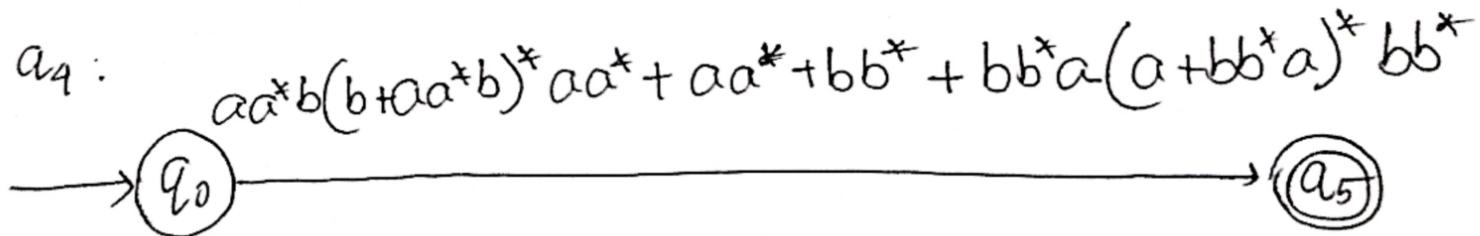
Q₂:

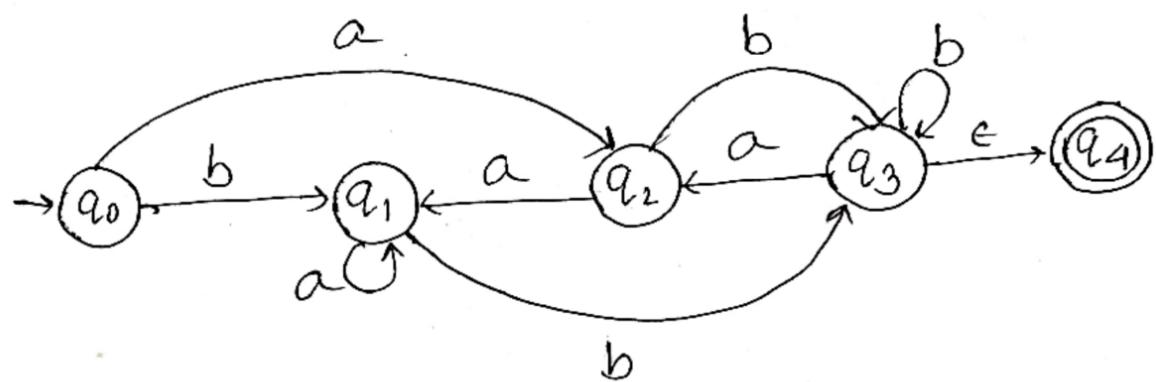
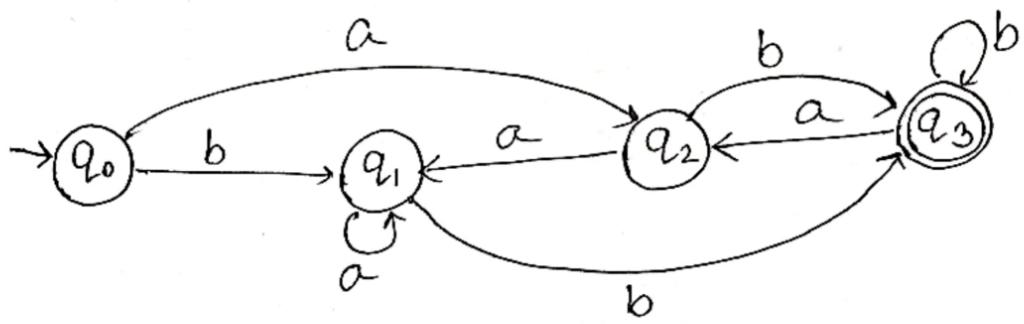


Q₃:

