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

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0/6 Questions Answered

Week 4 Monday Review Quiz

STUDENT NAME

Search students by name or email…

Q1 Pumping lemma

1 Point

Select all and only the statements that are (informally) equivalent to the pumping lemma.

- [ ] Every regular language has a pumping length.
- [ ] Every nonregular language does not have a pumping length.
- [ ] If L has a pumping length, then L is regular.
- [ ] If L does not have a pumping length, then L is nonregular.

Save Answer

Q2 Applying pumping lemma

2 Points

In a proof that a language is nonregular using the pumping lemma, which of the following variables represent witnesses whose value we (as the provers) define? (Select all and only that apply)

- [ ] The positive integer p
- [ ] The string s
- [ ] The string x
- [ ] The string y
- [ ] The string z
- [ ] The nonnegative integer i

Save Answer

Q3 Nonregular sets

2 Points

Select and only the languages below that are nonregular.

- [ ] $\{0^n1^n \mid n \geq 0\}$
- [ ] $\{0^n1^m \mid n, m \geq 0\}$
- [ ] $\{0^n1^m \mid 0 \leq n \leq m\}$
- [ ] $\{0^n1^m \mid 0 \leq m \leq n\}$
- [ ] $\{0^n1^m0^n \mid n, m \geq 0\}$

Save Answer

Q4 Extended Feedback

0 Points

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

Q4.1 What's working?
0 Points

What are you, as a student, doing that is helping your learning?

Enter your answer here

What are we, as course staff, doing that is helping your learning?

Enter your answer here

Save Answer

Q4.2 What can be improved?
0 Points

What can, as a student, change or start doing to improve your learning?

Enter your answer here

What can we, as course staff, change or start doing to improve your learning?

Enter your answer here

Additional information you would like to share with the instructor?

Enter your answer here

Save Answer

Q4.3 Course material

0 Points

Describe the single most confusing concept for you this quarter so far.

Enter your answer here

Describe the single most interesting concept for you this quarter so far.

Enter your answer here

Save Answer

Save All Answers

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Week 4 Wednesday Review Quiz

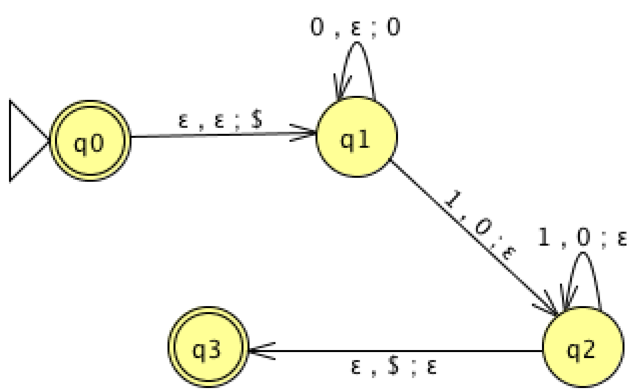
STUDENT NAME

Search students by name or email...

Q1 PDA

2 Points

Consider the PDA with input alphabet $\Sigma = \{0, 1\}$, stack alphabet $\Gamma = \{0, \$\}$ and state diagram:



Q1.1 Accepted?

1 Point

Select all and only the strings below that are accepted by this PDA.

- [ ] ε
- [ ] $\$$
- [ ] 0
- [ ] 1

Save Answer

Q1.2 Stack

1 Point

True or false: if the PDA is in state $q0$ then there must be a $\$$ somewhere in its stack.

- True
- False

True or false: if the PDA is in state $q1$ then there must be a $\$$ somewhere in its stack.

- True
- False

Save Answer

Q2 Modified PDA

2 Points

Consider the PDA resulting from using the state diagram from Q1 and making $q1$ and $q2$ also accept states (putting double circles on these nodes).

Select all and only the strings below that are accepted by this new PDA.

