

# HW1

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1. Give a regular expression, simplified to the best of your abilities, for the language of all strings of as, bs, and cs where a is never immediately followed by b.

$$\Sigma = \{ a, b, c \}$$

$$((a+c)^*(c^+b^*)^*(a+c)^*)^* + ((a^*c^+)^*(b^*)^*((a^*c^+)^*)^*$$

2. Give a regular expression, simplified to the best of your abilities, for the language of all strings of as, bs, and cs that contain an even number of bs.

$$\Sigma = \{ a, b, c \}$$

$$(a+c)^* + ((a+c)^*b(a+c)^*b)^*$$

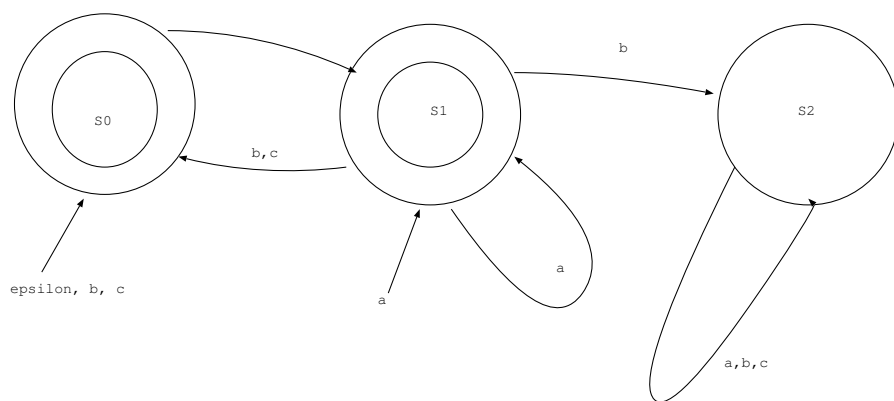
3. Simplify (if possible) the expression  $(a+b+c)^*(a+b)^*$ , then describe as concisely as you can in English the language it defines.

This regular expression is equal to  $(a^*b^*c^*)^*(a^*b^*)^*$  and be reduced to  $(a+b+c)^*$ . In english it essentially means that the language created from it has a general form of a-b-c and this form can repeat with repeating letters such as aaa-bbb-cc-aa-bb-cc.

4. Simplify (if possible) the expression  $(a + b)^*c^*(a + b)^*$ , then describe as concisely as you can in English the language it defines.

This could be simplified/converted to  $(a^*b^*)^*c^*(a^*b^*)^*$ . In english it essentially means a language of the form where a-b-c-a-b where there is a number of c's or none in the middle but on the outside there is a pattern of a-b where they can repeat the characters and the the pattern such as aa-bb-aa-bb in that order.

5. Define a DFA, simplified to the best of your abilities, for the language of all strings of as, bs, and cs where a is never immediately followed by b.



6. Define a DFA, simplified to the best of your abilities, that recognizes the language

