

Homework 4

You may collaborate with *one or two* other students on the graded homework if you wish, or work alone. Collaboration must be true collaboration however, which means that the work put into each problem should be roughly equal and all parties should come away understanding the solution.

The ungraded homework may be done in whatever way works best for you. There are no rules regarding collaboration. The point of ungraded homework is to develop your abilities and prepare you for the quiz. Solutions will be provided, but they should be consulted only when you need a hint and/or afterward to compare and contrast your solution with mine.

Homework Exercises

Completion of these tasks by 11:59pm Sunday March 13 is worth approximately 1-2% of your course grade. No late homework will be accepted.

1. (ungraded) Draw a deterministic FA (a DFA) that recognizes each of the languages 3, 4, 7, 13, and 15 from [this list](#).
2. (ungraded) Draw a deterministic FA (a DFA) using the alphabet $\{0,1\}$ that recognizes all strings that either begin or end with three 0s (or both).
3. (ungraded) Draw a nondeterministic FA (an NFA) using the alphabet $\{0,1\}$ that accepts all strings that either begin or end with three 0s (or both) and rejects all other strings. *Hint: The simplest way to do this is to have your start state have two lambda transitions: one to the part of machine that looks for one kind of input and another that looks for the other type.*
4. (ungraded) Write a regular expression that generates each of the languages 2, 5, 6, 8, and 12 from [this list](#).
5. (ungraded) The webpage at http://ivanzuzak.info/noam/webapps/fsm_simulator/ contains a tool that allows you to visualize and test FA. It is described briefly [here](#). For Problems 2 and 3 above, use the notation of the website to represent your solutions. This notation may be used in future quizzes or exams, so get comfortable with it.
6. (graded) I will soon place a "Homework quiz" on Canvas for you to complete. It will be untimed and you can take it as many times as you wish. You will be able to see your score after each submission, and the highest will be kept as your score.

Ungraded homework solutions

Study these after completing the homework or after struggling with it for a while.

Problems 1 and 4 ([pdf](#)).

Remaining problems ([text](#))