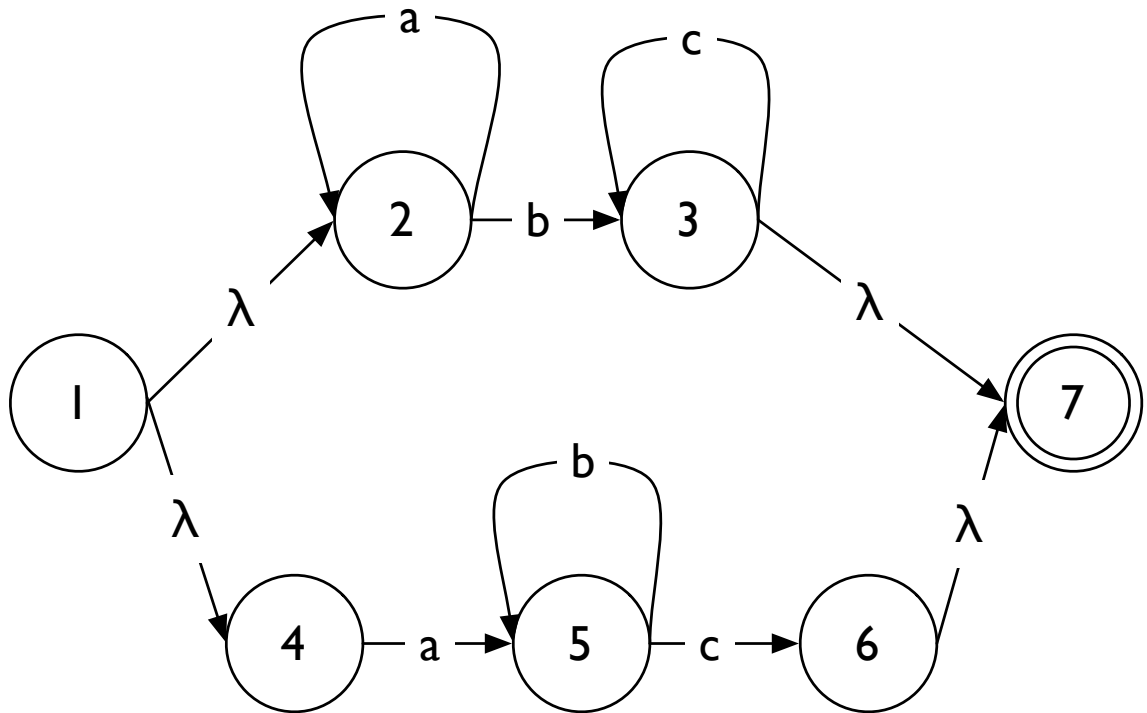


1. Give a *non-deterministic* finite automaton for the following regular expression:

$$((a^*bc^*)|(ab^*c))$$

Answer:

Here is one possible NFA—yours may look different. 1 is the start state.



2. Give a *deterministic* version of the finite automaton, using the construction we described in class. Provide both the graphical representation of the automaton as well as the state transition diagram.

Answer:

Here is the state transition table, as built through the subset construction:

State	a	b	c	Final?	New state name
1, 2, 4	2, 5	3, 7	Error	No	1
2, 5	2	3, 5, 7	6, 7	No	2
3, 7	Error	Error	3, 7	Yes	3
2	2	3, 7	Error	No	4
3, 5, 7	Error	5	3, 6, 7	Yes	5
6, 7	Error	Error	Error	Yes	6
5	Error	5	6, 7	No	7
3, 6, 7	Error	Error	3, 7	Yes	8

The graphical representation can be derived easily from here.

- Derive the reduced DFA. Provide both the graphical representation of the automaton as well as the state transition diagram.

Answer: New states 3 and 8 can be merged. No others can be merged.