ACD Lab ASSIGNMENT 3

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Section : CSE A

Roll no : 5

1 . Write a program to design a turing machine for a^nb^n-2 for n>=2

Sol :

Code : (python)

#turing machine for a^nb^n-2 n>=2

symbolSet={'a','b','null','h'}

inpString=input('Enter the string which you want to test in the turing machine e=>{a,b} : ')

tape=[]

tape.extend([char for char in inpString]+['null'])

curState=0

curTapeIndex=0

transitions={

    0:[('a','x','r',1)],

    1:[('a','a','r',1),('b','y','l',2),('null','null','l',3),('y','y','r',1)],

    2:[('a','a','l',2),('y','y','l',2),('x','x','r',0)],

    3:[('a','a','l',3),('y','y','l',3),('x','x','r',4)],

    4:[('a','a','r',5)],

    5:[('y','y','r',5),('null','null','l','HALT')],

    'HALT':[]

}

def MoveLeftOnTape():

    global curTapeIndex

    curTapeIndex-=1

def MoveRightOnTape():

    global curTapeIndex

    curTapeIndex+=1

def performTransitions(symbol):

    global curTapeIndex

    global curState

    transitionExists=False

    for tuple in transitions[curState]:

        if tuple[0]==symbol:

            transitionExists=True

            print('\n')

            print('Input symbol is : {} '.format(symbol))

            print('Moving from state q{} to state q{}'.format(curState,tuple[3]))

            print('Replace tape index : {} with {}'.format(curTapeIndex,tuple[1]))

            curState=tuple[3]

            tape[curTapeIndex]=tuple[1]

            if tuple[2]=='l':

                MoveLeftOnTape()

                print('Moving Left')

            elif tuple[2]=='r':

                MoveRightOnTape()

                print('Moving Right')

            break

    return transitionExists

while(curState!='HALT'):

    transitionExists=performTransitions(tape[curTapeIndex])

    if not transitionExists:

        print('Transition doesnt exist for {} on {}'.format(tape[curTapeIndex],curState))

        print('String Rejected')

        break

if curState=='HALT':

    print('String accepted by the turing machine')

else:

    print('String not accepted by the turing machine')

Output:

A screenshot of a computer

Description automatically generated with medium confidence

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