Mini Assignment 1

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20 points

Create a regular expression for each of the following problems. The alphabet for each problem is $A = \{a, b, c\}$.

1. Create a regular expression for a language l such that all strings in l contain an even number of b's or it contains an odd number of a's. This is not an exclusive or (i.e. bba, bab, bbaabab, bbaa, abbb are all valid).

   (a) $(c^*b^*)^*\,a\,((c^*b^*)^*\,a\,(c^*b^*)^*\,a)^*\,(c^*b^*)^*\ \mid\ ((a^*c^*)^*\,b\,(a^*c^*)^*\,b)^*\,(a^*c^*)^*\ \mid\ c^*$

2. Create a regular expression for a language l such that all strings in l do **not** contain the substring cc.

   (a) $((a|b)\,(a^*b^*)^*\,c\,(a^*b^*)^*)^*\ \mid\ ((a^*b^*)^*\,c\,(a|b)\,(a^*b^*)^*)^*\ \mid\ c\ \mid\ (a^*b^*)^*$

3. Create a regular expression for a language l such that for all strings in l, the number of c's is divisible by 2 or divisible by 3 (i.e. ccbaba, cbbacbbc, bcbcbcbc are in the language but ccccc is not).

   (a) $((a^*b^*)^*\,c\,(a^*b^*)^*\,c\,(a^*b^*)^*)^*\ \mid\ ((a^*b^*)^*\,c\,(a^*b^*)^*\,c\,(a^*b^*)^*\,c\,(a^*b^*)^*)^*\ \mid\ (a^*b^*)^*$