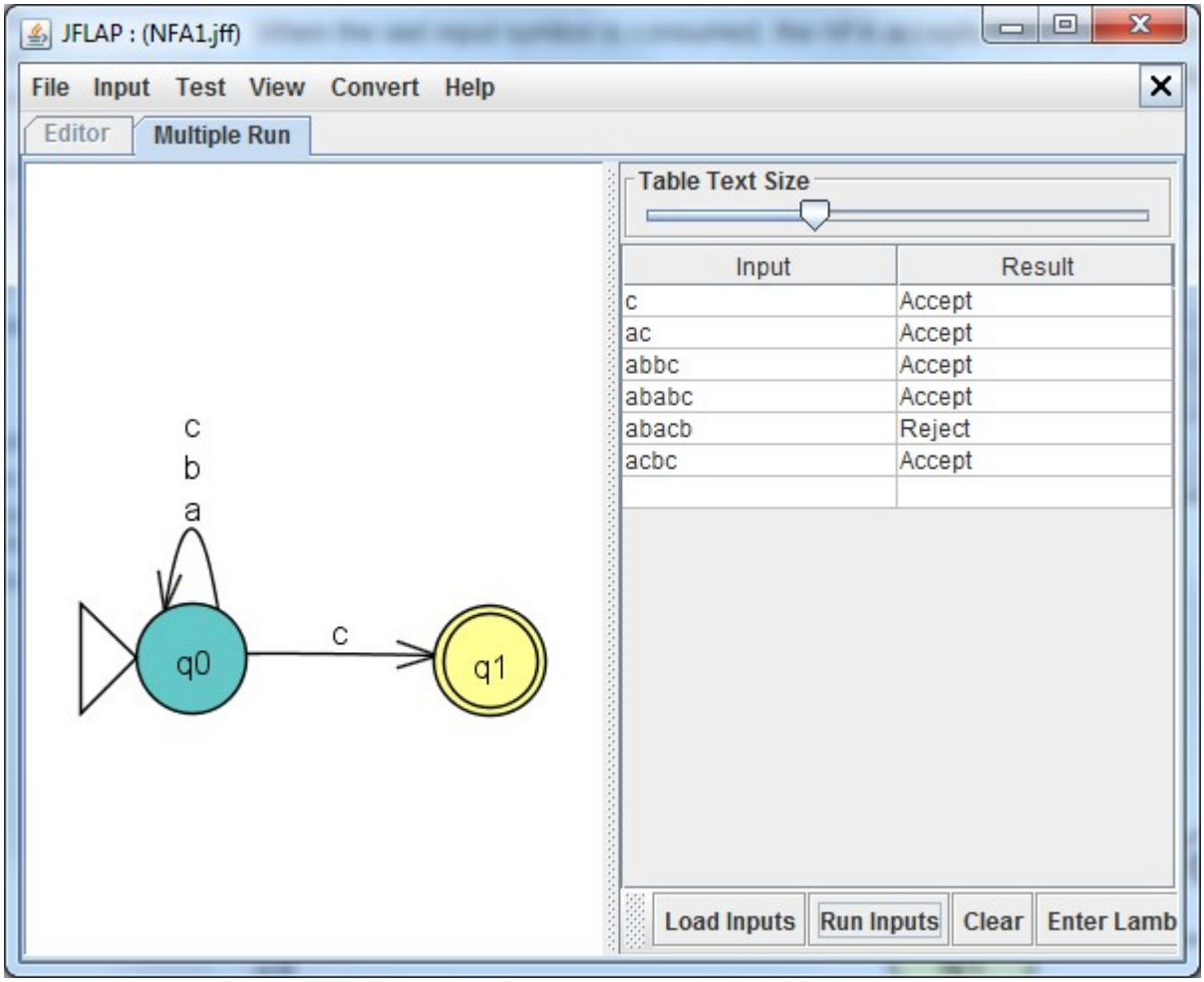
