

CSci 3501 Lab 7
30 points (See canvas for due date)
Work in pairs

- All lab submissions should be done by canvas. Please be sure to include your group members.
- When working on the lab, please comment your work so that it is clear what the contributions from each person are.
- At the end of the lab each group should submit the results of their in-class work. Please indicate if this is your final submission. Don't forget to answer all the questions below.
- If your submission at the end of the lab time was not final, please submit a final copy before the due time.

Lab overview and goals

The goal of the lab is to practice with JFLAP (a tool for experimenting with finite automata and other computability topics) and to design and test finite automata (DFAs and NFAs).

Resources

- JFLAP: download
- tutorial
- To run the jar file on the command, open the terminal, `cd` to the directory where the file is, and type `java -jar JFLAP.Thin.jar`

Using JFLAP and naming your files:

- Please save your automata files as `.jff` files and your data as `.txt` files. **Files names must be as follows:** names of those in the group followed by question name, e.g. `SmithAdams3.jff` (where 3 refers to the question number). This will help me (or the grader) in running test data

To load test data from a file, go to **Input** → **Multiple Runs** → **Load Inputs**

- When adding multiple transitions between the same two states, add them one by one. Typing "0, 1" in a label for an arrow will give you a wrong result since the automaton will try to match this input exactly, including the comma.
- When writing DFA, check that every state has a transition on every symbol. JFLAP does not check it.
- Consult the JFLAP tutorial as needed.

Lab task 1 (16 points: 4 points for each problem)

Unless specified otherwise, the alphabet is the set of 0 and 1. Recall that zero is an even number.

Please design and test the following finite automata:

- DFA to recognize the language of all strings that have at most three zeros.
- DFA to recognize the language of all strings that have an even number of zeros and an odd number of ones.
- DFA to recognize the language of all strings that end with an even number of zeros (i.e. the longest substring of 0s at the end of the string is of even length)
- DFA to recognize the language of all strings that have a pattern 01 but not 10

Lab task 2 (to be graded after the final presentation... this is just to keep you on track)

Continue working on your sorting program. For the final submission include, in addition to your Java files, a write-up on what sorting algorithms you are using and why. Discuss its efficiency in practice: effects of programming choices, such as an array versus ArrayList, using specific Java methods, etc.

If you changed anything in your program after the initial run, please indicate what you changed and why. Also include things that you tried that didn't work out and explain why.

What to submit

- Submit your all your files in a single `.zip` file to canvas. Make sure to submit your DFA files (as `.jff`) and your input data (as `.txt`). Make sure to follow the naming requirements! Make it clear which data refers to which automaton.