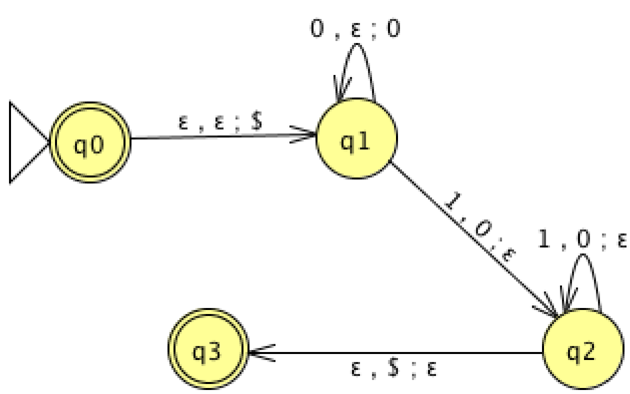
- [ ] 00
- [ ] 01
- [ ] 10
- [ ] 11

Save Answer

Q3 Formal definition of PDA

1 Point

Select the correct outputs for the transition function of the PDA from Q1. The state diagram is included again for reference:



$\delta(\ (q1, 0, \varepsilon)\ ) =$

- $q1$
- $(q1, 0)$
- $(0, q1)$
- $(q2, 1)$
- $(1, q2)$
- $\emptyset$
- None of the above.

$\delta(\ (q2, 1, \varepsilon)\ ) =$

- $\{(q2, 0)\}$
- $\{(q2, \varepsilon)\}$
- $\emptyset$
- None of the above.

Save Answer

Q4 Questions for class

0 Points

Any questions or concepts you'd like us to review together or explain in today's Zoom session? (Optional; not for credit)

Enter your answer here

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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0/6 Questions Answered

Week 4 Friday Review Quiz

STUDENT NAME

Search students by name or email…

Q1 PDA transition labels

5 Points

For this question, assume we have a PDA with input alphabet Σ and stack alphabet Γ.

Q1.1 (a)

1 Point

Select the correct meaning of the transition label

$a, b \to c$ when $a \in \Sigma, b \in \Gamma, c \in \Gamma$

- ○ Upon reading a and when a b is at the top of the stack, pop the b and push a c while following this transition
- ○ Upon reading a, if a b is at the top of the stack pop it and push a c while following this transition and if there is not b at the top of the stack, leave the stack unchanged while following this transition.

Save Answer

Q1.2 (b)

1 Point

Select the correct meaning of the transition label

$a, \varepsilon \rightarrow c$ when $a \in \Sigma$ and $c \in \Gamma$

- Upon reading a and when the stack is empty, push a c while following this transition
- Upon reading a and without looking at the top of the stack, push a c while following this transition

Save Answer

Q1.3 (c)

1 Point

Select the correct meaning of the transition label

$a, b \rightarrow \varepsilon$ when $a \in \Sigma$ and $b \in \Gamma$

- Upon reading a and when a b is at the top of the stack, clear the stack (make it empty) while following this transition
- Upon reading a and when a b is at the top of the stack, pop the b off the stack and do not push anything onto the stack while following this transition
- Upon reading a and when a b is at the top of the stack, add the character ε to be at the top of the stack while following this transition

Save Answer

Q1.4 (d)

1 Point

Select the correct meaning of the transition label

$a, \varepsilon \rightarrow \varepsilon$ when $a \in \Sigma$

- ○ Upon reading a and when the stack is empty, do not change the stack while following this transition
- ○ Upon reading a, follow this transition no matter the current status of the stack (and without changing the stack)

Save Answer

Q1.5 (e)

1 Point

Select the correct meaning of the transition label

$\varepsilon, \varepsilon \rightarrow \varepsilon$

- ○ Follow this transition without consuming any input characters and no matter the current status of the stack (and without changing the stack).
- ○ When the computation has completed reading the input string, follow this transition when the stack is empty.

Save Answer

Q2 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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0/5 Questions Answered

Week 5 Monday Review Quiz

STUDENT NAME

Search students by name or email...

Q1 CFG definition

2 Points

Consider the CFG defined as $(\{A, B\}, \{0, 1\}, R, A)$ with rules $A \to 0A0 \mid 0A1 \mid 1A0 \mid 1A1 \mid 1$.

Q1.1 (a)

1 Point

Select all and only the examples below that are a variable for this CFG?

- [ ] A
- [ ] 0
- [ ] ε

Save Answer

Q1.2 (b)

1 Point

Select all and only the examples below that are a terminal for this CFG?

- [ ] A
- [ ] 0
- [ ] ε

Save Answer

Q2 CFG derivations

3 Points

Consider the CFG defined as $(\{A, B\}, \{0, 1\}, R, A)$ with rules $A \to 0A0 \mid 0A1 \mid 1A0 \mid 1A1 \mid 1$.

Q2.1 (a)

1 Point

Select all and only the examples below that might appear in the start of a derivation of this grammar as a one step application of a production rule.

- [ ] $A \implies A$
- [ ] $A \implies 0$
- [ ] $A \implies 0A0$
- [ ] $A \implies 0A1$

Save Answer

Q2.2 (b)

2 Points

Select all and only the examples below that are in the language generated by this context free grammar.

