

Homework 8: NFAs and DFAs

Submission policy. Submit your answers on paper **before** the class starts on **Monday**, April 13, 2020. No late submissions accepted.

1. Handwritten answers are fine but please make sure they are readable.
2. Your name should be printed at the very top of the document.

Administration. This assignment will be graded by the GTA.

Practice Questions – Do NOT submit these.

Textbook questions 9.2, 9.6, 9.7, 9.8, 9.10, 9.11, 9.12, 9.13, 9.17, 9.18

Questions that will be graded. Total Points 100.

Define **nondeterministic** finite state automata (as state transition diagrams) for each of the following languages over the alphabet $\Sigma = \{a, b\}$:

$$L_1 = \{x \mid x \in \{a, b\}^* \text{ and } x \text{ contains the substring } aaa\}$$

$$L_2 = \{x = yz \mid x \in \{a, b\}^*; y \in \{a, b\}^* \text{ and } y \text{ contains an odd number of } as; z \in \{a, b\}^* \text{ and } z \text{ contains an odd number of } bs\}$$

(b) Define the automaton given in (a) as a 5-tuple $M = (Q, \Sigma, q_0, \delta, A)$.