CS344: Programming Languages
Homework 2

Required Problems

1. Write regular expressions to capture the following regular languages:

   (a) The set of 0-1 strings which have a 1 in every odd position. (Note: even positions may be either 0 or 1.)

   (b) Strings in C. These are delimited at the front and back by double quotes (") and may not contain newline characters. They may contain double quotes or backslash characters if and only if those characters are "escaped" by a preceding backslash. (You may find it helpful to introduce shorthand notation to represent any character that is *not* a member of a small specified set, just to make the picture more readable. For example, if wanting any character that is not a digit between 0 and 9, you could use the shorthand $\neg[0-9]$.)

   (c) Comments in Pascal. These are delimited by (* and *) or by { and }, and can contain anything in between.

2. Write a DFA or NFA to recognize the languages described in each part of problem 1.

3. Show the NFA that results from applying the standard construction we saw in class (or you can find in the book in Figure 2.7) to the regular expression $letter(letter|digit)*$. Convert this NFA to a DFA (see Example 2.14 in the book).

4. (a) Describe in English the language defined by the regular expression $a^*(ba^*ba^*)^*$.

   (b) Give a context free grammar that generates the same language. Is your grammar ambiguous? Justify your answer.

   (c) Show a (rightmost) derivation of the string *baabaaabb*.