1. Scanners

(a) Using Ocamllex-like syntax, write a scanner for C’s floating point numbers, as defined by Ritchie.

A floating constant consists of an integer part, a decimal point, a fraction part, an e, and an optionally signed integer exponent. The integer and fraction parts both consist of a sequence of digits. Either the integer part or the fraction part (not both) may be missing; either the decimal point or the e and the exponent (not both) may be missing.

Hint: make sure your scanner accepts constants such as 1. 0.5e-15 .3e+3 .2 1e5 but not integer constants such as 42

(b) Draw a DFA for a scanner that recognizes and distinguishes the following set of keywords. Draw accepting states with double lines and label them with the name of the keyword they accept. Follow the definition of a DFA given in class.

if else ifelse union unsigned void volatile

2. Dragon book 2ed, Exercise 3.7.3, p. 166:

Construct nondeterministic finite automata for the following regular expressions using Algorithm 3.23 (p. 159, shown in class), then use the subset construction algorithm to construct DFAs for them using Algorithm 3.20 (p. 153, also shown in class).

(a) \((a|b)^*\)

(b) \((a^*|b^*)^*\)

(c) \((\epsilon|a)b^*\)^*