

CS311 – Computational Structures – HW5

Thursday, April 28, 2011
due in class Thursday, May 5, 2011

Answer each question below. Write your answers neatly on paper. Be sure your name is on the paper, and the paper is clearly identified as Homework 5.

1. Question 3, Section 11.4.2, page 755 . Word Description to RegGram. Parts a, b, c, and d. (20 points)
2. Question 1, Section 12.1, page 762. Word description to CFGram. Parts a, b, c, and f. (20 points)
3. Question 3, Section 12.3, page 796. Left factoring. Parts a and b. In addition to the grammar for each part, give a sentence or two describing what you think the minimum k is for your answer. $LL(k)$ is defined in section 12.3.1 in the text, review it if you need to. (20 points)
4. Question 4, Section 12.3, page 796. Left recursion removal. Parts a and b. (20 points)
5. Argue that the regular languages are a subset of the context free languages. Do this by
 - Pick a formalism (other than regular grammars) that describes the regular languages. (2 points)
 - Write down the formal description (or definition) of that formalism. (3 points)
 - Using just the pieces available from the definition, give an algorithm that transforms the pieces into a context free grammar. Be as precise as you can, list individual steps, identify where you use loops or repetition, identify where you make a choice or case split, use indentation, flow charts, or other lexical features to make the structure of your algorithm clear. (8 points)
 - Give one (small but not trivial) example, transforming a concrete instance of your formalism into a concrete context free grammar. Your example should describe an infinite language. (4 points)
 - Finally, make a persuasive argument that the concrete context free grammar recognizes the same set of strings as the concrete formalism (3 points)