CS 302
REMOTE QUIZ 9

20 May, 2021

ANSWERS

(a) *(4 pts)* **G** *yields a PDA* **P** *as below*

$P=(Q=\{q_0, f\}, \Sigma=\{a,b\}, \Gamma=\{S,X,Y,Z_0,a,b\}, \delta, q_0, Z_0, F)$ *and* δ *as :*

$(q_0, e, S) \rightarrow \{(q_0, aXS), (q_0, bYS), (q_0, e)\}$

$(q_0, e, X) \rightarrow \{(q_0, aXX), (q_0, b)\}$; $(q_0, e, Y) \rightarrow \{(q_0, bYY), (q_0, a)\}$ *(productions)*

$(q_0, a, a) \rightarrow (q_0, e)$; $(q_0, b, b) \rightarrow (q_0, e)$ *(input shaving)*

$(q_0, e, Z_0) \rightarrow (q_0, SZ_0)$; $(q_0, e, Z_0) \rightarrow (f, Z_0)$ *(initial and final)*

(b) *(6 pts)* **P'** *transitions :* $(q_0, e, Z_0) \rightarrow (s, SZ_0)$ *where* **s** *is a new state and :*

$(s, a\text{-}b, V) \rightarrow (q_a - q_b, V)$; $V=S,X$ *or* Y ; $(s, e, S) \rightarrow (f, e)$

$(q_a, e, S) \rightarrow (s, XS)$; $(q_a, e, X) \rightarrow (s, XX)$; $(q_a, e, Y) \rightarrow (s, e)$

$(q_b, e, S) \rightarrow (s, YS)$; $(q_b, e, X) \rightarrow (s, e)$; $(q_b, e, Y) \rightarrow (s, YY)$

$(s, a, a) \rightarrow (s, e)$; $(s, b, b) \rightarrow (s, e)$

$(s, e, Z_0) \rightarrow (f, Z_0)$

Violates DPDA

Not a DPDA : to fix give ***priority*** *to input presence (see example in slides)*