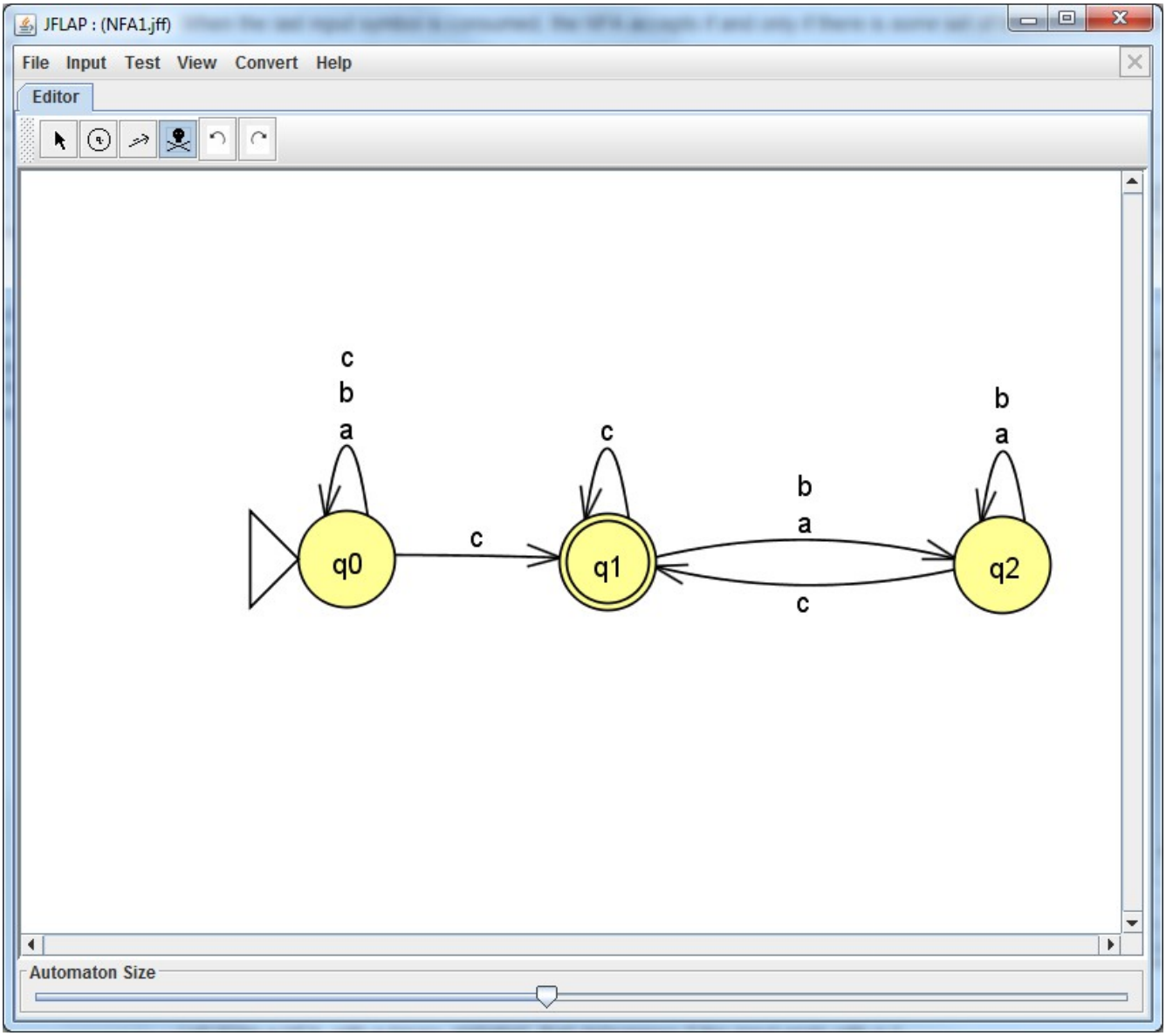
NFA to DFA EXERCISE

