ACD Lab ASSIGNMENT 1

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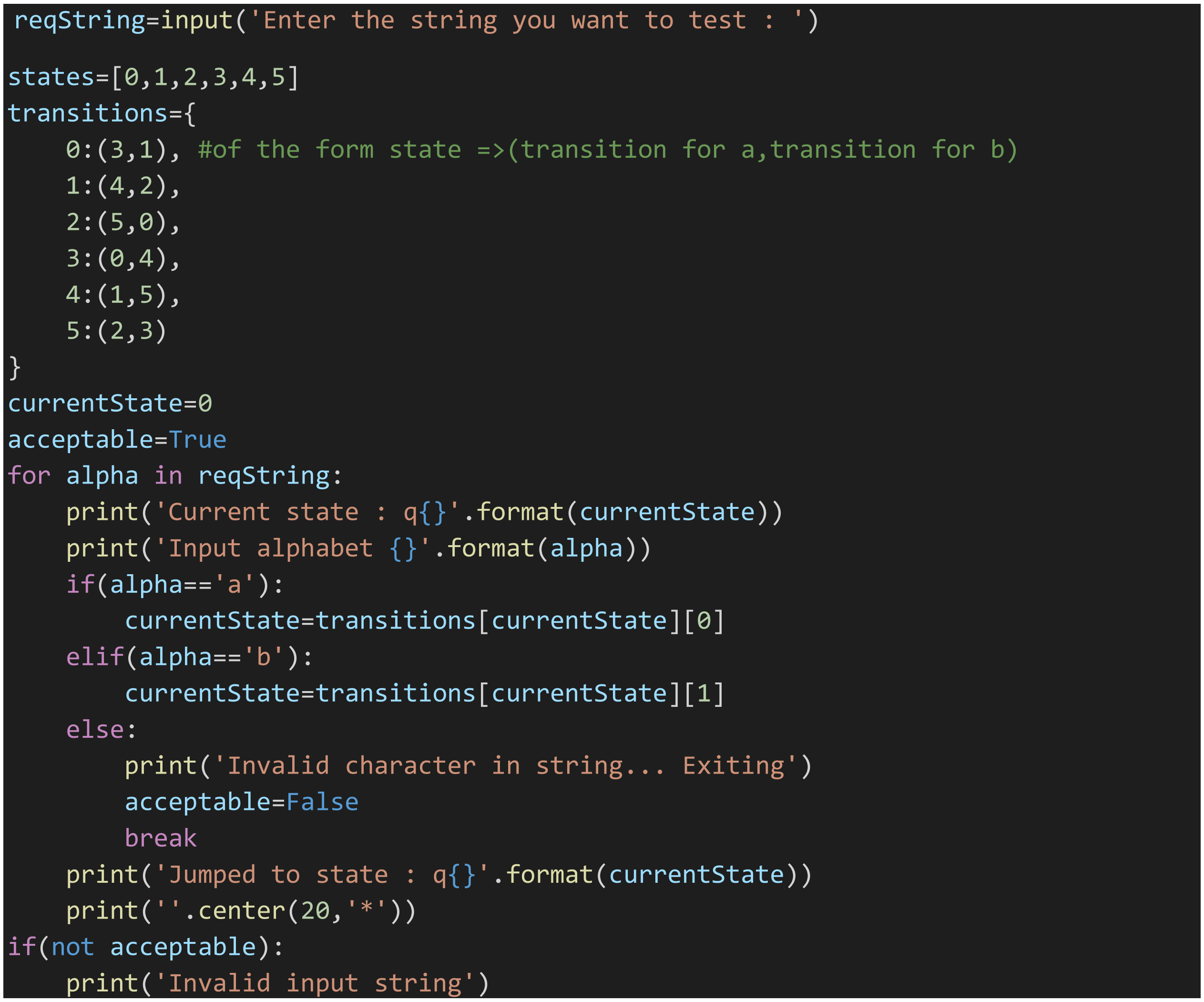
Section : CSE A

