

COMP 455  
Models of Languages and Computation  
Spring 2019  
Homework 2  
Due Thursday, January 24, 2019

1. Rewrite each of these regular expressions as a simpler expression representing the same set.

(a)  $b^* \cup a^* \cup (a \cup b)^*$

(b)  $((a^*b^*)^*(b^* \cup a^*)^*)^*$

2. Let  $\Sigma = \{a, b, c\}$ . Write a regular expression for the set of all strings in  $\Sigma^*$  such that the sum of the number of  $a$ 's and  $b$ 's in the string is at most two. Thus the string can have an  $a$  and a  $b$  but cannot have two  $a$ 's and a  $b$ , for example.

For this homework you may work in groups of up to four people if you choose to, and groups are encouraged to turn in only one paper with everyone's names in the group on it. This will make the work of the grader easier. However, people in different groups may not collaborate.

Those who want to be part of a group and can't find others may meet in the front after class (today or later) and form groups, if you desire to. Or send email to the TA who can assign people to groups.