0/5 Questions Answered

Week 1 Monday Review Quiz

STUDENT NAME

Search students by name or email...

Q1 Survey

2 Points

The Review quiz questions are in the Week 1 notes pdf available here: https://cseweb.ucsd.edu/classes/sp22/cse105-a/

Click "Spring 2022 Home" in the top left corner and navigate to Week 1.

Did you complete the beginning of the quarter survey https://forms.gle/9AaEcwwN5EvcJ4qp9 ?

- Yes

Save Answer

Q2 Class logistics

3 Points

We want you to be familiar with class policies and procedures so you are ready to have a successful quarter. Please take a look at the class website https://cseweb.ucsd.edu/classes/sp22/cse105-a/ and answer the following questions.

Q2.1 (a)

1 Point

What are the graded components for this class? (Select all and only that apply)

- [ ] Attendance
- [ ] Review quiz for each class
- [ ] Weekly HW
- [ ] Midterm exams
- [ ] Project
- [ ] Final exam

Save Answer

Q2.2 (b)

1 Point

Where do you find the homework assignments for this class?

- ○ The class website
- ○ Canvas

Save Answer

Q2.3 (c)

1 Point

We'll be using Piazza for class discussions. You need to self-enroll to access the discussion boards; to sign up, please go here: http://piazza.com/ucsd/spring2022/cse105_sp22_a00

Which questions should you ask as *private* posts on Piazza (viewable only to the instructors)?

- Followup questions on examples from class
- Questions about a review quiz
- Questions about a HW problem

Save Answer

Q3 Optional

0 Points

Any questions or feedback about today's material?
(Optional; not for credit)

Enter your answer here

Save Answer

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Week 1 Wednesday Review Quiz

STUDENT NAME

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Q1 Strings in language described by set notation

1 Point

Consider the language $\{w \mid w \text{ is a string over } \{0,1\} \text{ and } |w| \text{ is an integer multiple of } 3\}$. Which of the following are elements of this language? (Select all and only that apply)

- [ ] The empty set
- [ ] The empty string
- [ ] 0
- [ ] $(1, 0, 1)$
- [ ] $\{000\}$

Save Answer

Q2 Strings in language described by set notation

1 Point

Consider the language $X = \{w \mid w \text{ is a string over } \Sigma \text{ and has at least two } a\text{'s and exactly one } b\}$ over the alphabet $\Sigma = \{a, b\}$. Which strings of length 3 are elements of this language? (Select all and only that apply) Notice: the strings are listed in string order.

- [ ] aaa
- [ ] aab
- [ ] aba
- [ ] abb
- [ ] baa
- [ ] bab
- [ ] bba
- [ ] bbb

Save Answer

Q3 Strings in language described by regular expression

1 Point

Which strings over the alphabet $\{a, b\}$ are in the language described by the regular expression $(a \cup b)^*$? (Select all and only that apply)

- [ ] bbbb
- [ ] bab
- [ ] (a,b)
- [ ] The empty set
- [ ] The empty string
- [ ] {aba}
- [ ] a

Save Answer

Q4 Strings in language described by regular expression

1 Point

Select all and only the strings over $\{a, b\}$ that are in $L(aa^* \cup bb^*)$

- [ ] ε
- [ ] aa
- [ ] ba

Save Answer

Q5 Describing a language with a regular expression

1 Point

Which of the following regular expressions describe the language $\{w \mid w \text{ is a string over } \{0,1\} \text{ and } |w| \text{ is an integer multiple of } 3\}$

? (Select all that apply)

- [ ] $(0 \cup 1)^*$
- [ ] $((0 \cup 1)(0 \cup 1)(0 \cup 1))^*$
- [ ] $((000) \cup (001) \cup (010) \cup (011) \cup (100) \cup (101) \cup (110) \cup (111))^*$
- [ ] $(000)^* \cup (001)^* \cup (010)^* \cup (011)^* \cup (100)^* \cup (101)^* \cup (110)^* \cup (111)^*$