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)

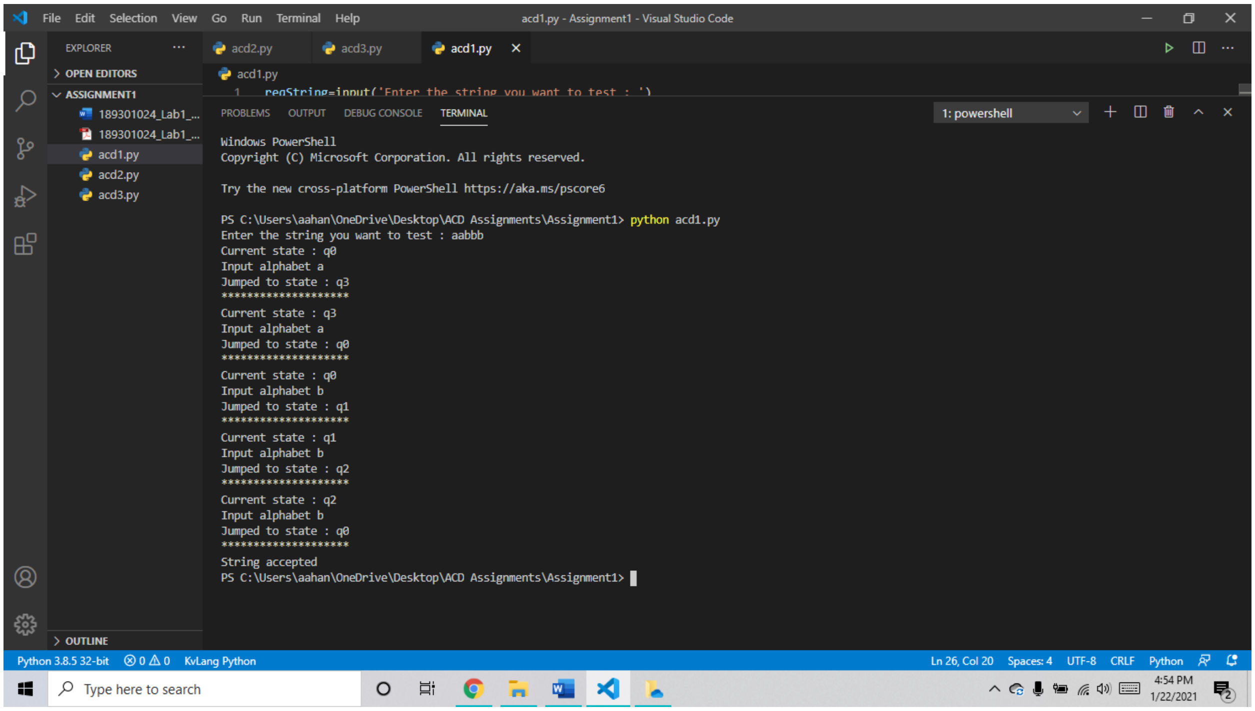


```
reqString=input('Enter the string you want to test : ')

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')
```

```python
elif(currentState==0):
    print('String accepted')
else:
    print('String not accepted')
```

Ouput:



