CS 374 HW 1 Problem 2

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TOTAL POINTS

100 / 100

QUESTION 1

1 2A **50 / 50**

✓ - **0 pts** Correct

- **40 pts** Incorrect DFA
- **10 pts** Minor mistake in DFA and the explanation of the relative states is incorrect/missing
- **5 pts** Minor mistake in DFA, but the explanation of the relative states is correct
- **10 pts** Minor mistake in DFA
- **10 pts** Incorrect/missing explanation of states
- **5 pts** Some states missing explanation
- **5 pts** Minor mistake in state explanations
- **5 pts** Missing transitions on accepting state

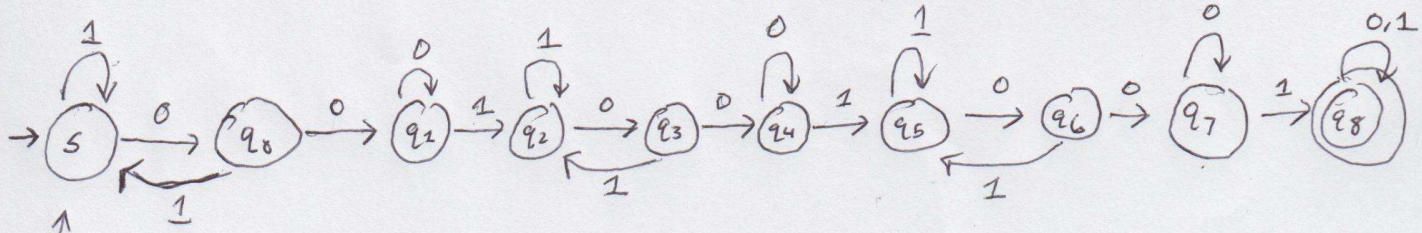
QUESTION 2

2 2B **50 / 50**

✓ - **0 pts** Correct

- **10 pts** Missing/incorrect explanation of regex
- **5 pts** Explanation of regex partially correct
- **5 pts** Minor mistake in regex, but explanation is correct.
- **40 pts** Completely incorrect/missing regex
- **20 pts** Major mistake in regex

2a)



The start state S

q_8 is the accepting state

q_0 is the state where the previous character is 0

q_1 is the state where the previous 2 characters are 00

q_2 is the state where 001 has been seen

q_3 is the state where 001 has been seen and the previous character was 0

q_4 is the state where 001 has been seen and the previous two characters are 0

q_5 is the state where 001 has been seen twice

q_6 is the state where 001 has been seen twice and the previous character is 0

q_7 is the state where 001 has been seen twice and the previous two characters are 00

q_8 is the state where 001 has been seen three times and is the accepting state

According to the description above a String W will only be accepted if 001 has been seen 3 times which means the DFA $\delta^*(S, W)$ will give the accepting state q_8 only when 001 has been seen 3 times which means this DFA only accepts strings which the substring 001 occur atleast 3 times

1 2A **50 / 50**

✓ **- 0 pts** **Correct**

- 40 pts Incorrect DFA

- 10 pts Minor mistake in DFA and the explanation of the relative states is incorrect/missing

- 5 pts Minor mistake in DFA, but the explanation of the relative states is correct

- 10 pts Minor mistake in DFA

- 10 pts Incorrect/missing explanation of states

- 5 pts Some states missing explanation

- 5 pts Minor mistake in state explanations

- 5 pts Missing transitions on accepting state

2b.) $(0+1)^*001(0+1)^*001(0+1)^*001(0+1)^*$

We know that the regular expression for a string w to contain a certain substring x is of the form $\Sigma^* x \Sigma^*$ and so the regular expression for a string to contain atleast three occurences of 001 must be of the form

$$(0+1)^*001(0+1)^*001(0+1)^*001(0+1)^*$$

According to the explanation of what a regular expression looks like for a string to have a certain sub-string

2 2B 50 / 50

✓ - 0 pts Correct

- 10 pts Missing/incorrect explanation of regex
- 5 pts Explanation of regex partially correct
- 5 pts Minor mistake in regex, but explanation is correct.
- 40 pts Completely incorrect/missing regex
- 20 pts Major mistake in regex