COMP 455
Models of Languages and Computation
Fall 2021
Homework 6
Due Tuesday, October 26, 2021

1. Consider the push-down automaton $M = (K, \Sigma, \Gamma, \Delta, s, F)$ where $K = \{p, q, r\}, \Sigma = \{a, b, c\}, \Gamma = \{b\}, s = p, F = \{r\}$, and Δ contains the following transitions:

$((p, b, \epsilon), (q, \epsilon)), ((q, a, \epsilon), (p, b)), ((p, c, b), (r, \epsilon)), ((r, c, b), (r, \epsilon))$.

a) Is the string *bcaa* accepted by M?

b) Is the string *bac* accepted by M?

c) Give a context-free grammar for the set of all strings accepted by M. Your grammar should have at most four productions. It should include all strings accepted by M and no others.

For this homework you may work in groups of up to four people 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 and form groups, if you desire to. You may also send email to the TA and he will assign people to groups.