0. Write regular expressions for each of the following.
   a. Strings over the alphabet \{a, b, c\} where the first \(a\) precedes the first \(b\).
   b. Strings over the alphabet \{a, b, c\} with an even number of \(a\)’s.
   c. Strings over the alphabet \{a, b, c\} that don’t contain the contiguous substring baa.

1. In section A2.5.1 of *The C programming Language*, the lexical definition of integer constants is given as follows:

   “An integer constant consisting of a sequence of digits is taken to be octal if it begins with 0 (digit zero), decimal otherwise. Octal constants do not contain the digits 8 or 9. A sequence of digits preceded by 0x or 0X (digit zero) is taken to be a hexadecimal integer. The hexadecimal digits include a or A through f or F with values 10 through 15.

   “An integer constant may be suffixed by the letter u or U to specify that it is unsigned. It may also be suffixed by the letter l or L to specify that it is long.”

   Write a regular expression (or collection of regular expressions) for this language of nonnegative integer constants in C.

2. Convert the following regular expression to a NFA:
   \(a ((bcd|a*cd)x^*) | x*a\)

3. a. Convert the following regular expression (where the alphabet is a, b, and c) into an NFA, following the mechanical rules developed in class.
   \((a|b) (a|b) * \mid (a|b) (a|b) * c (a|b) (a|b) *\)
   b. Convert this NFA into a DFA, following the algorithm from class. Be sure to label the NFA states and to label each of the DFA states with a set of NFA states.
   c. Describe the set of strings generated by this regular expression (e.g., an English description like the ones in question 0.)

4. a. The regular grammar specifying lexically correct programs for MiniJava is given as follows: \textbf{Program} ::= (\textbf{Token}|\textbf{Whitespace})*
   Modify this specification to require that all tokens be separated by whitespace, and optionally allow whitespace at the start and/or end of the program.
   b. Why does this language-change remove the need for the longest-match meta-rule?
   c. Do you think this would be a good language design change?

Produce a hard-copy of your answers and turn them in by the start of class on the due date. Do these exercises individually, not with your project partner.