Save Answer

Q6 Feedback

0 Points

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

Enter your answer here

Save Answer

Save All Answers

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Week 1 Friday Review Quiz

STUDENT NAME

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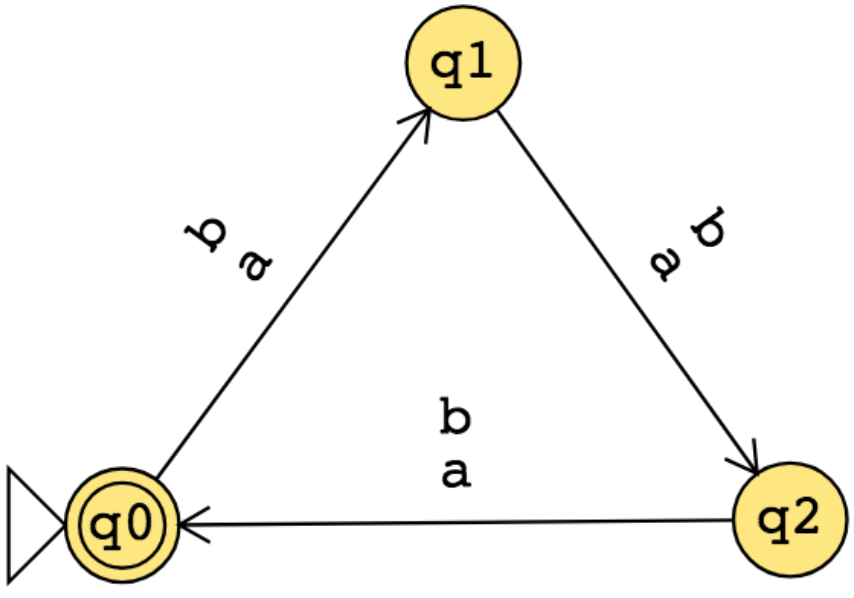
Q1 Strings in a language described by a DFA

1 Point

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



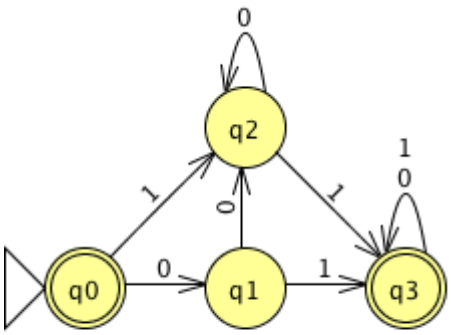
- [ ] The empty string
- [ ] a
- [ ] b
- [ ] abab
- [ ] ab
- [ ] bbb
- [ ] bba

Save Answer

Q2 Strings in a language described by a DFA

1 Point

Select all (and only) the strings of length 3 that are accepted by the DFA:



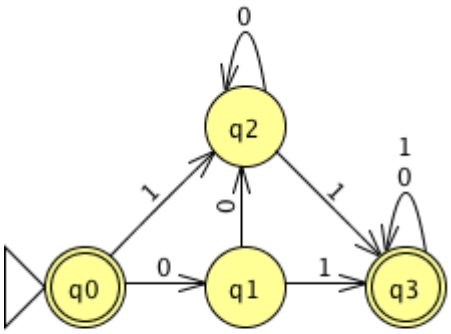
- [ ] 000
- [ ] 001
- [ ] 010
- [ ] 011
- [ ] 100
- [ ] 101
- [ ] 110
- [ ] 111

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)

Enter your answer here

Save Answer

Save All Answers

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Week 2 Monday Review Quiz

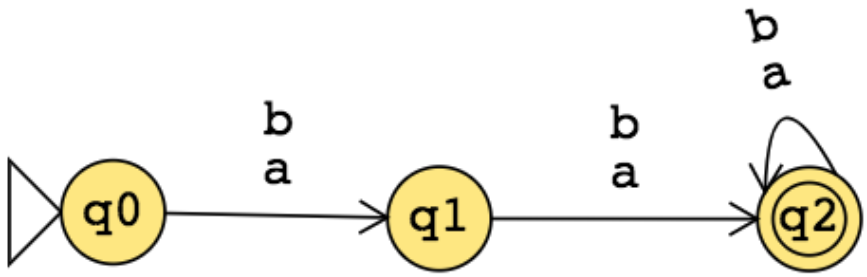
STUDENT NAME

Search students by name or email...