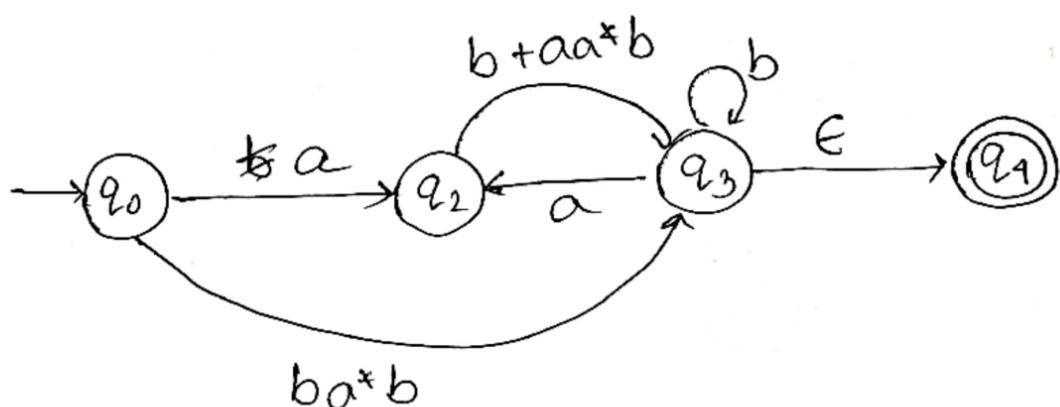


Q₄:

