

Graded Homework 6

Due Mar 12 at 11:59pm

Points 10

Questions 6

Available until Mar 12 at 11:59pm

Time Limit None

Allowed Attempts Unlimited

Instructions

This "quiz" is your graded homework for the week. Some of it can be done based solely on the materials found on Canvas, while other parts may require lecture material.

I suggest you consume the Canvas material as early as possible and attempt as many problems as you can, and then return to finish after lecture and/or office hours fills in any gaps in your understanding.

You are welcome to take the quiz alone or with others. If you do work with others, it is important that answers are not simply shared but that everyone involved works to understand the solution and could do similar problems alone in the future.

The quiz is untimed and may be taken multiple times. Your highest score achieved before the deadline is the one that will get recorded.

Take the Quiz Again

Attempt History

| | Attempt | Time | Score |
|--------|---------------------------|---------------|----------------|
| KEPT | Attempt 2 | 2 minutes | 10 out of 10 |
| LATEST | Attempt 2 | 2 minutes | 10 out of 10 |
| | Attempt 1 | 3,211 minutes | 9.67 out of 10 |

⚠️ Correct answers are hidden.

Score for this attempt: **10** out of 10

Submitted Mar 9 at 2:25pm

This attempt took 2 minutes.

Question 1

1 / 1 pts

Put a checkmark next to each of the following regular expressions that can generate the string "abab".

☐ a^*b^* ☐ $a^* + b^*$ ☒ $(a + b)^*$ ☒ $(ab)^*$ ☒ $(a^*b^*)^*$ ☒ $(b^*a^*)^*$

Question 2

1.5 / 1.5 pts

When listing strings in "lexicographic" order, shorter strings are listed before longer ones, and same length strings are listed in alphabetical order. For example: b, aab, aba are listed in lexicographic order. Consider the regular expression $(a + bb + aaaa)^*$. The first four strings in the language it represents, listed in lexicographic order are: λ , a, aa, bb. What are the next two strings in lexicographic order?

Next string:

Next after that:

Answer 1:

aaa

Answer 2:

abb

Question 3**1.5 / 1.5 pts**

A regular expression is shorthand for a set of strings. For example $ab^*a + a^*$ represents a set of strings for which the first several elements (when listed in length order with same length strings listed in alphabetical order) are: lambda, a, aa, aaa, aba, etc. What are the next two strings in this sequence?

Next string: Next after that: **Answer 1:****Answer 2:****Question 4****2 / 2 pts**

Here is the description of a DFA using the description language of

http://ivanzuzak.info/noam/webapps/fsm_simulator/

(http://ivanzuzak.info/noam/webapps/fsm_simulator/)

```
#states
s0
s1
s2
s3
s4
#initial
s0
#accepting
s0
s1
s2
s4
```

```
#alphabet
a
b
#transitions
s0:a>s1
s0:b>s4
s1:b>s2
s1:a>s4
s2:a>s3
s2:b>s4
s3:a,b>s4
s4:a,b>s4
```

How many input strings does it NOT accept?

Question 5

2 / 2 pts

Open a new browser window to the FA simulator we have been using in class (http://ivanzuzak.info/noam/webapps/fsm_simulator) and paste the following deterministic finite automata.

```
#states
s0
s1
s2
#initial
s0
#accepting
s2
#alphabet
0
1
#transitions
s0:0>s1
s0:1>s0
s1:0>s1
s1:1>s2
s2:0>s1
s2:1>s2
```

It is supposed to recognize the set of all strings over $\{0,1\}$ that end with 01, except exactly one transition arrow is incorrect. Below, enter the incorrect transition and its correction. (For each answer, enter using the exact format given above for transitions, something like "s4:b>s3".

Incorrect transition:

Correct transition:

Answer 1:

Answer 2:

Question 6

2 / 2 pts

Open a new browser window to the FA simulator we have been using in class (http://ivanzuzak.info/noam/webapps/fsm_simulator) and paste the following nondeterministic finite automata (NFA).

```
#states
a
b
c
d
#initial
a
#accepting
d
#alphabet
0
1
#transitions
a:0>a
a:1>a
a:1>b
b:1>c
c:0>d
c:1>d
```

Follow the NFA to DFA algorithm learned in class to convert it to a deterministic finite automata (DFA). Use the labeling convention seen in class where each DFA label indicates which states the NFA could be in and the letters are written in increasing order (eg, abc would indicate the NFA could be in state a, b or c). Answer the following questions. (Type only lower-case letters; no punctuation or spaces.)

How many states are in your DFA?

How many accept states are in your DFA?

When in state ad what state do you go to when consuming a 0?

When in state ad what state do you go to when consuming a 1?

When in state abcd what state do you go to when consuming a 0?

When in state abcd what state do you go to when consuming a 1?

Answer 1:

Answer 2:

Answer 3:

Answer 4:

Answer 5:

Answer 6:

Quiz Score: **10** out of 10