Q1 DFA design

2 Points

Consider the state diagram



Q1.1 (a)

1 Point

Over what alphabet is this the state diagram of a DFA? (Select all and only that apply)

- [ ] $\{a\}$
- [ ] $\{a, b\}$
- [ ] $\{1\}$
- [ ] $\{1, 2\}$

Save Answer

Q1.2 (b)

1 Point

True or false: The language of this DFA is the set of strings over $\{a, b\}$ with at least two as.

- ○ True
- ○ False

Save Answer

Q2 DFA definition

1 Point

From the state diagram of a DFA, which pieces of its formal definition can be inferred? (Select all and only that apply.)

- [ ] The set of states
- [ ] The alphabet
- [ ] The transition function
- [ ] The start state
- [ ] The set of accepting states.

Save Answer

Q3 General design

2 Points

Fix the alphabet $\Sigma = \{0, 1\}$. For each positive integer n, define L_n to be the language over Σ given by $L_n = \{w \in \Sigma^* \mid |w| \text{ is an integer multiple of } n\}$

Q3.1 (a)

1 Point

True or false: for each n, L_n is regular.

- O True
- O False

Save Answer

Q3.2 (b)

1 Point

True or false: The set of all strings over $\{0, 1\}$ with odd length is regular.

- True
- False

Save Answer

Q4 Feedback

0 Points

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

Enter your answer here

Save Answer

Save All Answers

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Week 2 Wednesday Review Quiz

STUDENT NAME

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Q1 Iterated transition function

1 Point

For some proofs it is useful to define the iterated transition function of a DFA. Given a DFA $(Q, \Sigma, \delta, q_0, F)$ the iterated transition function δ^* has domain $Q \times \Sigma^*$ and codomain Q and, on input (q, w) outputs the state that the machine is in when starting in state q and processing the entire string w character-by-character according to the transition function δ.

Since the string w is built up recursively, we will define the iterated transition function recursively.

The basis case is for $w = \varepsilon$ and we define

$\delta^*((q, \varepsilon))$ =

- ε
- Σ
- q
- q_0
- F

The recursive step is when $w = ua$ for $u \in \Sigma^*$ and $a \in \Sigma$, and we define

$\delta^*((q, w))$ =

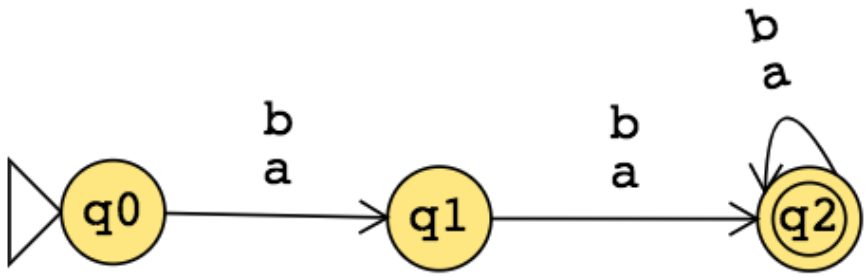
- $\delta((\delta^*((q,u)),a))$
- $\delta((\delta((q,u)),a))$

Save Answer

Q2 Iterated transition function example

2 Points

Consider again the state diagram from Monday's review quiz , and we'll refer to the transition function of this DFA by δ for this question.



Q2.1 (a)

1 Point

What is $\delta((q0,a))$?

- $q0$
- $q1$
- $q2$
- a
- b
- Undefined

What is $\delta((q0, abb))$?

- $q0$
- $q1$
- $q2$
- a
- b
- Undefined

Save Answer

Q2.2 (c)
1 Point

What is $\delta^*((q0, a))$?

- $q0$
- $q1$
- $q2$
- a
- b
- Undefined

What is $\delta^*((q0, abb))$?

- $q0$
- $q1$
- $q2$
- a
- b
- Undefined

Save Answer

Q3 DFA construction

2 Points

Consider an arbitrary DFA $M = (Q, \{a, b\}, \delta, q_0, F)$ and call the language of this DFA L. We will fill in the definition of a new DFA whose language is the result of taking each string in L and replacing each a in the string with 0 and each b in the string with 1. For example, if $L = \{a, aab\}$, then the new language is $\{0, 001\}$.