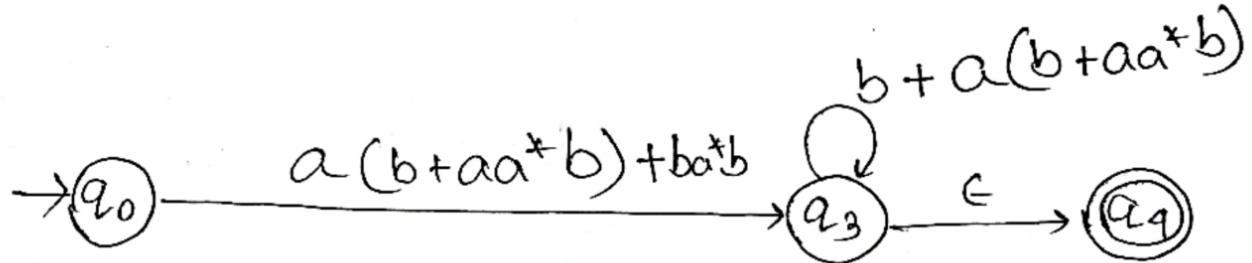




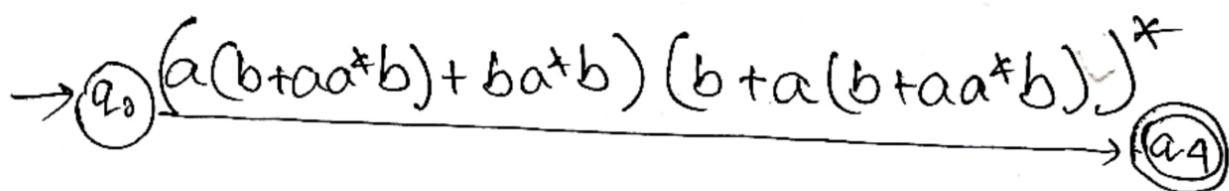
$q_1:$



$q_2:$

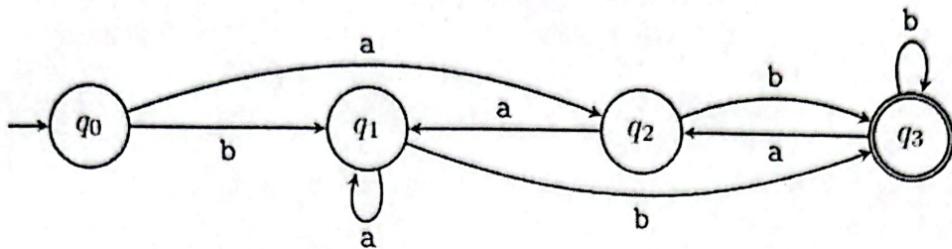


$q_3:$



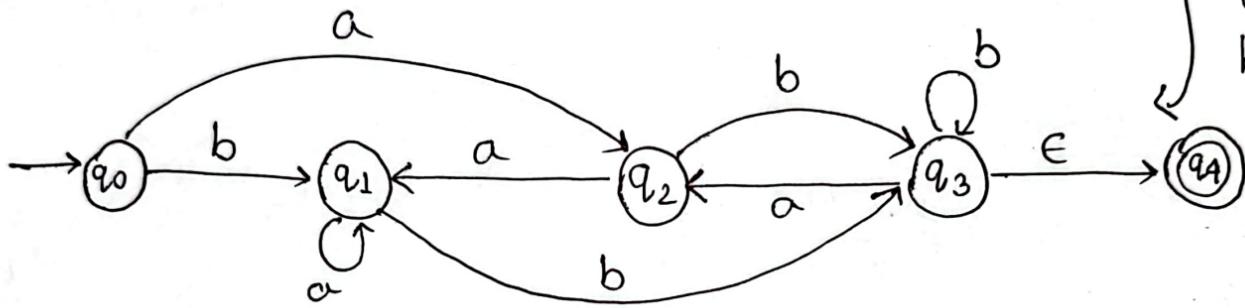
Problem 2: Converting DFAs to Regular Expressions (10 points)

Convert the following DFA into an equivalent regular expression using the state elimination method. First eliminate q_2 , q_1 and finally q_3 . You must show work.

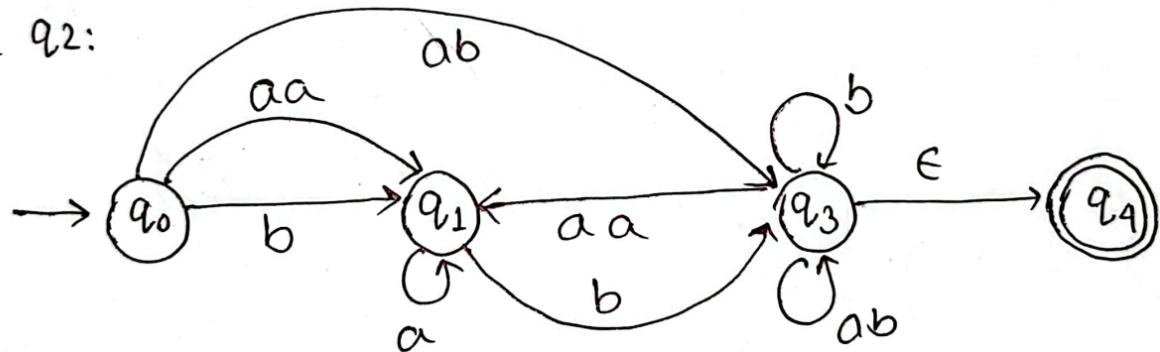


If you don't follow the order of elimination you will be awarded with 0 points.
If you don't use the state elimination method, 50% marks will be deducted.

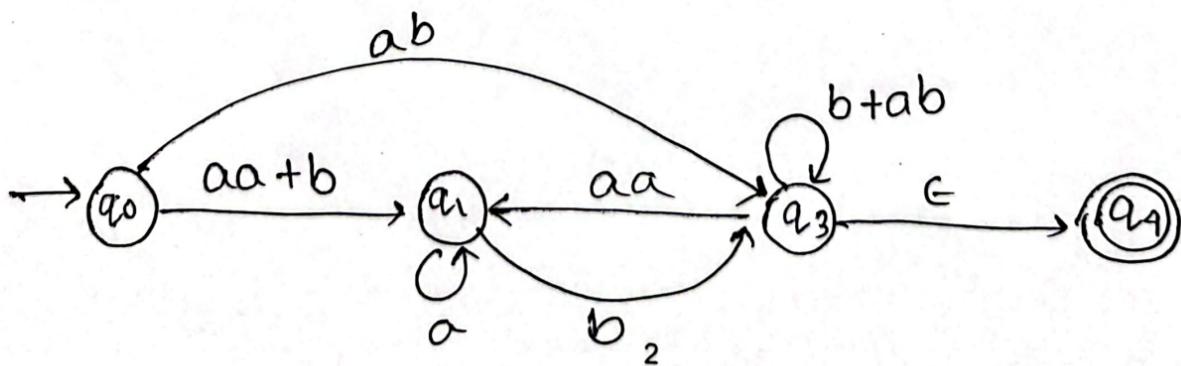
Since the accepting state has a outdegree



