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**Assignment No. 02  
Semester: Fall 2019  
Theory of Automata – CS402**

## Total Marks: 20

## Due date: 02Dec, 2019

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**Question#01**

Derive the regular Expressions (RE) for the following DFA. You are required to mention all the required steps

1

0

1

0

0,1

**1**

# Step 1:

There should be no incoming edges on the initial state and no outgoing edges on the final state, and there should be only one initial and one final state .Therefore we have introduced another state qi as initial state and qf as a final state with a null transition respectively as shown below:

1

0

0

0,1

**^**

1

## Step 2

By eliminating state 3 we get another loop on state q2 and by combining both loops on state q2 we get 1+0(0+1)as shown below.

0

**^**

1

1+0(0+1)

## Step3:

By eliminating state q1 we get a transition ^0\*1from q1 to q2 as shown below;

^0\*1

1+0(0+1)

## Step 4

By eliminating state q1 we get a transition ^0\*1(1+0(0+1))\*^ from q1 to qf as shown ;

^0\*1 (1+0(0+1))\*^

**Question no 2**

Derive the regular Expressions (RE) for the followingDFA. You are required to mention all the required steps.

a

b

a

## 

## Step1:

There should be no coming edges on an initial state and no outgoing edges on final state, and there should be only one initial state and one final state, therefore we have introduced another state qi as an initial state and q1 as a final state with a null transition respectively as shown below.

b

b

a

## Step2

By eliminating state q2 we get bb\*a from q2 to q3 path as given below.

## 

a

a

bb \*a

## step 3

By eliminating state q3 we get (a+bb\*aa\*b) as a loop on state q1 because there is a path from q2 to q3 that generates a loop on q1.therefore we have placed (a+bb\*aa\*b) as a loop expressions. As we know there is already a loop of alphabet a on q2 and two loops on a single state can be added by using ‘+’ operator.

(a+bb\*aa\*b)

^

^

## Step4

By eliminating q1we are left only one initial and one final state with a single path labeled with ^(a+bb\*aa\*b)\*^

^(a+bb\*aa\*b)\*^