The new machine is $M' = (Q', \Sigma', \delta', q', F')$ where

$Q' =$

- Q
- $\overline{Q}$, aka Q^c, aka the complement of Q
- $Q \times Q$

$\Sigma' =$

- $\{a, b\}$
- $\{0, 1\}$
- $\{0, 1, a, b\}$

$\delta' : Q' \times \Sigma' \to Q'$ is defined by $\delta'((q, 0)) = \delta((q, a))$ and $\delta'((q, 1)) = \delta((q, b))$ for each $q \in Q$.

$q' =$

- 0
- 1
- a
- b
- q
- q_0

$F' =$

- F
- $\overline{F}$, aka F^c, aka the complement of F
- $F \times F$

Save Answer

Q4 Closure

1 Point

A set X is said to be **closed** under an operation OP if, for any elements in X, applying OP to them gives an element in X. For example, the set of integers is closed under multiplication because if we take any two integers, their product is also an integer.

For each of the sentences below, (1) first determine if it is a closure claim, and, if it is, then (2) determine if the sentence is true or false.

Concatenating two strings over the alphabet Σ gives a string over the alphabet Σ

- Not a closure claim.
- Is a closure claim, but false.
- Is a closure claim, and true.

The intersection of two infinite sets of integers is an infinite set of integers.

- Not a closure claim.
- Is a closure claim, but false.
- Is a closure claim, and true.

The complement of a regular language is also regular

- Not a closure claim.
- Is a closure claim, but false.
- Is a closure claim, and true.

Save Answer

Q5 Feedback

0 Points

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

Enter your answer here

Save Answer

Save All Answers

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Week 2 Friday Review Quiz

STUDENT NAME

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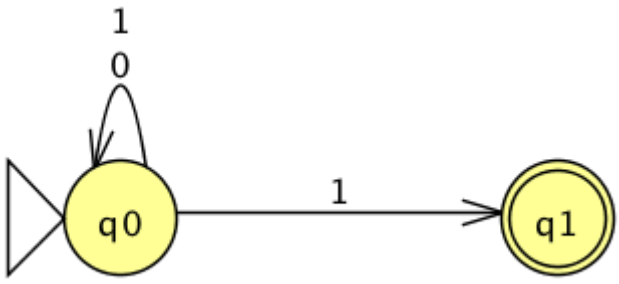
Q1 Strings accepted by NFA

2 Points

Select all (and only) the strings of length 3 that are accepted by the NFA over the alphabet $\{0, 1\}$ with state diagram:



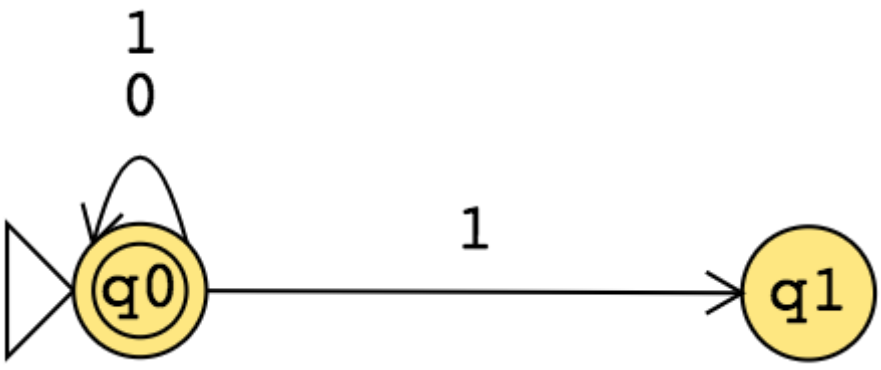
- [ ] 000
- [ ] 001
- [ ] 010
- [ ] 011
- [ ] 100
- [ ] 101
- [ ] 110
- [ ] 111

Save Answer

Q2 Strings accepted by NFA

2 Points

Select all (and only) the strings of length 3 that are accepted by the NFA over the alphabet $\{0, 1\}$ with state diagram:



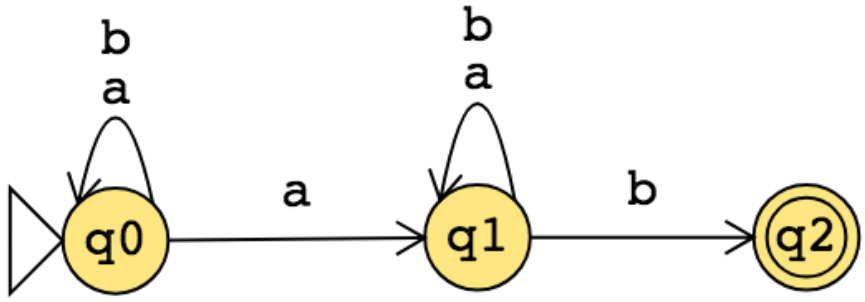
- [ ] 000
- [ ] 001
- [ ] 010
- [ ] 011
- [ ] 100
- [ ] 101
- [ ] 110
- [ ] 111

Save Answer

Q3 Language recognized by NFA

1 Point

Pick the regular expression that describes the language of the NFA over the alphabet $\{a, b\}$ with state diagram:



- $(a \cup b)^* ab$
- $(a \cup b)^* ab(a \cup b)^*$
- $(a \cup b)^* ab(a \cup b)^* b$
- $(a \cup b)^* a(a \cup b)^* b$
- $(a \cup b)^* a(a \cup b) b$
- None of the above

Save Answer

Q4 Feedback

0 Points

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

Enter your answer here

Save Answer

Save All Answers

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Week 3 Monday Review Quiz

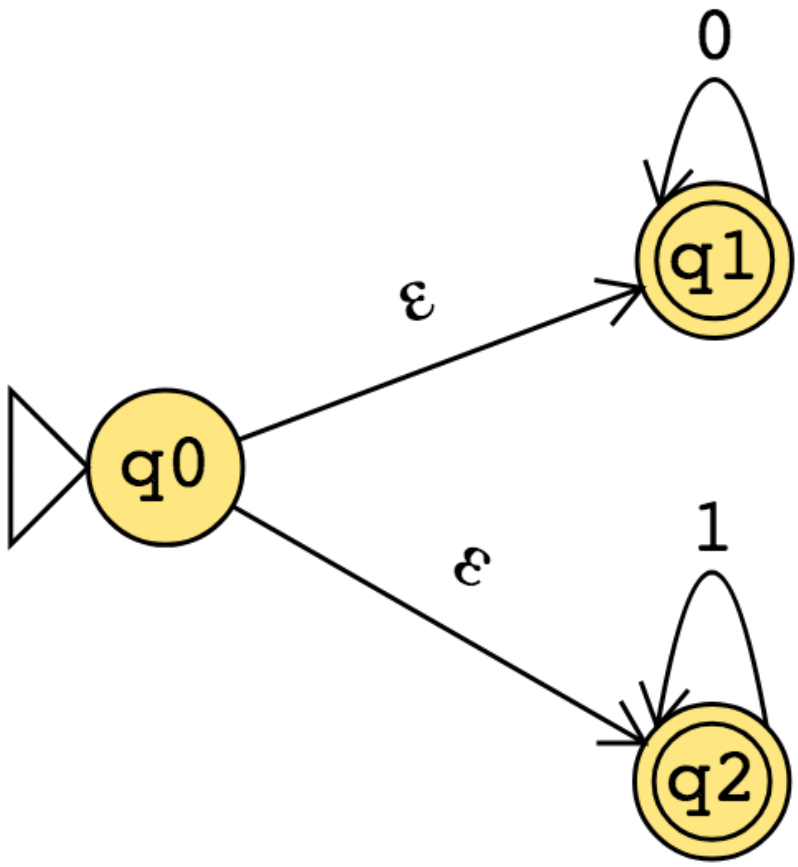
STUDENT NAME

Search students by name or email...

Q1 Union

1 Point

The NFA whose state diagram below



is the result of applying the union construction (see Theorem 1.45) to obtain a machine that recognizes the language $\{w \in$

$\{0,1\}^*|w$ has all zeros or all 1s$\}$

- ○ True
- ○ False

Save Answer

Q2 Concatenation

2 Points

Let $N_1 = (Q_1, \Sigma, \delta_1, q_1, F_1)$ and $N_2 = (Q_2, \Sigma, \delta_2, q_2, F_2)$ be NFAs. When applying the construction in Theorem 1.47 to build the NFA $N = (Q, \Sigma, \delta, q_1, F_2)$ that recognizes $L(N_1) \circ L(N_2)$, select all and only the statements below that are universally true.

