ACD Lab ASSIGNMENT 1

Name : Aahan Singh Charak

Registration Number :189301024

Section : CSE A

Roll no : 5

1. Give a DFA for Σ = {a, b} that accepts all string containing number of b’s as multiple of 3 and even number of a’s.

Sol :

Code : (python)

reqString=input('Enter the string you want to test : ')

states=[0,1,2,3,4,5]

transitions={

    0:(3,1), #of the form state =>(transition for a,transition for b)

    1:(4,2),

    2:(5,0),

    3:(0,4),

    4:(1,5),

    5:(2,3)

}

currentState=0

acceptable=True

for alpha in reqString:

    print('Current state : q{}'.format(currentState))

    print('Input alphabet {}'.format(alpha))

    if(alpha=='a'):

        currentState=transitions[currentState][0]

    elif(alpha=='b'):

        currentState=transitions[currentState][1]

    else:

        print('Invalid character in string... Exiting')

        acceptable=False

        break

    print('Jumped to state : q{}'.format(currentState))

    print(''.center(20,'\*'))

if(not acceptable):

    print('Invalid input string')

elif(currentState==0):

    print('String accepted')

else:

    print('String not accepted')

Ouput:

Text

Description automatically generated

1. Construct a DFA that accepts any string over {a,b} that does not contain aabb in it.

Sol:

Code in python:

reqString=input('Enter the string you want to test : ')

states=[0,1,2,3,4]

transitions={

    0:(1,0), #of the form state =>(transition for a,transition for b)

    1:(2,0),

    2:(2,3),

    3:(1,4),

    4:(4,4)

}

currentState=0

acceptable=True

for alpha in reqString:

    print('Current state : q{}'.format(currentState))

    print('Input alphabet {}'.format(alpha))

    if(alpha=='a'):

        currentState=transitions[currentState][0]

    elif(alpha=='b'):

        currentState=transitions[currentState][1]

    else:

        print('Invalid character in string... Exiting')

        acceptable=False

        break

    print('Jumped to state : q{}'.format(currentState))

    print(''.center(20,'\*'))

if(not acceptable):

    print('Invalid input string')

elif(currentState==4):

    print('String not accepted')

else:

    print('String accepted')

Ouput:

A screenshot of a computer

Description automatically generated with medium confidence

1. Construct a Moore machine that counts the occurrence of the sequence ‘abb’ in any input string over {a,b}.

reqString=input('Enter the string you want to test : ')

states=[0,1,2,3]

transitions={

    0:(1,0,0), #of the form state =>(transition for a,transition for b,output at incoming transition on q)

    1:(1,2,0),

    2:(1,3,0),

    3:(1,0,1),

}

currentState=0

noofabb=0

acceptable=True

for alpha in reqString:

    print('Current state : q{}'.format(currentState))

    print('Input alphabet {}'.format(alpha))

    if(alpha=='a'):

        currentState=transitions[currentState][0]

    elif(alpha=='b'):

        currentState=transitions[currentState][1]

    else:

        print('Invalid character in string... Exiting')

        acceptable=False

        break

    output=transitions[currentState][2]

    print('Jumped to state : q{}'.format(currentState))

    print('Output is : {}'.format(output))

    if output==1:

        noofabb+=1

    print(''.center(20,'\*'))

if(not acceptable):

    print('Invalid input string')

else:

    print('Number of abb in the given string are : {}'.format(noofabb))

print(''.center(20,'\*'))

Output:  
Text

Description automatically generated