



Gradiane Online Accelerated Learning

Zayd

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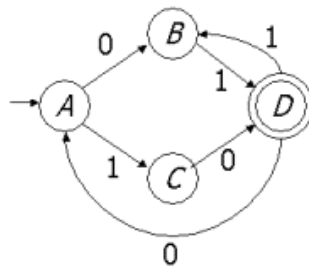
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Number of questions: 7
Positive points per question: 3.0
Negative points per question: 1.0
Your score: 21

Based on Sections 3.1 and 4.1 of HMU.

Help

1. Here is a finite automaton:



Which of the following regular expressions defines the same language as the finite automaton? Hint: each of the correct choices uses component expressions. Some of these components are:

1. The ways to get from A to D without going through D.
2. The ways to get from D to itself, without going through D.
3. The ways to get from A to itself, without going through A.

It helps to write down these expressions first, and then look for an expression that defines all the paths from A to D.

- a) $(01+10)(0(01+10))^*(11)^*$
- b) $(01+10)(11+0(01+10))^*$
- c) $(01+10)(11^*+0(01+10))^*$
- d) $((01+10)0)^*(01+10)(11)^*$

Answer submitted: **b)**

You have answered the question correctly.

2. Consider the languages.

- (a) $\{0^{2n}1^n \mid n > 0\}$
- (b) $\{0^{5n}1^n \mid n > 0\}$
- (c) $\{w \mid w \text{ a string of 0's and 1's such that when interpreted in reverse as a binary integer it is a multiple of 5}\}$
- (d) $\{0^n1^n \mid n > 0\}$
- (e) $\{w \mid w \text{ a string of 0's and 1's such that its length is a perfect square}\}$
- (f) $\{w \mid w \text{ string of 0's and 1's such that when interpreted as a binary integer it is not a multiple of 5}\}$
- (g) $\{w \mid w \text{ a string of 0's and 1's such that its length is not a perfect cube}\}$
- (h) $\{w \mid w \text{ a string of 0's and 1's such that the number of 0's is not equal to twice the number of 1's}\}$

Which is a regular language?

- a) (h)
- b) (e)
- c) (b)
- d) (c)

Answer submitted: **d)**

You have answered the question correctly.

3. Which among the following languages is not regular (cannot be defined by a regular expression or finite automaton)?

- a) $L = \{x \mid x = a^n b^n, n \text{ a positive integer}\}$
- b) $L = \{x \mid x = a^m (bc)^n, n, m \text{ positive integers}\}$
- c) $L = \{x \mid x = a^m b^n c^k, n, m, k \text{ positive integers}\}$
- d) $L = \{x \mid x = (a^2 b^2 c^2)^n, n \text{ a positive integer}\}$

Answer submitted: **a)**

You have answered the question correctly.

4. In this question you are asked to consider the truth or falsehood of six equivalences for regular expressions. If the equivalence is true, you must also identify the law from which it follows. In each case the statement $R = S$ is conventional shorthand for " $L(R) = L(S)$." The six proposed equivalences are:

- 1. $0^*1^* = 1^*0^*$
- 2. $01\phi = \phi$
- 3. $\epsilon 01 = 01$
- 4. $(0^* + 1^*)0 = 0^*0 + 1^*0$
- 5. $(0^*1)0^* = 0^*(10^*)$
- 6. $01+01 = 01$

Identify the correct statement from the list below.

Note: we use ϕ for the empty set, because the correct symbol is not recognized by Internet Explorer

by Michael L. Lippert.

- a) $(0^*1)0^* = 0^*(10^*)$ follows from the idempotent law for union.
- b) $0^*1^* = 1^*0^*$ is false.
- c) $(0^*1)0^* = 0^*(10^*)$ is false.
- d) $01+01 = 01$ is false.

Answer submitted: **b)**

You have answered the question correctly.

5. Which of the following strings is NOT in the Kleene closure of the language $\{011, 10, 110\}$?
- a) 10011101
 - b) 110011110
 - c) 10110011
 - d) 1101010

Answer submitted: **a)**

You have answered the question correctly.

6. Here are seven regular expressions:

- 1. $(0^*+10^*)^*$
- 2. $(0+10)^*$
- 3. $(0^*+10)^*$
- 4. $(0^*+1^*)^*$
- 5. $(0+1)^*$
- 6. $(0+1^*0)^*$
- 7. $(0+1^*)^*$

Determine the language of each of these expressions. Then, find in the list below a pair of equivalent expressions.

- a) $(0+1)^*$ and $(0^*+10)^*$
- b) $(0+1^*0)^*$ and $(0^*+1^*)^*$
- c) $(0+1)^*$ and $(0+1^*)^*$
- d) $(0^*+10^*)^*$ and $(0+10)^*$

Answer submitted: **c)**

You have answered the question correctly.

7. Identify from the list below the regular expression that generates all and only the strings over alphabet $\{0,1\}$ that end in 1.
- a) $(0^*1^+)^+$
 - b) $(0^*1)^?$
 - c) $(0+1)^*1+1$

d) $(0^{*}+1)^{+}$

Answer submitted: **a)**

You have answered the question correctly.

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