

1. The assignment can be handwritten or typed. It MUST be legible.
2. You must do this assignment individually.
3. Submit this assignment only if you have read and understood the policy on academic honesty on the course web page. If you have questions or concerns, please contact the instructor.
4. Use the dropbox near the main office to submit your assignments, or hand them in at the beginning of class (please note the times and day above). No late submissions will be accepted.

Question 1

Draw a finite automaton that accepts the language of all strings containing bb and aba as substrings. Note that substrings must be contiguous, so the string bab does not contain the word bb as a substring.

Question 2

Let $\Sigma = \{a, b\}$. Construct DFA's accepting the following languages:

1. All words not ending in aab .
2. Construct a FA that accepts all strings over $\{a, b, c\}$ whose symbols are in alphabetical order. For example, $aaabcc$ and ac are accepted by the FA, $abca$ and cb are not.

Question 3

Assume that L_1, L_2 are regular languages. Prove that $L_1 - L_2$ is regular.

Hint: Construct an automaton that accepts $L_1 - L_2$.

Question 4

Show that if L is a regular language, the language obtained from L (alphabet Σ) by deleting the last letter in every non-empty word, i.e., the following, is regular.

$$L' = \{w|w\sigma \in L, \sigma \in \Sigma\}$$

Write down a short intuitive argument to show that your answer is correct.

Question 5

Show that if L is a regular language, the language obtained from L (alphabet Σ) by adding a single character σ to each word, i.e., the following, is regular.

$$L' = \{w_1\sigma w_2 | w_1w_2 \in L, \sigma \in \Sigma\}$$

Write down a short intuitive argument to show that your answer is correct.