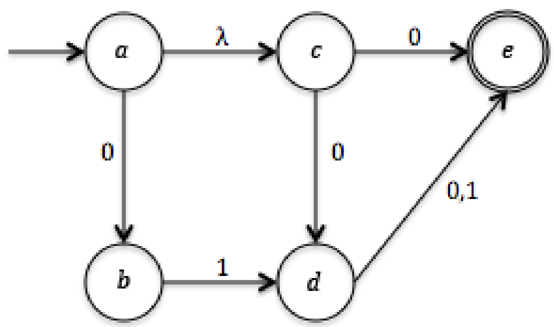
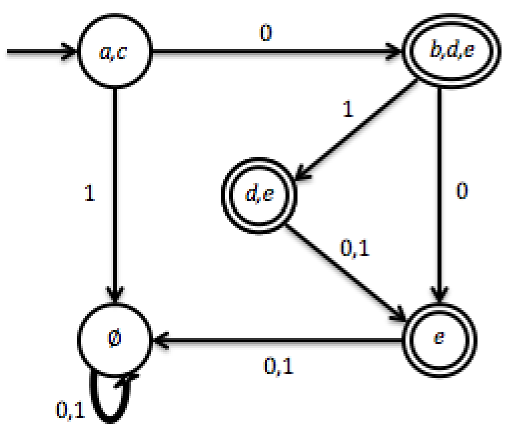
CSE 311 Quiz Section: November 29, 2012 (Solutions)

1 NFAs to DFAs

Convert the following NFA to a DFA.

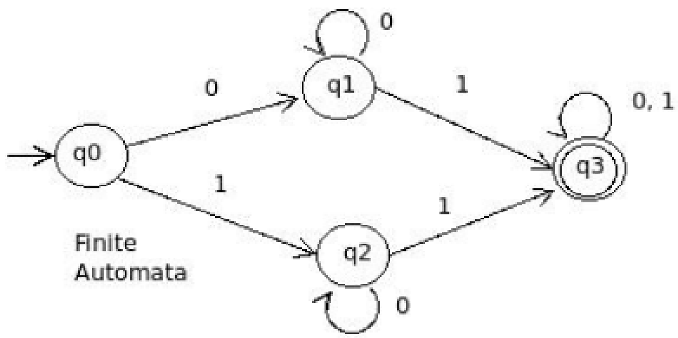


Solution:

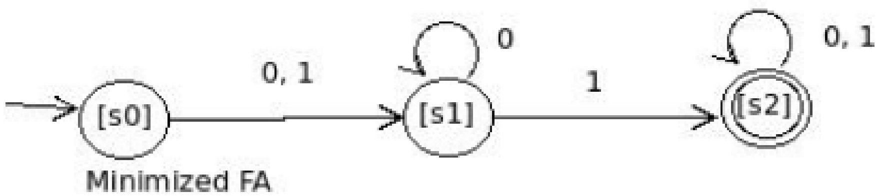


2 State minimization

Use the state minimization algorithm from lecture to minimize the following finite state machine.



Solution:



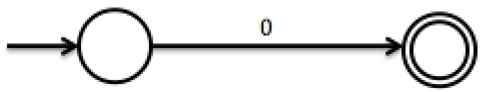
3

Regular Expressions to NFAs

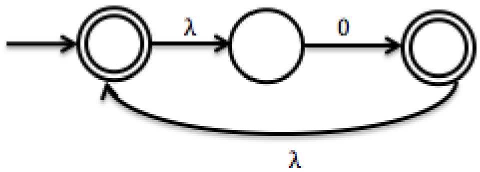
Using the constructions given in lecture, find nondeterministic finite-state automata that recognize each of these sets:

a) 0*1*

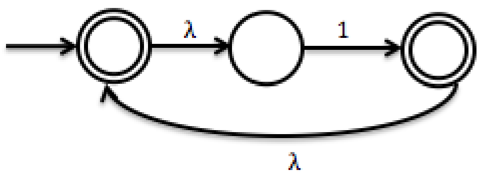
Solution:
1) First, we create the machine for the regular expression 0:



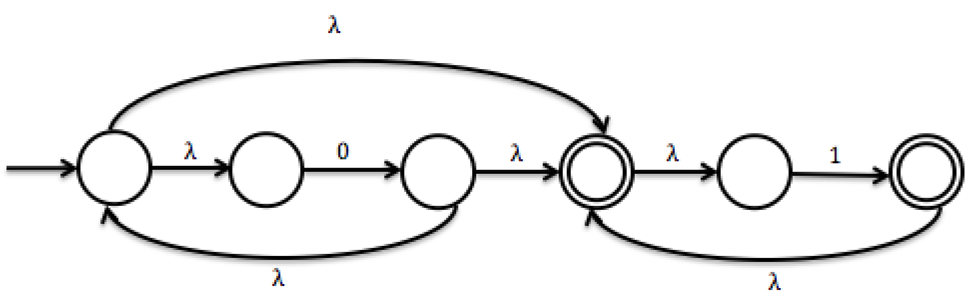
2) Next, we apply the construction for A* with our machine A = 0 from the previous step:



3) Similarly, we can create the machine for 1*:

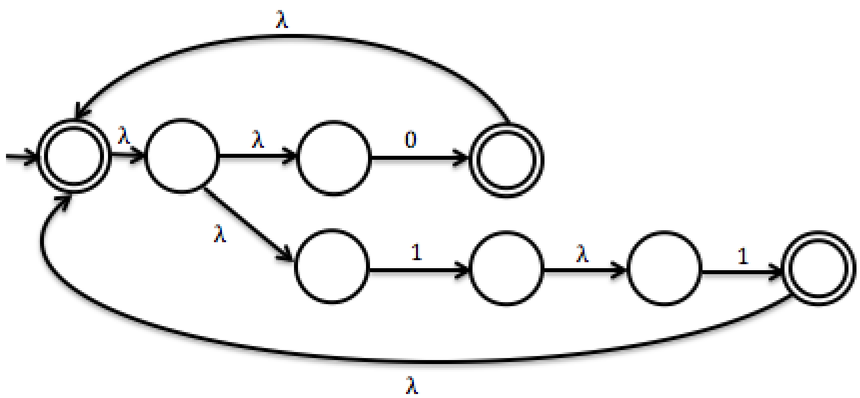


4) Lastly, we use the construction for concatenation to connect 0* and 1*. Note that since our start state is also a final state in 0*, we must connect it to the start state for 1* with lambda and then make sure that it becomes a non-final state as well.



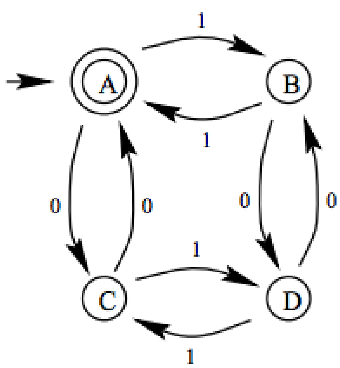
b) $(0 \cup 11)^*$

Solution:



4 FSAs to Regular Expressions

Convert the following DFA to a regular expression.



Solution:

$\mathbf{[11 \cup 00 \cup (10 \cup 01)(00 \cup 11)^*(01 \cup 10)]^*}$