- ☐ $|Q| > |Q_1|$
- ☐ $|Q| > |Q_2|$
- ☐ $|Q| > 2$
- ☐ $|Q| = |Q_1| + |Q_2|$
- ☐ $|Q| = |Q_1| \cdot |Q_2$

Save Answer

Q3 Kleene star

2 Points

Select and only the languages below for which $L^* = L$.

- [ ] $\emptyset$
- [ ] $\{\varepsilon\}$
- [ ] $\{0\}$
- [ ] $\{0, 1\}$
- [ ] $\{0, 1\}^*$

Save Answer

Q4 Feedback

0 Points

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

Enter your answer here

Save Answer

Save All Answers

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Week 3 Wednesday Review Quiz

STUDENT NAME

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Q1 DFA vs. NFA

2 Points

True or False: The state diagram of any DFA is also the state diagram of a NFA.

- True
- False

True or False: The state diagram of any NFA is also the state diagram of a DFA.

- True
- False

True or False: The formal definition $(Q, \Sigma, \delta, q0, F)$ of any DFA is also the formal definition of a NFA.

- True
- False

True or False: The formal definition $(Q, \Sigma, \delta, q0, F)$ of any NFA is also the formal definition of a DFA

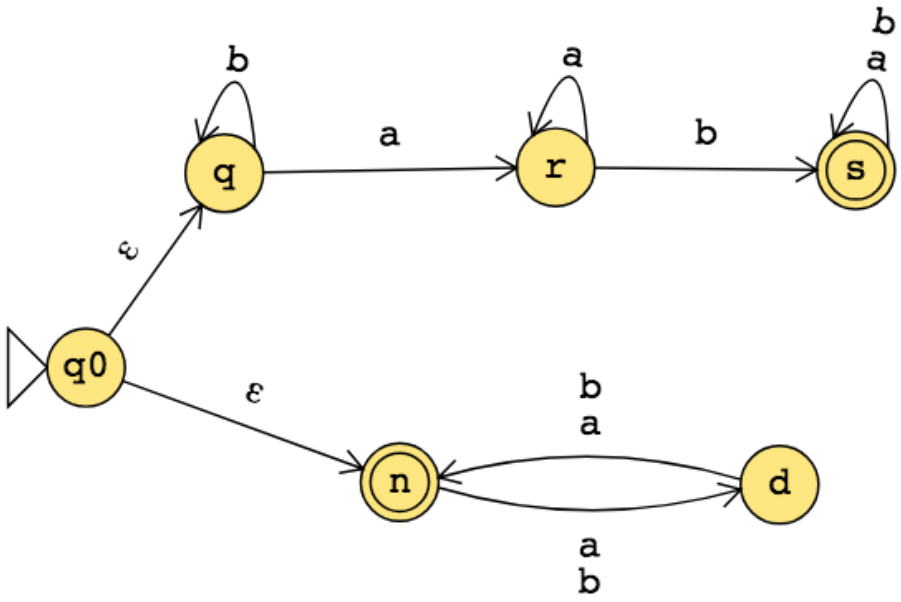
- True
- False

Save Answer

Q2 NFA to DFA

2 Points

Consider the following state diagram of a NFA over the alphabet $\{a, b\}$.



Answer the following questions about applying the construction for building an equivalent DFA from Theorem 1.39.

What is the start state of the equivalent DFA?

- $q0$
- $\{q0\}$
- $\{q0, q, n\}$

What is the output of the transition function the equivalent DFA from the start state on reading the character a?

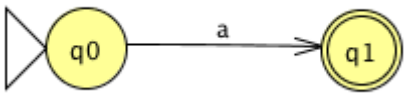
- ○ $\emptyset$
- ○ $\{q0\}$
- ○ $\{q\}$
- ○ $\{n\}$
- ○ $\{q, n\}$
- ○ $\{q, d\}$
- ○ $\{r, n\}$
- ○ $\{r, d\}$
- ○ None of the above, because DFA have a single state as the output of each transition function application, not a set of states.

