COMPSCI 3331 - Fall 2022 - Quiz 3

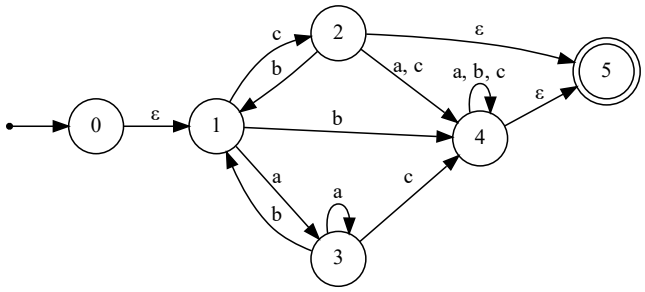
1. (1 mark) For each of the words in the table, put a checkmark in the box if it is accepted by the regular expression $(a+b)(a+b)(aa(ab+ba)^*)^*a$, and place an X in the box if it is not accepted.

bbaaaaa	✓
abaaabaabaa	✓

2. (1 mark) Write a regular expression corresponding to the language L of words over $\{a,b\}$ such that *aa* does not appear in the word. For example, *bbbabb* and *abbbbabbabb* are in L, but *aaba* is not. (Hint: if an *a* appears, what comes after it?)

Solution: $(b+ab)^*(a+\varepsilon)$. *The regular expression allows any repetition of b, but if an a appears, it must be immediately followed by a b. Finally, at the end, the word could end with a single a, or* ε *(which allows the word to end with b).*

3. (2 marks) Consider the ε-NFA below. Answer the following questions about what the **single label** (i.e., **only one transition**) would be for a transition after removing a state. Both questions are **independent** and you should start from the diagram both times to answer the questions.



If state 2 were eliminated, the transition from 1 to 4 would be labelled:	$c\varepsilon^*(a+c)+b$ *or* $c(a+c)+b$
If state 3 were eliminated, the transition from 1 to 4 would be labelled:	aa^*c+b