CS 302 Spring 2020
REMOTE Midterm

Question 1 (*50* points)

(a) (15 pts) Write down a regular expression *E* corresponding to the non-empty language in *{0,1}** where (i) *each sequence that starts with a 1 ends with a 0 ; (ii) each sequence that starts with a 0 ends with a 1 and ;(iii) between the first and last symbols in the sequence there is at least one 1.*

(b) (15 pts) Construct an *NFA A* with ≤ 6 states that accepts the language given in *(a)*.

(c) (20 pts) Construct a minimal state *DFA B* that is equivalent to *A* above.

Question 2 (*50* points)

(a) (20 pts) Construct a *CFG G* that generates the language $L= \{a^n b^m c^k ; n=m+k ; n,m,k \geq 0 \}$.

(b) (15 pts) Construct a *PDA P* with a **single state** that accepts the language *L* above by *empty stack.*

(c) (15 pts) Construct a CFG G that generates the language corresponding to the regular expression $E =(0.1+1.0)^*$.