

CSCI 450 Fall 2024  
Homework 6

Problem 1: (3 pts) Using the grammar below, show the leftmost derivation (1.5 pts) and the parse tree (1.5 pts) for the following statement:  $a = a * (b + (c * a))$

(**Note:** DON'T skip any steps in the derivation)

$$\begin{aligned}\langle \text{assign} \rangle &\rightarrow \langle \text{id} \rangle = \langle \text{expr} \rangle \\ \langle \text{id} \rangle &\rightarrow a \mid b \mid c \\ \langle \text{expr} \rangle &\rightarrow \langle \text{id} \rangle + \langle \text{expr} \rangle \mid \langle \text{id} \rangle * \langle \text{expr} \rangle \mid (\langle \text{expr} \rangle) \mid \langle \text{id} \rangle\end{aligned}$$

Problem 2: (1 pt) Consider the following grammar:

$$\begin{aligned}\langle S \rangle &\rightarrow a \langle S \rangle c \langle B \rangle \mid \langle A \rangle \mid b \\ \langle A \rangle &\rightarrow c \langle A \rangle \mid c \\ \langle B \rangle &\rightarrow d \mid \langle A \rangle\end{aligned}$$

Which of the following sentences are in the language generated by this grammar?

- a. abcd
- b. acccbd
- c. acccbcc
- d. acd
- e. accc

Problem 3: (1 pt) Convert the following EBNF to BNF:

$$\begin{aligned}S &\rightarrow A \{bA\} \\ A &\rightarrow a[b]A\end{aligned}$$

Problem 4: (5 pts) Finish the Fortran program, make sure to include the header comments (check Program Template on Bb). If your program does not compile/execute, you will get NO credit.