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

```
Windows PowerShell
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Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\aahan\OneDrive\Desktop\ACD Assignments\Assignment1> python acd1.py
Enter the string you want to test : aabbb
Current state : q0
Input alphabet a
Jumped to state : q3
********************
Current state : q3
Input alphabet a
Jumped to state : q0
********************
Current state : q0
Input alphabet b
Jumped to state : q1
********************
Current state : q1
Input alphabet b
Jumped to state : q2
********************
Current state : q2
Input alphabet b
Jumped to state : q0
********************
String accepted
PS C:\Users\aahan\OneDrive\Desktop\ACD Assignments\Assignment1>
```
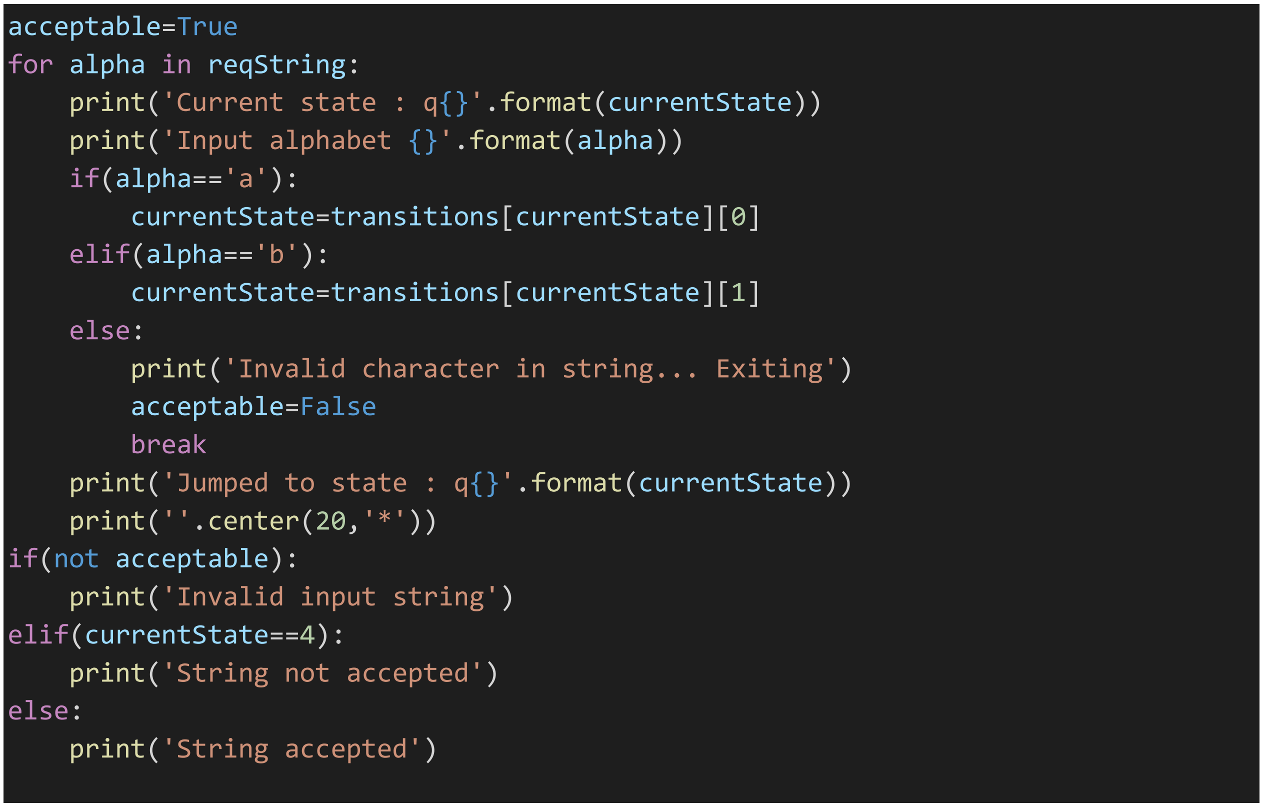

2. Construct a DFA that accepts any string over {a,b} that does not contain aabb in it.

Sol:

