Problem set 1

Due Thursday, January 21, 2016

Regular expressions should be typed, but the FSA may be drawn by hand if you wish. If you draw by hand, take a picture and insert the image in your text document.

1. Write regular expressions for the following languages. You may use either Perl/Python notation or the minimal “algebraic” notation of Section 2.3, but make sure to say which one you are using. Before you write the regex, ask yourself what alphabet is either stated or assumed in each of the following problems.
   1. the set of all lower case alphabetic strings ending in a b;
   2. the set of all strings from the alphabet *a, b* such that each *a* is immediately preceded by and immediately followed by a *b*;
   3. all strings that have both the word *grotto* and the word *raven* in them (but not, e.g., words like *grottos* that merely *contain* the word *grotto*). By “word”, we mean an alphabetic string separated from other words by whitespace, any relevant punctuation, line breaks, and so forth.
2. Design an FSA that recognizes the following types of simple date expressions: *March 15, the 22nd of November, Christmas*. You should try to include all such “absolute” dates (i.e., not “deictic” ones relative to the current day, like *the day before yesterday*). Each edge of the graph should have a word or a set of words on it. You should use some sort of shorthand for classes of words to avoid drawing too many arcs (e.g., furniture 🡪 desk, chair, table).