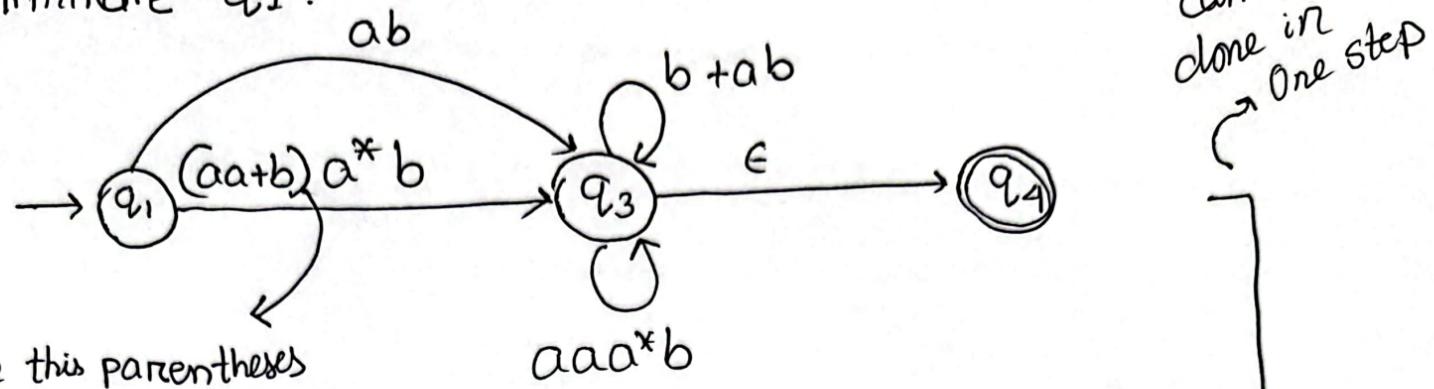
Eliminate q_2 :



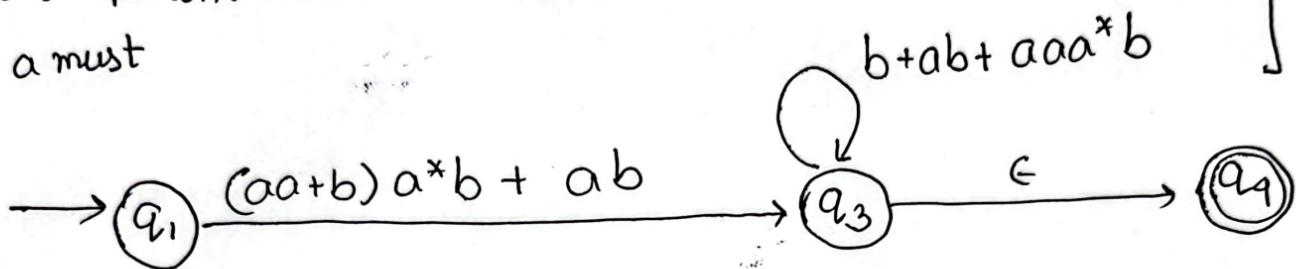
Merging parallel edge with 'Or' [you can do this at one step, for better understanding I'm doing separately]