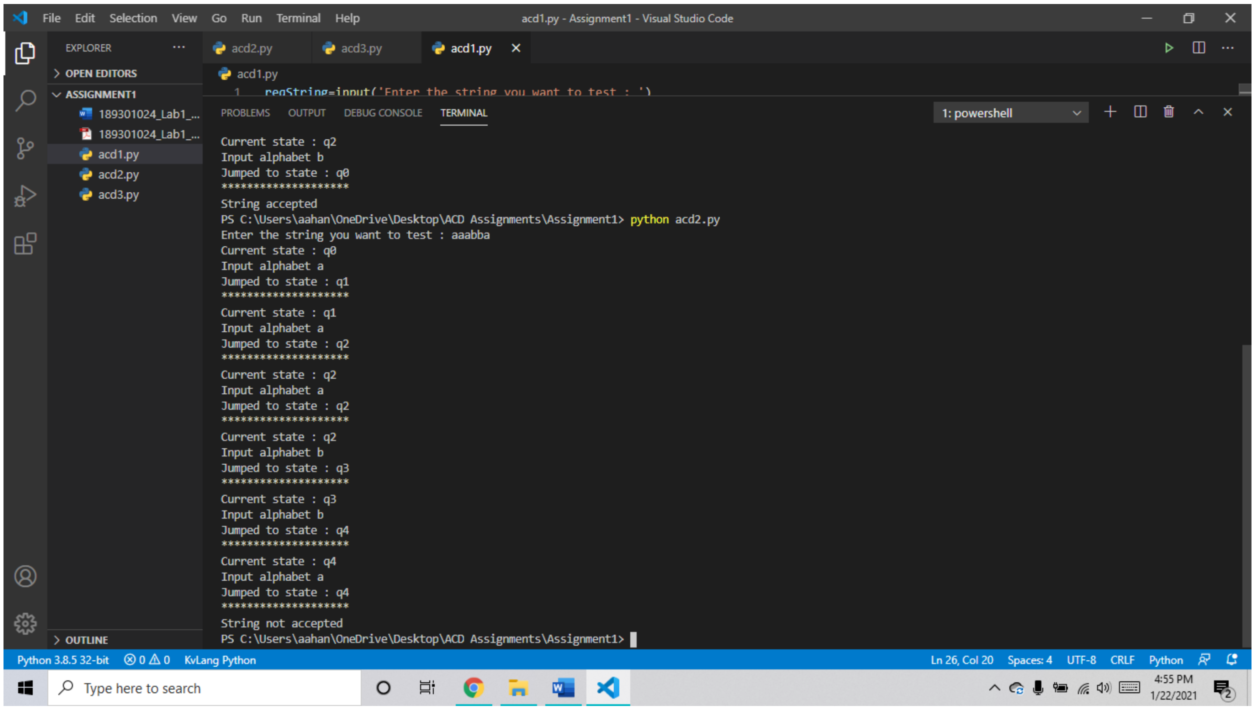
Code in python:

```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
```



```python
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')
```

