(I) Give a formal definition with any notations for the following:

DFA as a 5 tuple, Language accepted by automaton, Regular language

(II) Given the alphabet as {0, 1}, write a DFA for the following three regular languages.

(Give the complete description of the DFA, and also as a transition graph)

(i) L = {w | w is a string of even length}

(ii) L = {w | |w| mod 3 = 0}

(iii) L = {w | w contains the string 001 as a substring}

(iv) L = {w | w does not contain two consecutive 1's}

(III) Choose any DFA you made for Problem (II), describe the extended transition function on a string recursively using transitions one symbol at a time of following problems.

(i) A string (of length >=4) that belongs to the language

(II) A string (of length >=4) that does not belong to the language