University of New Brunswick
Faculty of Computer Science
CS2333: Computability and Formal Languages
Homework Assignment 3, ***Due Time, Date*** *5:00 PM, February 11, 2022*

Student Name: _____ Matriculation Number: _____

Instructor: Rongxing Lu
The marking scheme is shown in the left margin and [100] constitutes full marks.

[**20**] 1. Give NFAs with the specified number of states recognizing each of the following languages.

[4] (a) The language $\{w | w \in \{0,1\}^*$ end with 00 with three states$\}$.

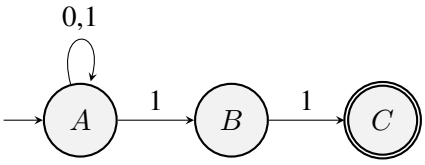
[4] (b) The language $\{0\}$ with two states.

[4] (c) The language $0^*1^*0^*0$ with three states.

[4] (d) The language $\{\varepsilon\}$ with one state.

[4] (e) The language 0^* with one state.

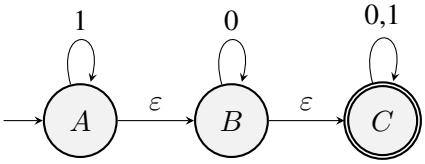
[**10**] 2. Given below is the NFA for a language



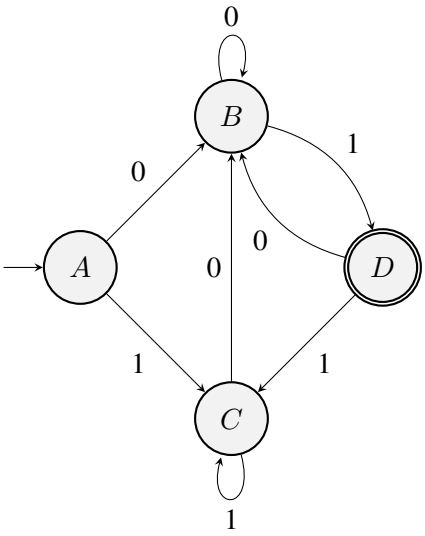
$$L = \{ \text{ set of all strings over } \{0,1\} \text{ that end with '11'} \}$$

Construct its equivalent DFA.

[**10**] 3. Convert the following ε-NFA to its equivalent NFA.



[**10**] 4. Minimize the following DFA with reduced states.

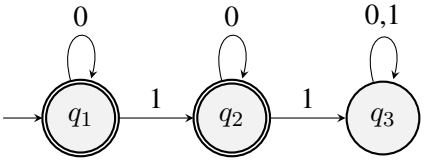


[**10**] 5. Design Regular Expression for the following languages over $\{a, b\}$.

[5] (a) Language accepting strings of length at least 1.

[5] (b) Language accepting strings of length at most 3.

[**10**] 6. Find the Regular Expression for the following DFA.



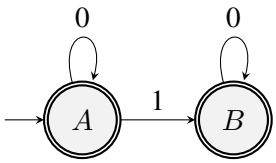
[**10**] 7. Covert each of the following Regular Expression to its equivalent Finite Automata.

[5] (a) $0^* + 0^*10^*$

[5] (b) $10 + (1 + 00)1^*0$

[**20**] 8. Convert each of the following NFAs to an equivalent DFA.

[10] (a)



[10] (b)