Recitation #3 – Worksheet

Regular Expressions

1. Write a regular expression for:
   a. All strings of 0’s and 1’s.
      \((0 \mid 1)^*\)

   b. All strings of 0’s and 1’s with at least 2 consecutive 0’s.
      \((0 \mid 1)^*00(0 \mid 1)^*\)

   c. All strings of 0’s and 1’s beginning with 1 and not having two consecutive 0’s.
      \(1(1 \mid 01)^*0^?\), need to recognize 101011110, 10, 111111

2. Express in words what the following regular expressions mean:
   a. \((0 \mid 1)^*011\)
      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. \(^[aeiou]^*$\)
      Any complete line that does not contain a lowercase vowel.

3. Find all strings in \((a \mid b)^*b(a \mid ab)^*\) 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