0/7 Questions Answered

Week 1 Friday Review Quiz

Student Name

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Q1 Combining languages
5 Points

For this question, consider an arbitrary alphabet Σ and, whenever L_1, L_2 are sets of strings over Σ, we can use the following rules to define associated sets of strings:

$$\text{SUBSTRING}(L_1) := \{w \in \Sigma^* \mid \text{there exist } a, b \in \Sigma^* \text{ such that } awb \in L_1\}$$

and

$$L_1 \circ L_2 := \{w \in \Sigma^* \mid w = uv \text{ for some strings } u \in L_1 \text{ and } v \in L_2\}$$

For the statements below, let $\Sigma = \{0, 1\}$ be the alphabet.

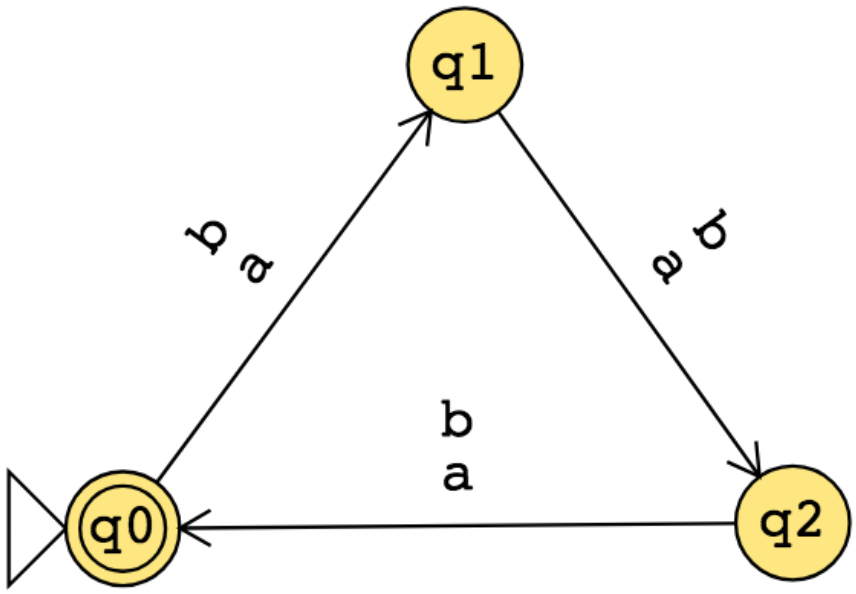
Select all and only the true statements.

- [ ] $SUBSTRING(\{0\}) = SUBSTRING(\{1\}) = \{\varepsilon\}$
- [ ] $SUBSTRING(\emptyset) = \emptyset$
- [ ] $SUBSTRING(\Sigma^*) = \Sigma^*$
- [ ] $\{0\} \circ \{1\} = \{0, 1\}$
- [ ] $\{0, 1, 01\} \circ \{\varepsilon\} = \{01\}$

Save Answer

Q2 Strings in a language recognized by a DFA
1 Point

Select all (and only) the strings below that are accepted by the DFA.



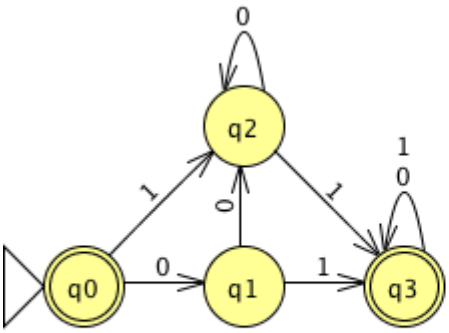
- [ ] The empty string
- [ ] a
- [ ] b
- [ ] abab
- [ ] ab
- [ ] bbb
- [ ] bba

Save Answer

Q3 Describing DFA

4 Points

Consider the DFA, M, given by the state diagram:



Q3.1 (a)
1 Point

The author of this DFA claims that its formal definition is:
M = ({q0, q1, q2, q3}, {0, 1, 2, 3}, δ, q0, q3) with δ given by the table below:

	0	1
$q0$	$q1$	$q2$
$q1$	$q2$	$q3$
$q2$	$q2$	$q3$
$q3$	$q3$	$q3$

Select all and only the components of the formal definition that are correct.

- [ ] Set of states
- [ ] Input alphabet
- [ ] Transition function
- [ ] Start state
- [ ] Set of accept states

Save Answer

Q3.2 (b)
1 Point

True or False: The empty string is accepted by this DFA.

True

False

Save Answer

Q3.3 (c)
1 Point

True or False: $L(M)$ is infinite.

True

False

Save Answer

Q3.4 (d)
1 Point

True or False: If $x \in L(M)$, the string obtained by flipping each bit in x (changing 0 to 1 and 1 to 0) is also in L(M).

True

False

Save Answer

Q4 Feedback

0 Points

Any feedback about this week's material or comments you'd like to share? (Optional; not for credit)

Save Answer

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