CMPT125, Fall 2018
Homework Assignment 5
Due date: November 30, 2018

Submit homework, printed or written in readable handwriting,
to the assignment boxes in CSIL ASB9838.

1) [20 points] Draw a DFA that defines the language
$$L_1 = \{x \in \{a,b\}^* : x \text{ contains the string abbab}\}$$

2) [20 points] Draw a DFA with 4 states that defines the language
$$L_2 = \{x \in \{0,1\}^* : x \text{ has even number of 1's and odd number of 0's}\}$$
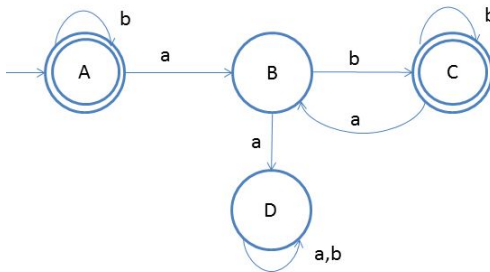
3) Recall, a DFA is described using a 5-tuple (Σ, S, s_0, δ, F).
   Consider the following description of DFA:

$\Sigma = \{0,1\}$ $S = \{s_0, s_1, s_2\}$ $F = \{s_2\}$	$\delta(s_0,0) = s_0$ $\delta(s_0,1) = s_1$ $\delta(s_1,0) = s_2$ $\delta(s_1,1) = s_0$ $\delta(s_2,0) = s_1$ $\delta(s_2,1) = s_2$

[15 points] Draw the corresponding DFA.
[15 points] Write a regular expression for the language defined by the DFA. Freebie

4) [10 points] Describe the language L_4 defined by this DFA.

5) [20 points] For each of the following regular expressions do
   - explain in words the language defined by the regular expression
   - draw a DFA that defines the language given by the regular expression.
      a. (abc*)*
      b. a*ba*
      c. ab*a
      d. $((1|0)^2)^2$