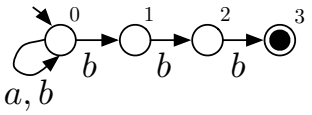
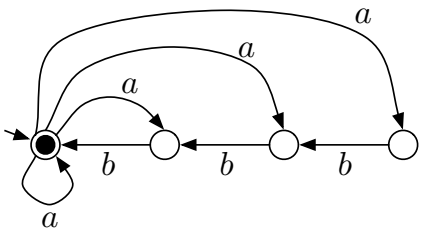
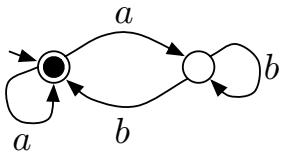
COMP2210 Theory of Computing
Tutorial 2

1. Convert the following NFA into a DFA using the subset construction. Show clearly which subset of the states of the NFA corresponds to each state of the DFA that you have constructed. Do not include states that are not reachable.



2. Convert the following NFAs into DFAs using the subset construction.



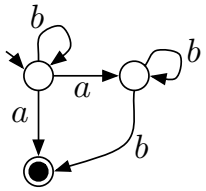


3. Give a DFA for the set of strings matched by the following regular expressions. Try to simplify as much as possible.

   a) $(aaa^* + bbb^*)^*$;

   b) $(a + b(ab^*a)^*b)^*$;

4. Use the procedure from Lecture 4 in order to come up with a regular expression for the following NFA. You don't need to follow the recursion to the end. Try to simplify at each step.



5. Give regular expressions for the following sets of strings over $\{a, b\}$. Aim for simplicity.

   a) strings with an even number of a's;

   b) strings with an odd number of b's;

   c) strings with an even number of a's *or* an odd number of b's.

   d) strings with an even number of a's *and* an odd number of b's;