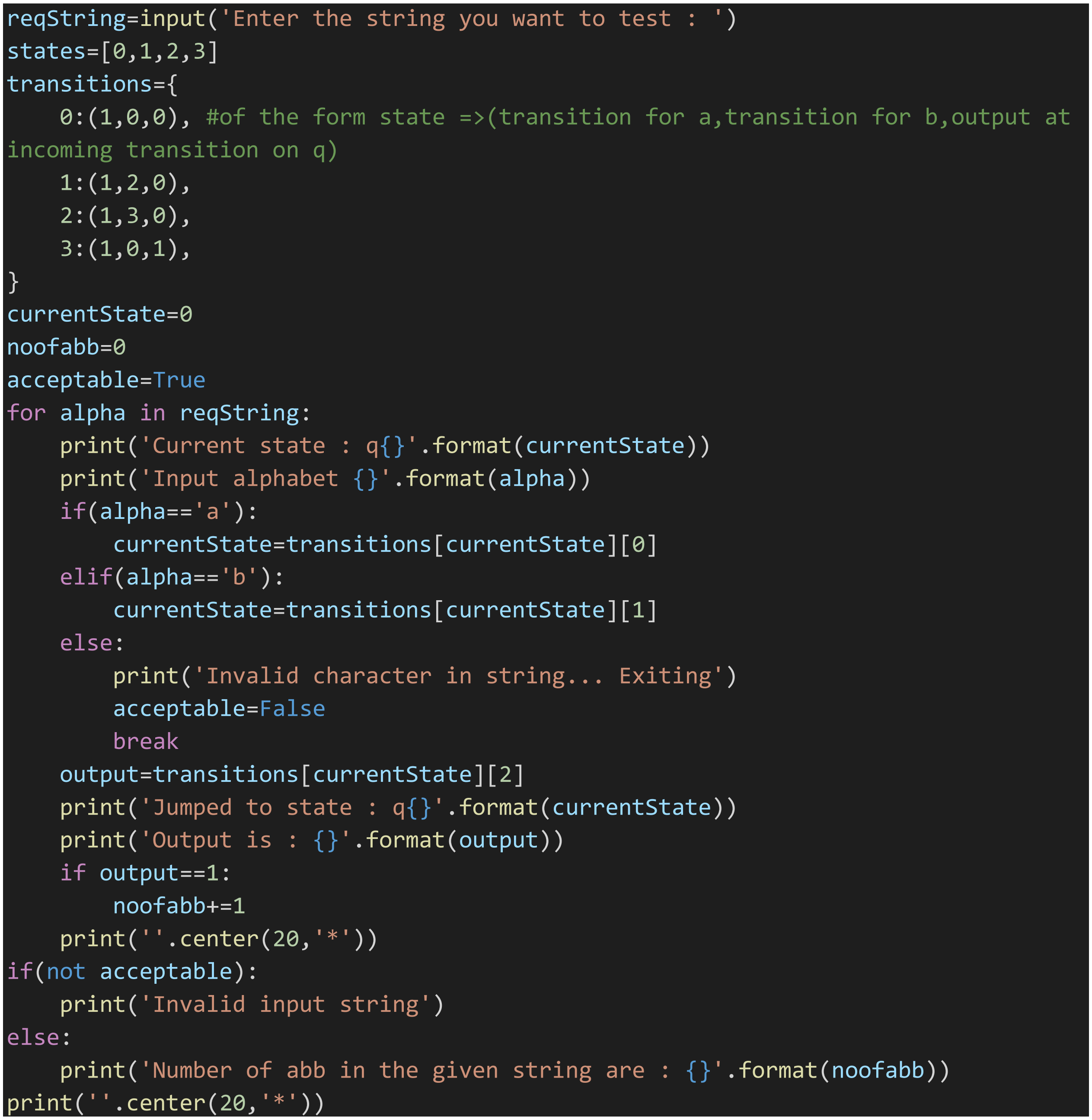
Ouput:



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

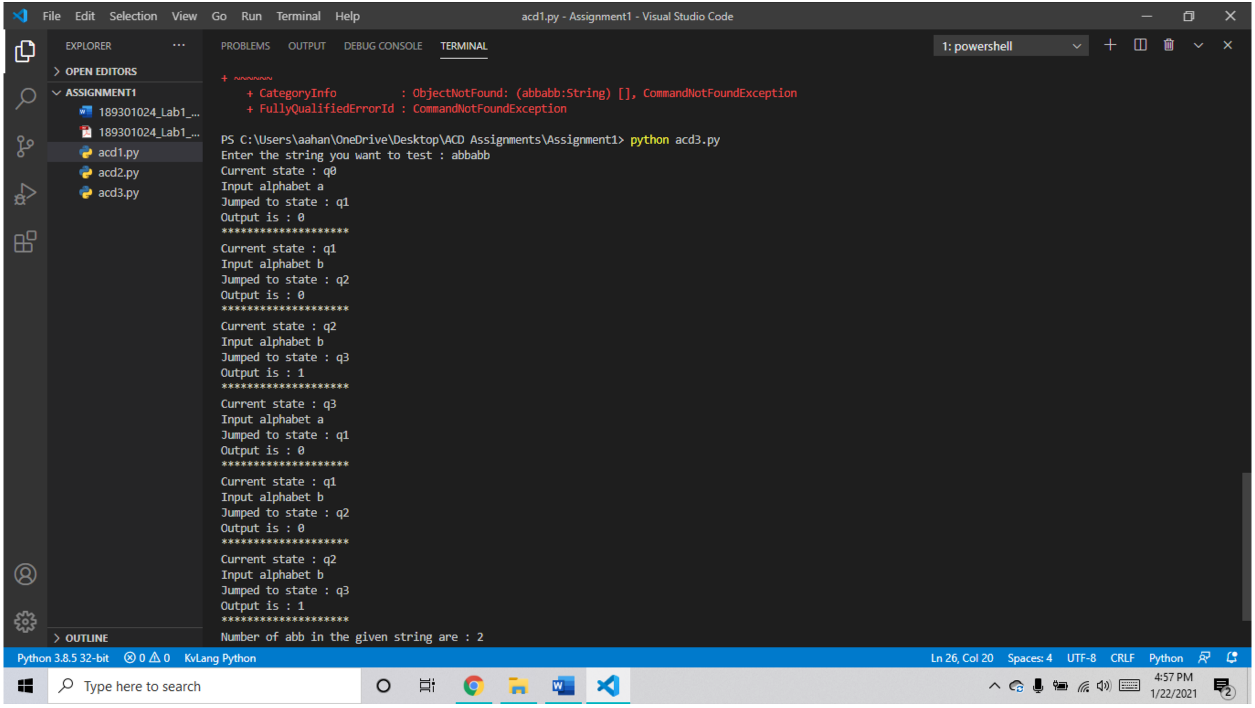
```
Current state : q2
Input alphabet b
Jumped to state : q0
********************
String accepted
PS C:\Users\aahan\OneDrive\Desktop\ACD Assignments\Assignment1> python acd2.py
Enter the string you want to test : aaabba
Current state : q0
Input alphabet a
Jumped to state : q1
********************
Current state : q1
Input alphabet a
Jumped to state : q2
********************
Current state : q2
Input alphabet a
Jumped to state : q2
********************
Current state : q2
Input alphabet b
Jumped to state : q3
********************
Current state : q3
Input alphabet b
Jumped to state : q4
********************
Current state : q4
Input alphabet a
Jumped to state : q4
********************
String not accepted
PS C:\Users\aahan\OneDrive\Desktop\ACD Assignments\Assignment1>
```

3. 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:


File Edit Selection View Go Run Terminal Help
acd1.py - Assignment1 - Visual Studio Code
EXPLORER
OPEN EDITORS
ASSIGNMENT1
189301024_Lab1_...
189301024_Lab1_...
acd1.py
acd2.py
acd3.py
OUTLINE
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
1: powershell
Python 3.8.5 32-bit ⊗ 0 ⚠ 0 KvLang Python
Ln 26, Col 20 Spaces: 4 UTF-8 CRLF Python
Type here to search
4:57 PM
1/22/2021

```
+ ~~~~~~
    + CategoryInfo          : ObjectNotFound: (abbabb:String) [], CommandNotFoundException
    + FullyQualifiedErrorId : CommandNotFoundException

PS C:\Users\aahan\OneDrive\Desktop\ACD Assignments\Assignment1> python acd3.py
Enter the string you want to test : abbabb
Current state : q0
Input alphabet a
Jumped to state : q1
Output is : 0
********************
Current state : q1
Input alphabet b
Jumped to state : q2
Output is : 0
********************
Current state : q2
Input alphabet b
Jumped to state : q3
Output is : 1
********************
Current state : q3
Input alphabet a
Jumped to state : q1
Output is : 0
********************
Current state : q1
Input alphabet b
Jumped to state : q2
Output is : 0
********************
Current state : q2
Input alphabet b
Jumped to state : q3
Output is : 1
********************
Number of abb in the given string are : 2
```