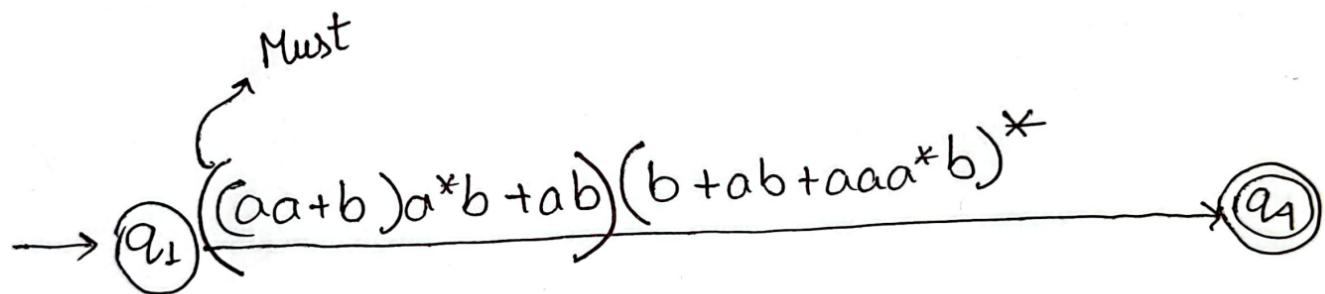
Eliminate q_1 :

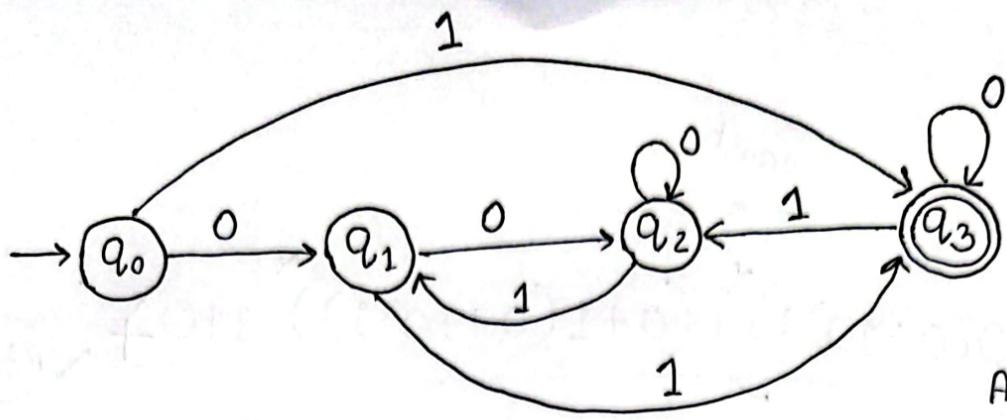


Hence this parentheses
is a must



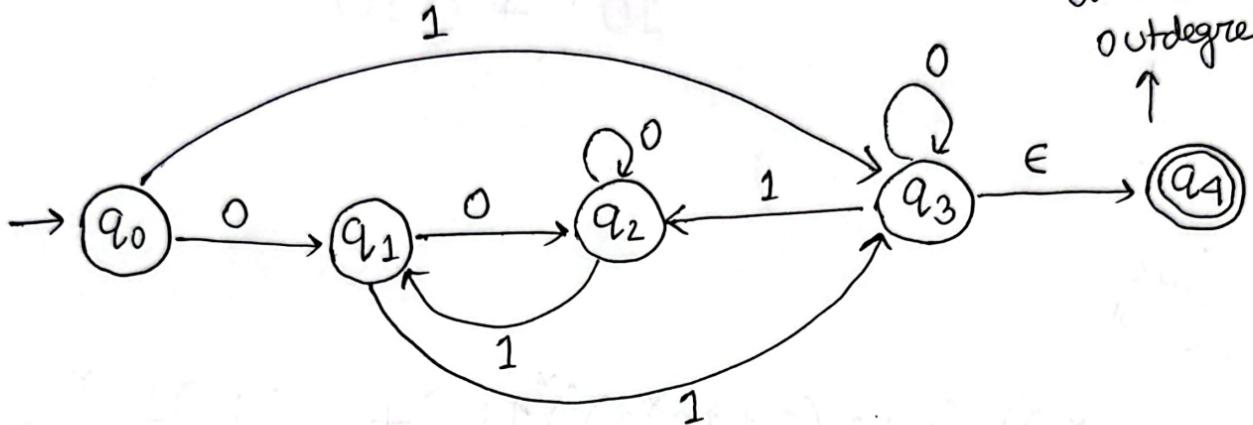
Eliminate q_3 :