Given the Alphabet {a,b,c} construct a NFA which accepts (a|b|c)*c and the following NFA construct a DFA.

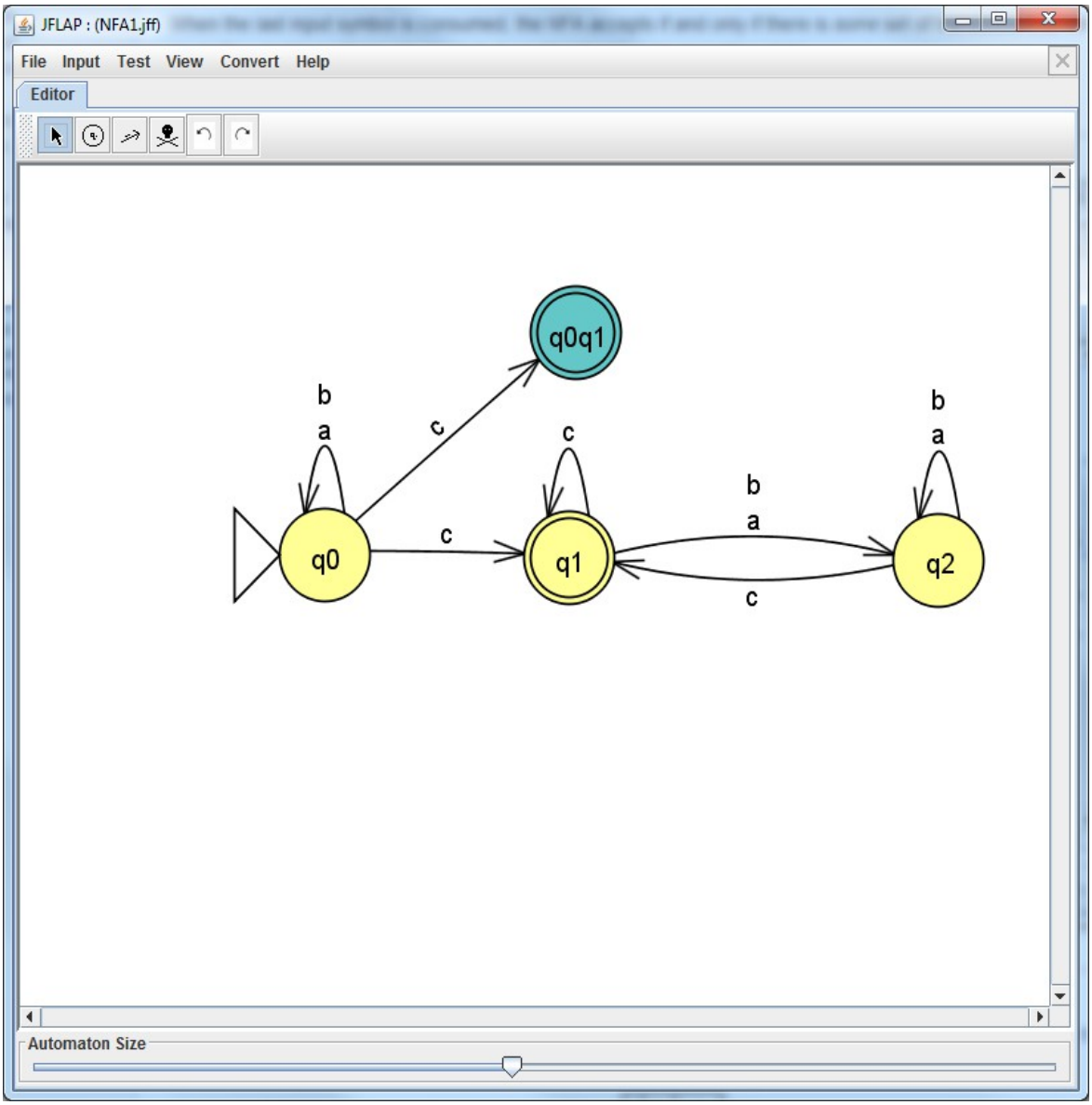


Solution

Start by explicitly making a reject state from the acceptance state q1. Since strings ending in an a or b must be rejected. Since we are building toward a DFA, we need to make sure that all transitions are represented on the reject state.

