# CS 6041 Theory of Computation

# Homework 2

You can use online tool to draw the figure: <http://madebyevan.com/fsm/>

**Make sure you follow the instruction before submission:**

**1, Any late submission due to whatever reason will not be graded.**

**2, The answer should be written in BLUE and the figure can be any color. The wrong format submission might not be considered.**

**3, The submission file must be in PDF. Any other format (i.e., docx, pages) will not be graded. We don’t accept the hand-written submission.**

1. (40 points) Please give the state diagram of a DFA for the language given. In all parts, Σ = {a, b}.
2. {w| w has an even number of a’s}
3. {w| w has one or two b’s}
4. {w| w has even length}
5. {w| w has an odd number of a’s}

Your solution should be a DFA solution.

1. (30 points) The alphabet is {0, 1}, and the language A= {w| w contains an even number of 0s, or contains exactly two 1s}.

Give the state diagram of an NFA N that recognizes A, i.e., L(N) = A.

1. (30 points) THEOREM 1.39: Every nondeterministic finite automaton has an equivalent deterministic finite automaton.

Use the construction given in Theorem 1.39 to convert the following nondeterministic finite automata to equivalent deterministic finite automata.

Diagram

Description automatically generated

(Optional) If you can, please use a concise sentence to describe the language A recognized by the finite automaton, i.e., A = { w | w ……}.