

CS311 Exercise # 5

Due by classtime, Thursday, October 31, Submit via D2L

1. Consider the context free grammar

$R \rightarrow RR \mid R + R \mid R^* \mid (R)$

$R \rightarrow \varepsilon \mid \emptyset$

$R \rightarrow A$

$A \rightarrow 0 \mid 1$

The above is an informal description of the grammar. Extract a formal description as a 4-tuple $G = (V, \Sigma, R, S)$. Use the conventions discussed in the text and the notes.

2. Using the grammar G from question 1 above. Consider the string $0(1+0^*)1$ Provide

A. A derivation of string

B. A parse tree of your derivation

C. Do you recognize the strings derived by G ? Describe in English the language $L(G)$.

3. Prove that the grammar G is ambiguous

1. Hint, find a string that has two leftmost derivations

4. Consider the PDA to the right.

Give a sequence of instantaneous descriptions (IDs, see the posted class notes for

Definition of ID) that show that the string $aabcc$ is accepted by the PDA.

