

CSE340: Theory of Computation (Homework Assignment 2)

Due Date: 11th September, 2021, 11:59 PM

Total Number of Pages: 2

Total Points 50

Question 1. (12 points) Give regular expressions for the following languages.

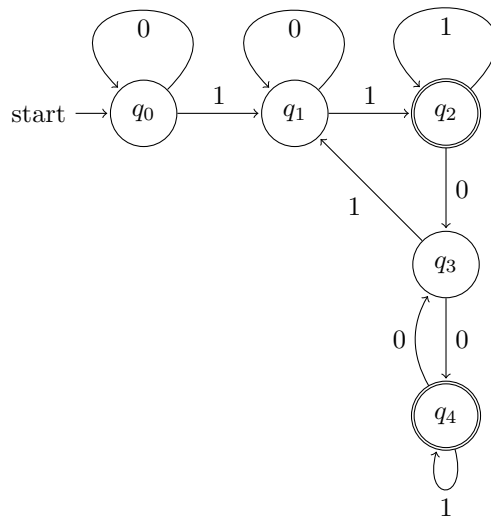
(a)

$$L_1 = \{x \in \{0,1\}^* \mid x \text{ does not contain the substring } 101\}$$

(b)

$$L_2 = \{x \in \{0,1\}^* \mid x \text{ has at most two 0's and at most three 1's}\}$$

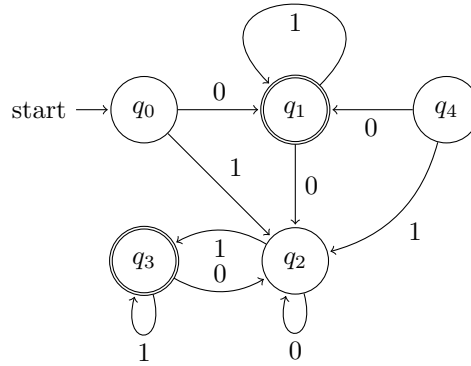
Question 2. (8 points) Give regular expression corresponding to the following DFA.



Question 3. (6 points) Minimize the given DFA and show all steps.

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Question 4. (14 points) Give CFGs for the following languages.

(a) $L_1 = \{a^m b^n c^n d^{2m} \mid n, m \geq 0\}$

(b) $L_2 = \{a^n b^m \mid n \neq m\}$

Question 5. (10 points) Show that the following language is not regular.

$$L = \{x \in \{a, b, c\}^* \mid x = a^n b^m c^{n+m}, n, m \geq 0\}$$