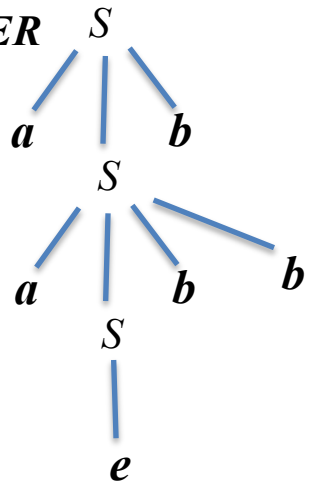
CS 302
QUIZ 7

16 November, 2015

QUESTION

(a)(5 pts) Draw the parse tree for the string **aabbb** generated by the CFG **G=({S}, {a,b}, P, S)** where **P : S → aSb | aSbb | e** and express the language L_G generated by **G**.

ANSWER



$L_G = \{ a^n b^m \mid n \le m \le 2n \}$

QUESTION

(b)(5 pts) Construct a **PDA** that accepts the language L_G by final state where **G** is as given in part **(a).** Is your **PDA** a deterministic one (i.e. a **DPDA**) ? Explain.

ANSWER $(q_0, e, Z_0) \rightarrow (q_0, SZ_0)$; $(q_0, e, S) \rightarrow (q_0, aSb)$; $(q_0, e, S) \rightarrow (q_0, aSbb)$; $(q_0, e, S) \rightarrow (q_0, e)$; $(q_0, a, a) \rightarrow (q_0, e)$; $(q_0, b, b) \rightarrow (q_0, e)$; $(q_0, e, Z_0) \rightarrow (f, e)$
NOT a **DPDA** ,e.g. **:** $(q_0, e, S) \rightarrow (q_0, aSb)$ and $(q_0, e, S) \rightarrow (q_0, aSbb)$ violates the DPDA condition