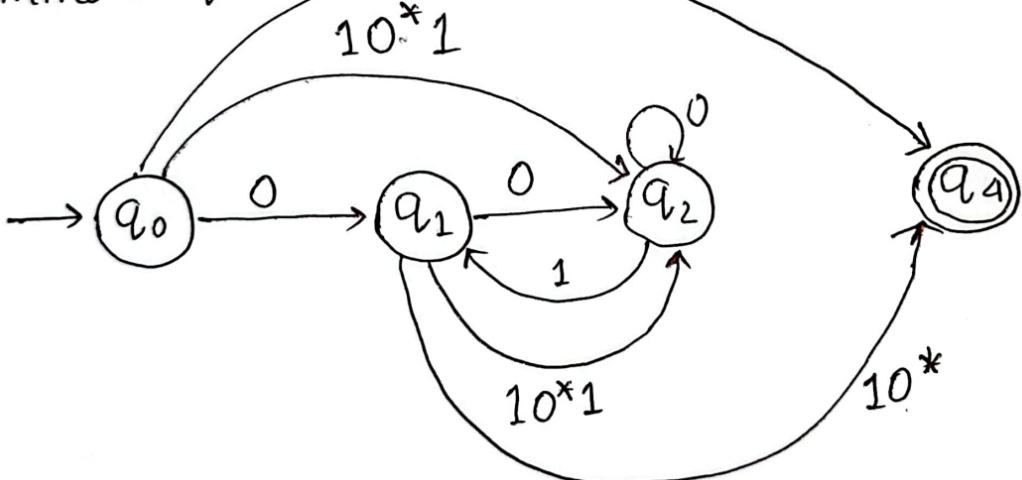


q_3, q_1, q_2

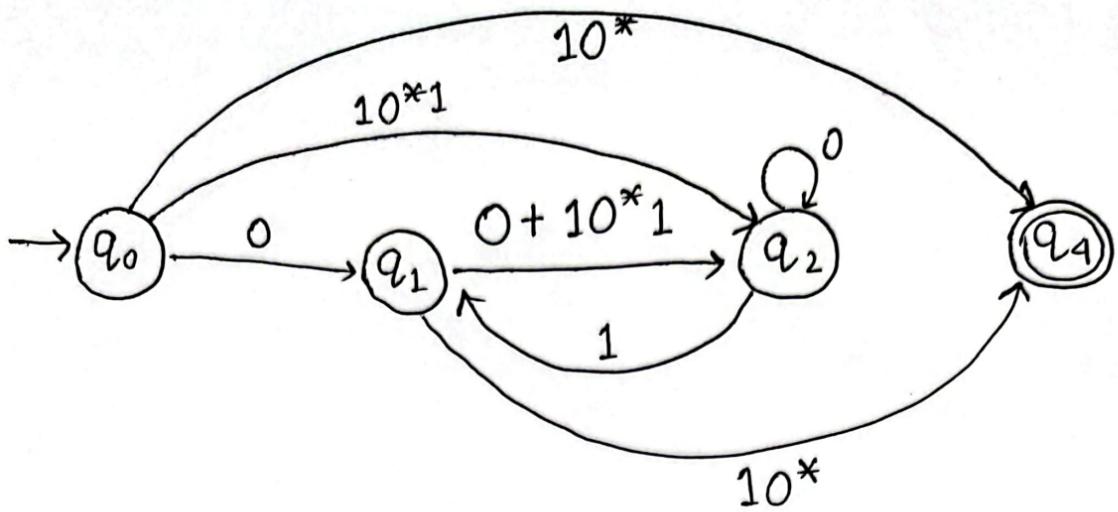
Adding a new accepting state, since q_3 has a outdegree



