Compsci 334 **Classwork 4** **Oct 8 or 10, 2024**

10 pts

You can work in a group and turn one in with all names.

1. Consider the context-free grammar G = (V,T,S,P), where V=$\{S, A, B\}$, T= $\{a, b, c, d\}$, and P consists of

$$\begin{aligned} &\text{S} \to \text{ASdB} \mid \text{cB}, \\ &\text{A} \to \text{aA} \mid \lambda, \\ &\text{B} \to \text{bBb} \mid \lambda. \end{aligned}$$

   (a) Calculate the FIRST and FOLLOW sets for all variables in the grammar.

	FIRST	FOLLOW
S		
A		
B		

   (b) Calculate the LL(1) Parse Table for this grammar.

	a	b	c	d	$
S					
A					
B					

   (c) Explain why this grammar is not LL(1).

Two more problems on the back!

2. Consider the grammar G = (V,T,S,P), where V=$\{S, A, B\}$, T= $\{a, b, c, d\}$, and P consists of

$$\begin{aligned} &\text{S} \rightarrow \text{aBaa} \mid \text{Acd}, \\ &\text{A} \rightarrow \text{aA} \mid \text{b}, \\ &\text{B} \rightarrow \text{aabB} \mid \text{b}. \end{aligned}$$

This grammar is LL(k) for what value of k?

3. Consider the grammar G = (V,T,S,P), where V=$\{S, A, B\}$, T= $\{a, b, c\}$, and P consists of

$$\begin{aligned} &\text{S} \rightarrow \text{AbB} \mid \text{aABa}, \\ &\text{A} \rightarrow \text{aA} \mid \text{aAa} \mid \lambda, \\ &\text{B} \rightarrow \text{caB} \mid \text{b}. \end{aligned}$$

This grammar is LL(k) for what value of k?