

CSE 420

Assignment 01

Deadline: 22/02/2018

1. (a) Left factor the following grammar:

$$E \rightarrow int \mid int + E \mid int - E \mid E - (E)$$

(b) Eliminate left-recursion from the following grammar:

$$\begin{aligned} A &\rightarrow A + B \mid B \\ B &\rightarrow int \mid (A) \end{aligned}$$

2. Consider the following grammar over the alphabet $\{\%, \#, !, :, w\}$ (L is the start symbol).

$$\begin{aligned} 1 \quad L &\rightarrow \%wD \\ 2 \quad L &\rightarrow U\# \\ 3 \quad U &\rightarrow \epsilon \\ 4 \quad U &\rightarrow !wDU \\ 5 \quad D &\rightarrow :wD \\ 6 \quad D &\rightarrow wL \\ 7 \quad D &\rightarrow \epsilon \end{aligned}$$

(a) Write the nullable nonterminals in this grammar.

(b) Write the FIRST sets for the nonterminals.

(c) Write the FOLLOW sets.

(d) Construct the LL(1) parse table.

(e) Show the sequence of stack and input configurations that occurs when parsing “%w : ww!w#”

3. Consider the following grammar:

$$\begin{array}{lcl} S & \rightarrow & bAb \mid bBa \\ A & \rightarrow & aS \mid CB \\ B & \rightarrow & b \mid BC \\ C & \rightarrow & c \mid cC \end{array}$$

Give two reasons why this grammar is not LL(1).

4. Consider the following Grammar:

$$S \rightarrow SS+ \mid SS^* \mid a$$

(a) Derive the LL(1) parse table (check for ambiguity first)

(b) Parse the string “aa*a*+”.

5. Convert the RE $((ab)|(ba))^*$ to an DFA determining the first-pos, last-pos & follow-pos of each node.