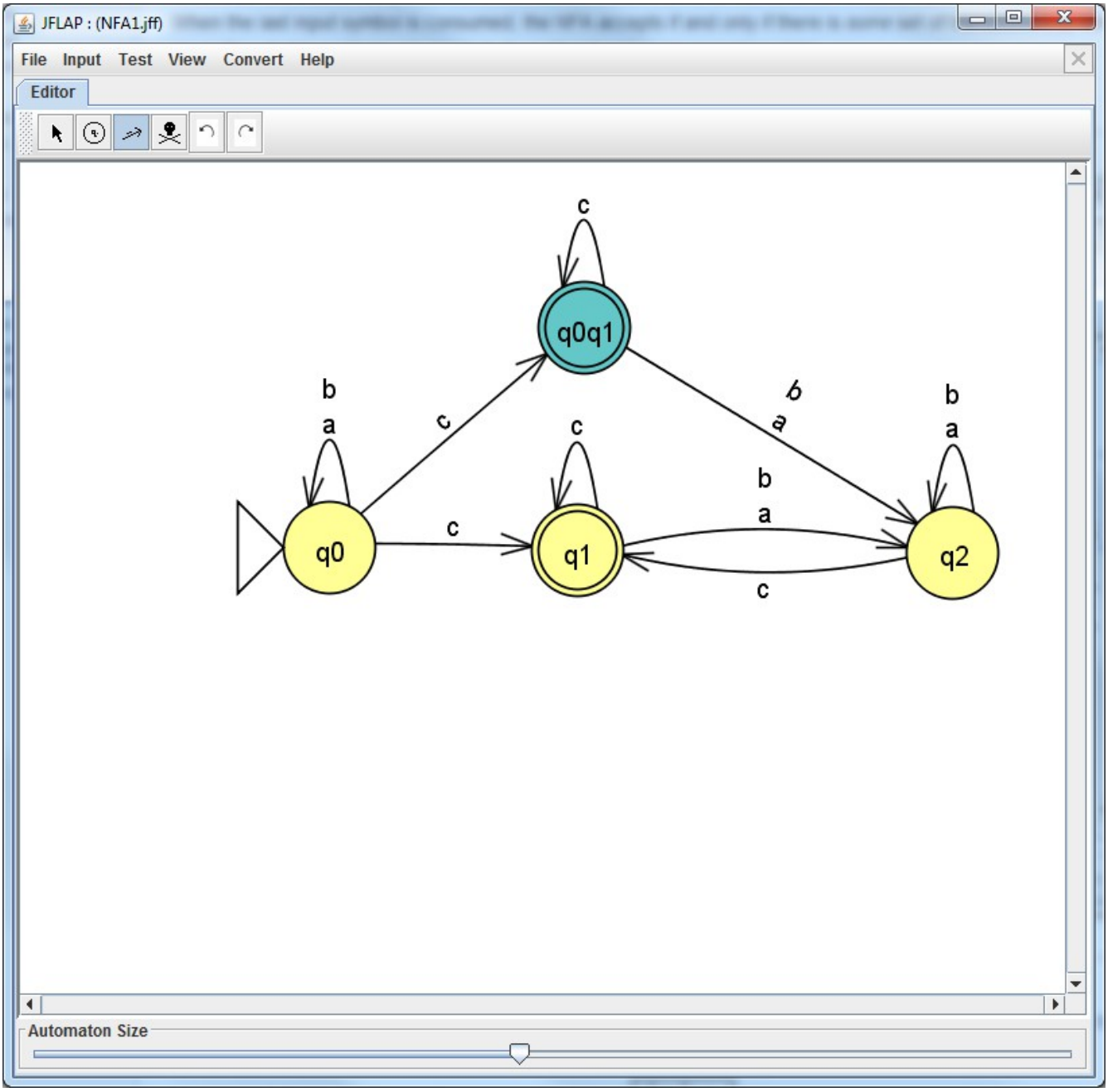


Then, split state q0 into the deterministic and non-deterministic parts, call the non-deterministic part q0 q1, to indicate it is currently in both possible states. We will do this is a few steps to be clear.



Now we need to determine the transitions out of q0q1 on ***a b*** and ***c.***

On a **c** we can accept. On an ***a*** or ***b*** we need to reject



