Homework quiz 7

Due Mar 19 at 11:59pm   **Points** 10   **Questions** 6

Available until Mar 19 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.

<div style="border:1px solid; text-align:center; padding:1em;">Take the Quiz Again</div>

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	116 minutes	9.5 out of 10

⚠ Correct answers are hidden.

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

Submitted Mar 9 at 5:28pm

This attempt took 2 minutes.

Question 1	**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?   5

How many accept states are in your DFA?   2

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

a

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

ab

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

ad

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

abcd

Answer 1:

5

Answer 2:

2

Answer 3:

a

Answer 4:

ab

Answer 5:

ad

Answer 6:

abcd

Question 2   1.5 / 1.5 pts

In class we learned an algorithm for converting a regular expression into a NFA. Apply the conversion algorithm to the regular expression (ab)* and answer the following questions about the resulting NFA. Type a single digit for each answer.

How many states are in your NFA? 5

How many arrows are labeled lambda? 4

How many arrows point at your accept state? 2

Answer 1:

  5

Answer 2:

  4

Answer 3:

  2

Question 3   1.5 / 1.5 pts

In class we learned an algorithm for converting a regular expression into a
NFA. Apply the conversion algorithm to the regular expression (a*b)* and
answer the following questions about the resulting NFA. Type a single
digit for each answer.

How many states are in your NFA? | 7

How many arrows are labeled lambda? | 8

How many arrows point at your accept state? | 2

Answer 1:

  7

Answer 2:

  8

Answer 3:

  2

Question 4   1.5 / 1.5 pts

While performing the DFA to RE algorithm learned in class, let's say the following NFA is created as an intermediate step. (You may view the NFA at **http://ivanzuzak.info/noam/webapps/fsm_simulator/** ↪ **(http://ivanzuzak.info/noam/webapps/fsm_simulator/)** if you wish). Note that $ is a lambda transition in this text representation.

```
#states
A
B
C
D
E
#initial
A
#accepting
E
#alphabet
0
1
#transitions
A:$>B
B:0>C
C:1>C
C:0>D
D:$>E
```

If State C is removed next, a single transition from B to D results, what will be the label on the transition from B to D? Write your answer without any spaces or parentheses.

01*0

Question 5   1.5 / 1.5 pts

While performing the DFA to RE algorithm learned in class, let's say the following NFA is created as an intermediate step. (You may view the NFA at **http://ivanzuzak.info/noam/webapps/fsm_simulator/** ↪ **(http://ivanzuzak.info/noam/webapps/fsm_simulator/)** if you wish). Note that $ is a lambda transition in this text representation.

```
#states
A
B
C
D
E
#initial
A
#accepting
E
#alphabet
0
1
#transitions
A:$>B
B:0>C
C:1>C
C:0>D
B:1>D
D:$>E
```

If State C is removed next, a single transition from B to D results, what will be the label on the transition from B to D? Write your answer without any spaces or parentheses.

01*0+1

Question 6

2 / 2 pts

While performing the DFA to RE algorithm learned in class, let's say the following NFA is created as an intermediate step. (You may view the NFA at **http://ivanzuzak.info/noam/webapps/fsm_simulator/** ⇨ **(http://ivanzuzak.info/noam/webapps/fsm_simulator/)** if you wish). Note that $ is a lambda transition in this text representation.

```
#states
A
B
C
D
E
#initial
A
#accepting
E
#alphabet
0
1
```

```
#transitions
A:$>B
B:0>C
C:1>B
C:1>C
C:0>D
D:1>C
D:$>E
```

If State C is removed next, what are the labels on each of the following transitions? Write your answer without any spaces or parentheses. If no such transition exists, write exactly the word "none".

B to D: `01*0`

D to B: `11*1`

B to B: `01*1`

D to D: `11*0`

Answer 1:

01*0

Answer 2:

11*1

Answer 3:

01*1

Answer 4:

11*0

Quiz Score: 10 out of 10