COMP 5361: Assignment 4

Due on Thursday, March 13 2014

Presented to Dr. Stan Klasa

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I certify that this submission is my original work and meets the Faculty's Expectations of Originality.

Question 1

A)

$a(bb)^*(ab)^*$
Let L represent the regular language described by $a(bb)^*(ab)^*$.

Given the definition of L words must start with an a and be followed by bb or ab.

In order to form the word $abab$ one must be able to follow a with ba. As such, it is impossible to construct the word $abab$ with this language L.

B)

ab^*a^*
Let L represent the regular language described by ab^*a*.

Given the definition of L words must start with an ab and be followed by b or a.

In order to form the word $abab$ one must be able to follow ab with ab. As such, it is impossible to construct the word $abab$ with this language L.

C)

$a(ba)^*b^*$
Let L represent the regular language described by $a(ba)^*b^*$.

Given the definition of L one can assign a value of 1 to the first and second exponent. This would result in $abab$.

As such, it is possible to construct the word $abab$ with this language L.

D)

$a^*ba(a \cup b)$
Let L represent the regular language described by $a^*ba(a \cup b)$.

Given the definition of L one can assign a value of 1 to the first exponent and choose b over a in $(a \cup b)$. This would result in $abab$.

As such, it is possible to construct the word $abab$ with this language L.

E)

$(ab)^*(bb)^*$
Let L represent the regular language described by $(ab)^*(bb)^*$.

Given the definition of L one can assigns a value of 2 to the first exponent and 0 to the second exponent. This would result in $abab$.

As such, it is possible to construct the word $abab$ with this language L.

F)

$a^*(ba \cup bb)^*$
Let L represent the regular language described by $a^*(ba \cup bb)^*$ and wL be a word formed with this language.

Given the definition of L words must start with a a, ba or bb. The only scenario where it would be possible to form the words $abab$ is if wL begins with a. Following a the only options are ba or bb followed again by ba or bb.

In order to form the word $abab$ one must be able to follow a with bab. As such, it is impossible to construct the word $abab$ with this language L.

G)

$a^*(ba)^*bb$
Let L represent the regular language described by $a^*(ba)^*bb$ and wL be a word formed with this language.

Given the definition of L words must start with a a, ba or bb. The only scenario where it would be possible to form the words $abab$ is if wL begins with a. Following a the only options are ba^* or bb^*.

In order to form the word $abab$ one must be able to follow a with bab. As such, it is impossible to construct the word $abab$ with this language L.

H)

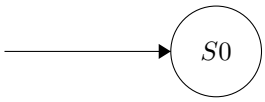
$ab(ab \cup a)b^*$
Let L represent the regular language described by $ab(ab \cup a)b^*$.

Given the definition of L one can assigns a value of 0 to the exponent and choose ab over a. This would result in $abab$.

As such, it is possible to construct the word $abab$ with this language L.

Question 2

A)



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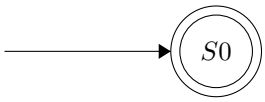
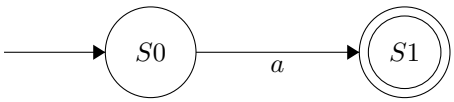
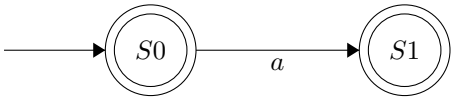


C)

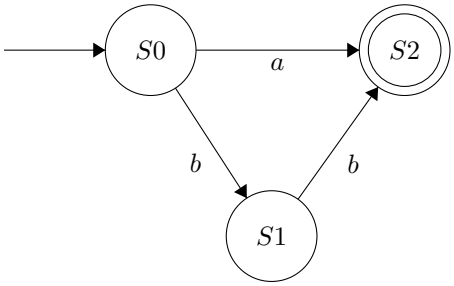


Question 3

A)



B)



C)