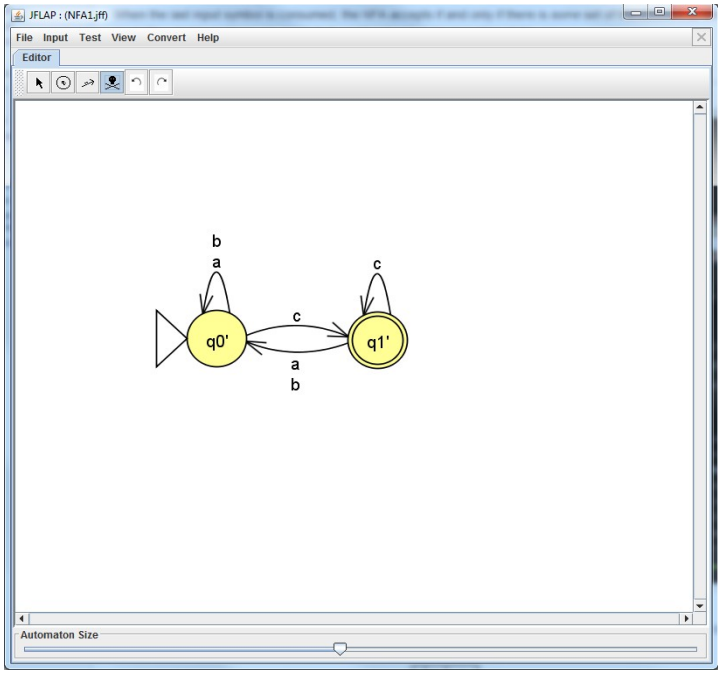
List the next states for each state

	a	b	c
Current state			
q0	q0	q0	q0q1,q1
q1	q2	q2	q1
q2	q2	q2	q1
q0q1	q2	q2	q0q1

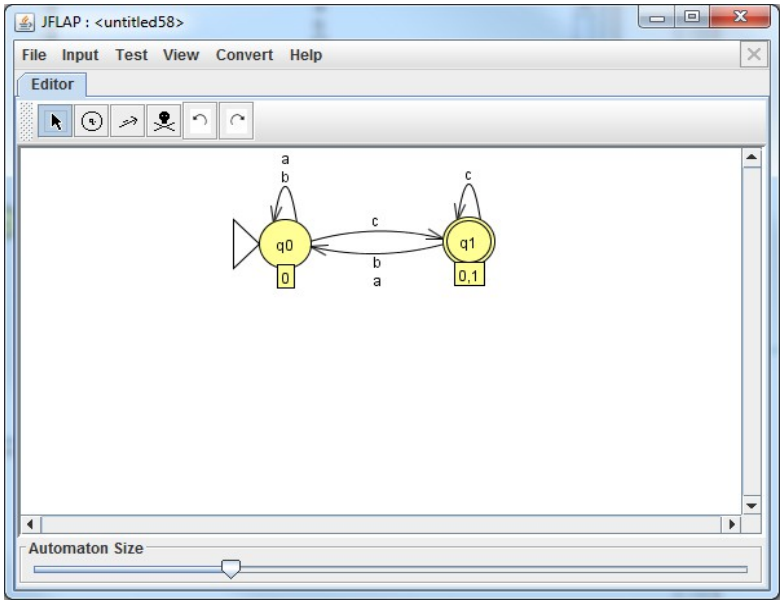
Notice that q1 and q0q1 are accepting states with exactly the same next state function, so these are equivalent. So we can merge these, call it q1'