- [ ] ε
- [ ] 0
- [ ] 1
- [ ] A
- [ ] 111
- [ ] 10101

Save Answer

Q3 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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0/6 Questions Answered

Week 5 Wednesday Review Quiz

STUDENT NAME

Search students by name or email...

Q1 Closure for CFL

2 Points

Q1.1 Union

1 Point

To prove that the set of all context-free languages is closed under the union operation ... (select all and only the correct ways to finish this sentence)

- [ ] we define a general procedure which takes two context-free grammars and produces a new grammar that generates the union of the languages of the input CFGs.
- [ ] we define a general procedure which takes two PDA and produces a new PDA that recognizes the union of the languages of the input PDAs.

Save Answer

Q1.2 Kleene star

1 Point

True or false: The following construction can be used to prove that the class of context-free languages is closed under Kleene star.

Consider a CFG (V, Σ, R, S) and suppose $S_{new} \notin V$, then we define a new grammar as $(V \cup \{S_{new}\}, \Sigma, R \cup \{S_{new} \to \varepsilon, S_{new} \to S_{new}S\}, S_{new})$. We can prove that this new grammar generates the Kleene star of the language of the given CFG.

- True
- False

Save Answer

Q2 CFL and non-context-free languages

3 Points

The alphabet for this problem is $\Sigma = \{a, b, c\}$.

Q2.1 (a)

1 Point

True / False: Every context-free language over Σ is nonregular.

- True
- False

Save Answer

Q2.2 (b)

1 Point

True / False: There is a context-free language over Σ which has the string $abba$ as an element.

- True
- False

Save Answer

Q2.3 (c)

1 Point

True / False: There is a non-context-free language over Σ which has the string $abba$ as an element.

- 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

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0/6 Questions Answered

Week 5 Friday Review Quiz

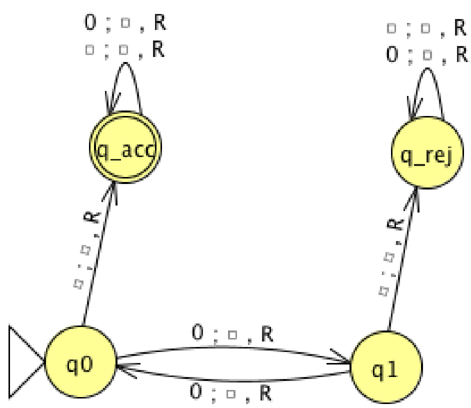
STUDENT NAME

Search students by name or email...

Q1 TM state diagram

1 Point

Which strings over $\{0\}$ are accepted by the Turing machine with the state diagram below? (Select all that apply)



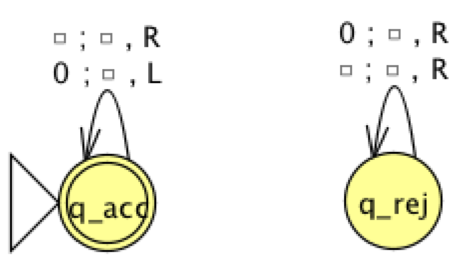
- [ ] Empty string
- [ ] 0
- [ ] 00
- [ ] 000
- [ ] 0000
- [ ] _00 (where the _ denotes a blank symbol)
- [ ] Empty set

Save Answer

Q2 TM state diagram and formal definition

4 Points

Consider the TM with the following state diagram.



We will consider the formal definition of this TM $(Q, \Sigma, \Gamma, \delta, q0, qaccept, qreject)$

Q2.1 (a)

1 Point

What is Σ ?

- $\{0\}$
- $\{0, \square\}$
- $\{0, \square, L, R\}$

What is Γ ?

- $\{0\}$
- $\{0, \square\}$
- $\{0, \square, L, R\}$

Save Answer

Q2.2 (b)

1 Point

What is $q0$?

- q_acc
- q_rej
- None of the above

Save Answer

Q2.3 (c)

1 Point

What is $\delta((q_{acc}, 0))$?

- $0; \square, L$
- $(q_{acc}, \square, L)$
- $\{(q_{acc}, \square, L)\}$

Save Answer

Q2.4 (d)
1 Point

What is the language recognized by this TM?

- $\emptyset$
- $\{\varepsilon\}$
- $\{0\}$
- $\{0\}^*$
- $\{0, \square\}^*$

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

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