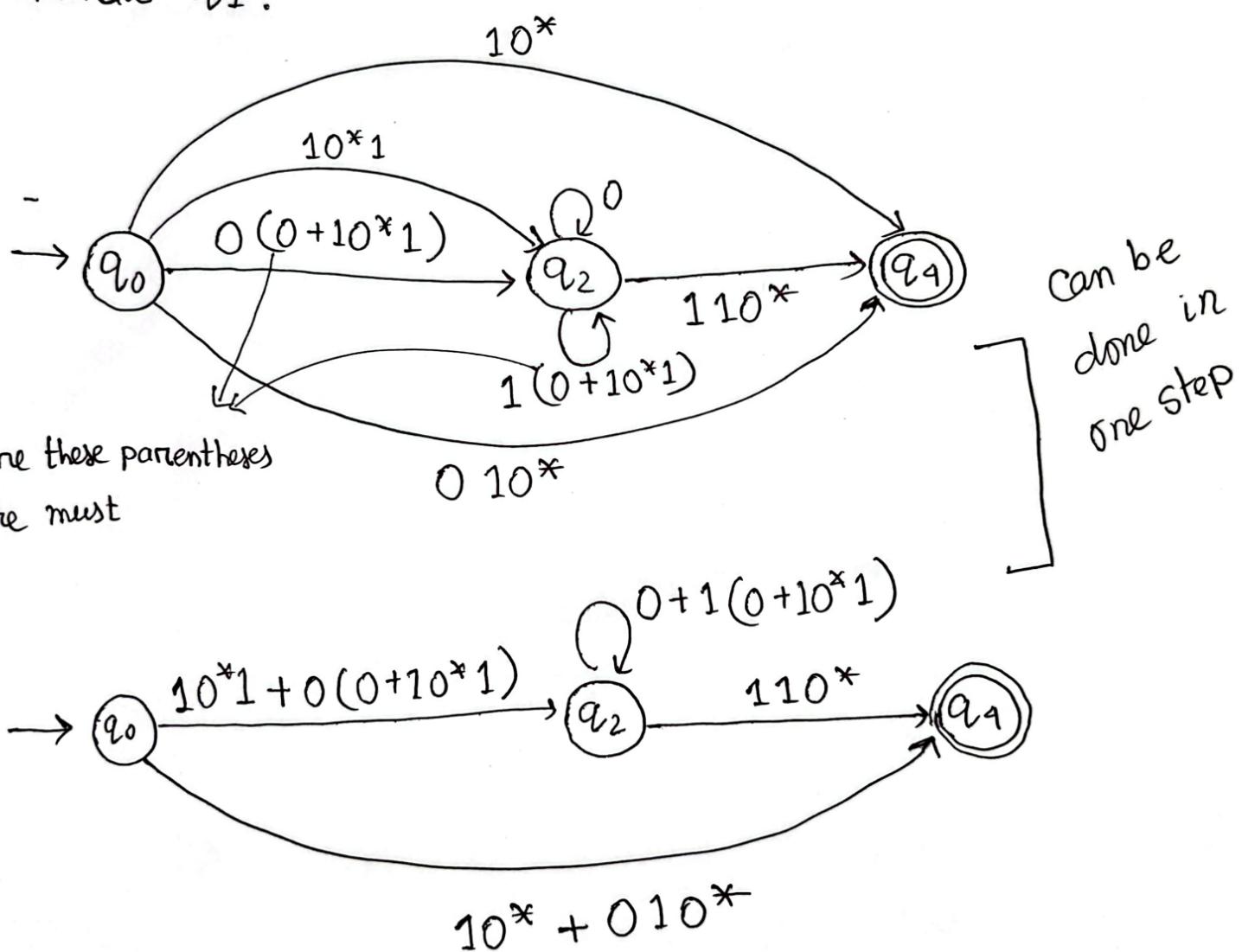
Eliminate q^3 :



Merging the parallel edges with 'or' [It can be done in one step, for better understanding I'm doing separately]



Eliminate q_1 :



Eliminate q2:

Must, since
there's a 01

$$\rightarrow \textcircled{q_0} (10^* 1 + 0(0+10^* 1)) (0+1(0+10^* 1))^* 110^* + 10^* + 010^* \rightarrow \textcircled{q_1}$$