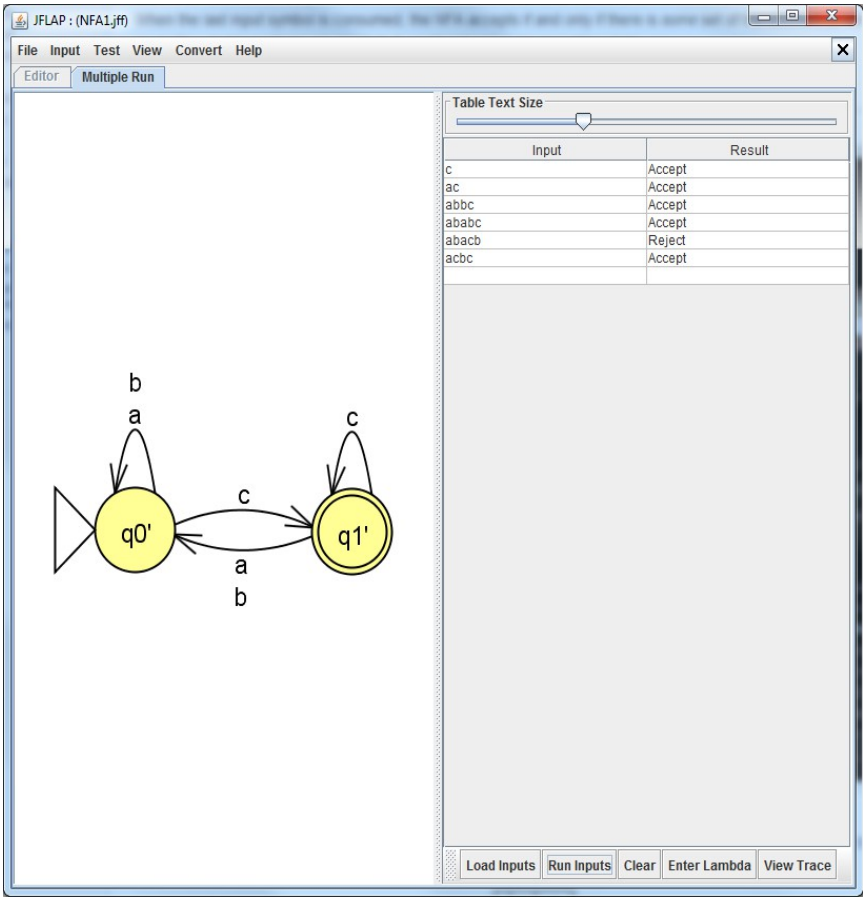
	a	b	c
Current state			
q0	q0	q0	q1'
q1'	q2	q2	q1'
q2	q2	q2	q1'

Notice that q0 and q2 are non-accepting states with exactly the same next state function. So we can merge. Call it q0'



Of course, you can use the tool as well. Convert to DFA


JFLAP : <untitled58>
File Input Test View Convert Help
Editor
a
b
c
q0
q1
c
b
a
0
0,1
Automaton Size


JFLAP : (NFA1.jff)
File Input Test View Convert Help
Editor
Multiple Run
Table Text Size
Input
Result
c
Accept
ac
Accept
abbc
Accept
ababc
Accept
abacb
Reject
acbc
Accept
b
a
c
q0'
q1'
c
a
b
Load Inputs
Run Inputs
Clear
Enter Lambda
View Trace