Recitation #3 – Worksheet

Regular Expressions

1. **Write a regular expression for** :

   a. All strings of 0's and 1's.
      $(0|1)*$

   b. All strings of 0's and 1's with at least 2 consecutive 0's.
      $(0|1)*00(0|1)*$

   c. All strings of 0's and 1's beginning with 1 and not having two consecutive 0's.
 $1(1|01)*0?$, need to recognize 1010111110, 10, 1111111

2. **Express in words what the following regular expressions mean**:

   a. $(0|1)*011$
      All strings of 0's and 1's ending in 011.

   b. $0*1*2*$
      Any number of 0's followed by any number of 2's.

   c. $\char`\^[\char`\^aeiou]*\$$
      Any complete line that does not contain a lowercase vowel.
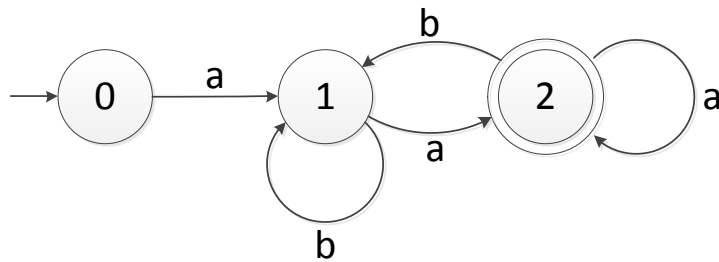
3. Find all strings in $(a|b)*b(a|ab)*$ of length less than four.
   Length 0: none, since there must be at least one *b*.
   Length 1: *b*
   Length 2: *ab*, *bb*, *ba* (*aa* is not possible)
   Length 3: *aab*, *aba*, *abb*, *baa*, *bab*, *bba*, *bbb*. (*aaa* is not possible)

DFAs

4. Make a DFA that accepts the strings in the language denoted by regular expression
   $ab*a$
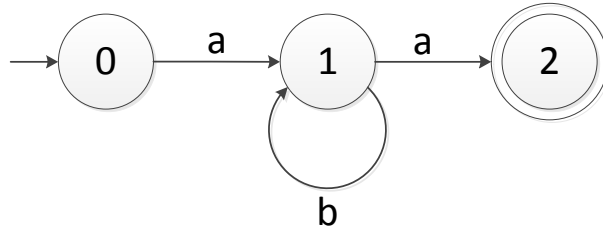
5. Write the regular expression for the following automata:

$a(a|b)*a$

Analyze by parts:

- aa works
- If we are in state 1, any number of b's as long as they are followed by one a; any number of a's (at least one) gets us to final state too