

CS131 Compilers: Writing Assignment 1

Due 11:59pm March 12, 2023

Name - ID

I worked with Name1 Name2 ...
Completed on February 20, 2023

Code of Conduct

This writing assignments should be your own individual work. Discussion on concept, methodology, and class materials are welcomed, but you should list all the people you have discussed with. Copying is strictly prohibited. Plagiarism, once confirmed, may result in assignment grades reduced to zero for all involved people. And this event will be reported. Also you should use \LaTeX to produce your response based on this template. Submission in other forms won't be graded.

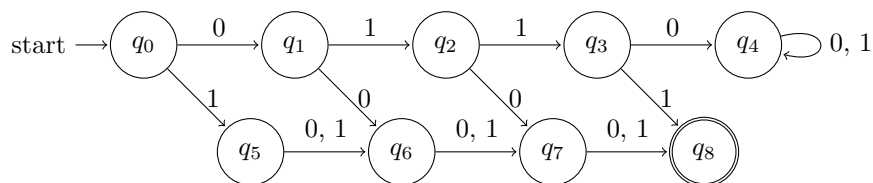


Figure 1: Automata Drawn by Tikz package

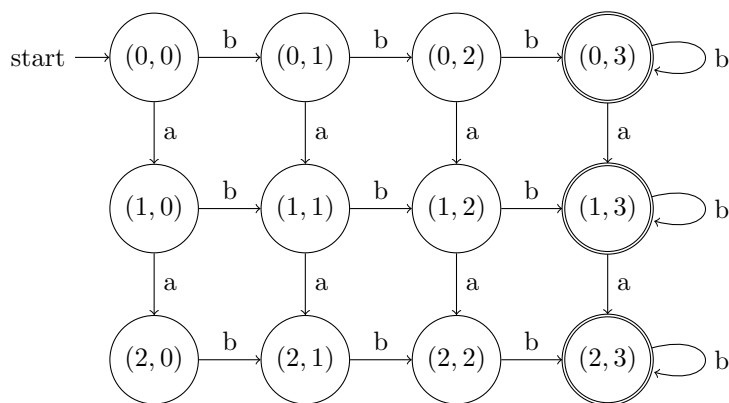


Figure 2: Automata drawn by Tikz package

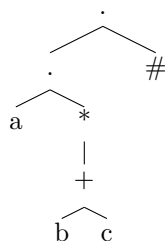


Figure 3: Tree drawn by Tikz-qtrees package

1. ($4 \times 1 = 4$ **pts**) For each of the follow prompts, write any non-empty sentence:
 - (a) Name one reason why you would like to sign up this class.
RESPONSE:
 - (b) Name one of your biggest concerns or difficulties about this class.
RESPONSE:
 - (c) How will you schedule your time to complete this course successfully?
RESPONSE:
 - (d) Do you read the Code of Conduct carefully?
RESPONSE:
2. ($5 \times 2 = 10$ **pts**) Write a relevant regular expression or draw an automata(DFA/NFA/ ϵ -NFA) that correctly represents the regular language described each question. Your response should be sound and complete. Alphabet $\Sigma = \{0, 1\}$ if not other specified.
 - (a) $L_1 = \{\text{All strings that contain at **most** two 0's}\}$
RESPONSE:
 - (b) $L_2 = \{\text{All strings that contain at **least** two 1's}\}$
RESPONSE:
 - (c) $L_3 = L_1 - L_2 = L_1 \cap \overline{L_2}$
RESPONSE:
 - (d) $L_4 = \{\text{All strings that no sequential 000 appears}\}$
RESPONSE:
 - (e) $L_5 = \{\text{All strings that contains an even number of 0's}\}$
RESPONSE:

3. ($3 \times 5 = 15$ **pts**) Use regular expression or **clear** natural language to describe the automata. You may not have learned formal methods, but you can figure it out just by your brilliant brains and observations!

(a) A_1

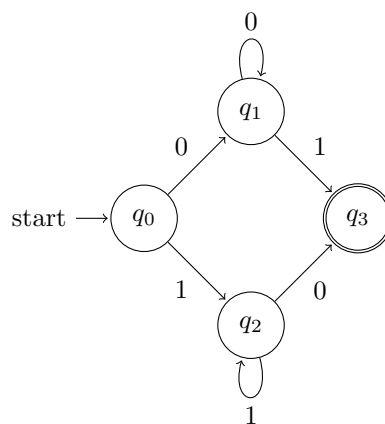


Figure 4: A_1

RESPONSE:

(b) A_3

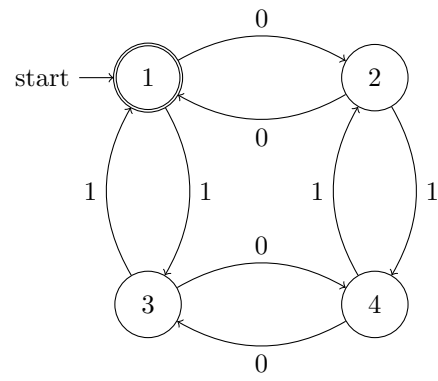


Figure 5: A_3

RESPONSE:

(c) A_2

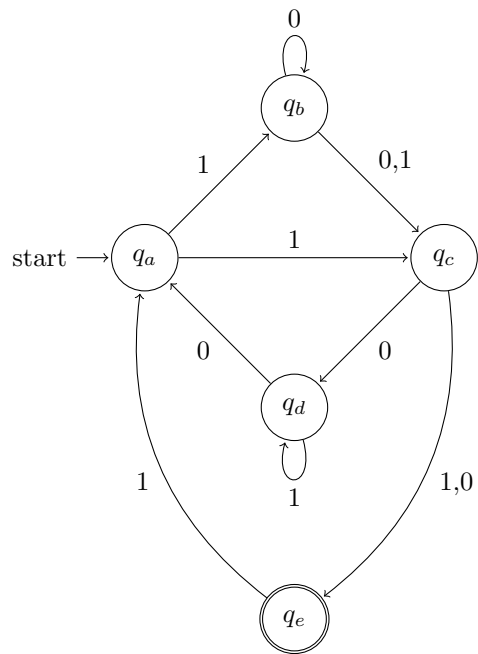


Figure 6: A_2

RESPONSE:

4. (20 pts) Convert the following regular expression to minimized DFA, the process is **not required**. But **showing your process may save your score** if your ultimate answer is accidentally wrong. You may spend a lot of time on these problems, since the score account is several times as those of other problems. Be focused.

$$00100 + 001(0 + 1)^* + 010101 + 001^*101 + 101^*0 + (010)^* + 01(1 + 0^*)10$$

(Hint: draw the ϵ -NFA(NFA that allows ϵ) first, and then convert it to DFA, and then run the Minimizing Algorithm) To draw your automata, you can refer to the automata examples in the preface.

- (a) Parse tree for regex (optional)
- (b) NFA (optional)
- (c) DFA (optional)
- (d) minimized DFA (required)

RESPONSE:

End of This Assignment