CSCI 301 - Assignment 8, Fall 2024

Your name here

Modify the .tex source file for this document, adding your answers below each question. This is an individual assignment. See the syllabus for the collaboration policy.

1. (5 points) Prove that the language $L_1 = \{a^n b^{n+2} : n \geq 0\}$ is context-free by giving a context-free grammar for L_1.
2. (5 points) Prove that the language $L_2 = \{a^i b^j c^k : (i, j, k \geq 0) \wedge (i = j \vee j = k)\}$ is context-free by constructing a context-free grammar for L_2.
3. (10 points) Consider the grammar $S \to S(S)S \mid \epsilon$.
   (a) (2 points) Give a leftmost derivation for the string (()()).
   (b) (3 points) Prove that the grammar is ambiguous.
   (c) (2 points) Compute $FIRST(S)$.
   (d) (3 points) An LL(1) parse table for the above grammar would have the following form:

	(	)	$
$S \to$			

   Give a correct LL(1) parse table for this grammar, or explain why one does not exist.