Save Answer

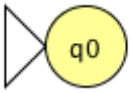
Q3 Regular expression to NFA

1 Point

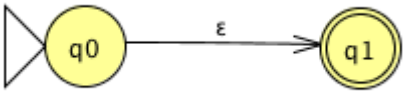
First diagram:



Second diagram:



Third diagram:



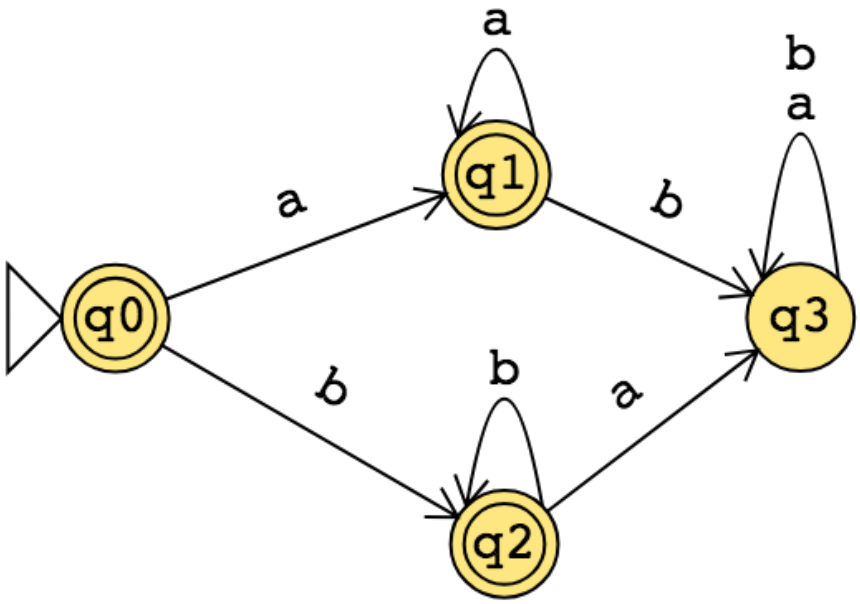
Which of the three diagrams above is a state diagram over the alphabet $\{a, b\}$ for a NFA that recognizes the language $L = \emptyset$?

- ○ first diagram
- ○ second diagram
- ○ third diagram
- ○ None of the above

Save Answer

Q4 DFA to regular expression

1 Point



Which of the following regular expressions describe the language recognized by the DFA with state diagram above? (Select all and only that apply.)

- [ ] $a^+ \cup b^+$
- [ ] $\varepsilon \cup aa^* \cup bb^*$
- [ ] $a^*a \cup b^*b \cup \varepsilon$
- [ ] $aa^*b(a \cup b)^* \cup bb^*a(a \cup b)^*$
- [ ] $a^+b(a \cup b)^* \cup b^+a(a \cup b)^*$

Save Answer

Q5 Feedback

0 Points

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

Enter your answer here

Save Answer

Save All Answers

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0/3 Questions Answered

Week 3 Friday Review Quiz

STUDENT NAME

Search students by name or email...

Q1 Cardinality of sets

2 Points

Which of the following sets are countably infinite? (select all that apply)

- [ ] The set of all languages over $\{0, 1\}$
- [ ] The set of all regular languages over $\{0, 1\}$
- [ ] The set of all strings over $\{0, 1\}$
- [ ] The set $\{0, 1\}$
- [ ] The set of all DFAs over $\{0, 1\}$ (whose states are labelled by integers)
- [ ] The set of all regular expressions over $\{0, 1\}$

Save Answer

Q2 True/ False

3 Points

True/ False: Every proper subset of a regular set is regular.

- True
- False

True/ False: Every proper subset of a nonregular set is nonregular.

- True
- False

True/ False: The complement of a regular set is regular.

- True
- False

True/False: The complement of a nonregular set is nonregular

- True
- False

True/ False: The union of any two regular sets is regular.

- True
- False

True/ False: The union of two nonregular sets is nonregular.

- True
- False

Save Answer

Q3 Feedback

0 Points

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

Enter your answer here

Save Answer

Save All Answers

Submit & View Submission