# COMPILER DESIGN ASSIGNMENT 3

```
def DFA():
    string =input("Enter String over alphabet{0-9} : ")
    state=0
    n=len(string)
    if (n==0):
        print("Empty String \u03B5")
        return None
    mod_0=['0','3','6','9']
    mod_1=['1','4','7']
    mod_2=['2','5','8']
    for i in string:
        if (state==0):
            if i in mod_0: state=0
            elif i in mod_1: state=1
            elif i in mod_2: state=2
        elif (state==1):
            if i in mod_0: state=1
            elif i in mod_1: state=2
            elif i in mod_2: state=0
        elif (state==2):
            if i in mod_0: state=2
            elif i in mod_1: state=0
            elif i in mod_2: state=1

    if (state==0):
        print("Given string is accepted at state : ",state)
    else:
        print("Given string is rejected at state : ",state)

DFA()
```

```python
def PDA():
    string = input("Enter any string over given alphabet{0,1} : ")
    n=len(string)
    if (n==0):
        print("Empty String \u03B5")
        return None
    stack,state,flag=[],0,True
    for i in string:
        if state==0:
            if i=='0' or i=='1': stack.append(i)
            elif i=='C' or i=='c':
                state=1
                continue
        elif state==1:
            if (len(stack)>0 and i==stack[-1]): stack.pop()
            else:
                flag=False
                break

    if (len(stack)==0 and flag==True):
        state=2
    if (len(stack)>0):
            print("Stack top : ",stack[-1])
    else:
            print("Stack top : ","Empty")
    if (state==2):
        print("String is accepted at state : ",state)
    else:
        print("String is rejected at state : ",state)

PDA()
```

**Output of Task A: Design and Implementation of a Finite State Machine (FSM) to Recognize Strings Divisible by 3.**

```
PS C:\Users\Samar Mittal\Desktop\Compiler LAb\lab3> python -u
Enter String over alphabet{0-9} : 9
Given string is accepted at state :  0
PS C:\Users\Samar Mittal\Desktop\Compiler LAb\lab3> python -u
Enter String over alphabet{0-9} : 123
Given string is accepted at state :  0
PS C:\Users\Samar Mittal\Desktop\Compiler LAb\lab3> python -u
Enter String over alphabet{0-9} : 123456789
Given string is accepted at state :  0
PS C:\Users\Samar Mittal\Desktop\Compiler LAb\lab3> python -u
Enter String over alphabet{0-9} : 314159265358979
Given string is rejected at state :  2
PS C:\Users\Samar Mittal\Desktop\Compiler LAb\lab3> python -u
Enter String over alphabet{0-9} : 000000000
Given string is accepted at state :  0
PS C:\Users\Samar Mittal\Desktop\Compiler LAb\lab3> python -u
Enter String over alphabet{0-9} :
Empty String ε
```

**Output of Task B: To design and simulate a Pushdown Automaton (PDA) for the language L, which recognizes strings in the form WCW^R,**

```
PS C:\Users\Samar Mittal\Desktop\Compiler LAb\lab3> python -u
Enter any string over given alphabet{0,1} : 10C01
Stack top :  Empty
String is accepted at state :  2
PS C:\Users\Samar Mittal\Desktop\Compiler LAb\lab3> python -u
Enter any string over given alphabet{0,1} : 110C011
Stack top :  Empty
String is accepted at state :  2
PS C:\Users\Samar Mittal\Desktop\Compiler LAb\lab3> python -u
Enter any string over given alphabet{0,1} : 101C11
Stack top :  0
String is rejected at state :  1
PS C:\Users\Samar Mittal\Desktop\Compiler LAb\lab3> python -u
Enter any string over given alphabet{0,1} : 101101
Stack top :  1
String is rejected at state :  0
PS C:\Users\Samar Mittal\Desktop\Compiler LAb\lab3> python -u
Enter any string over given alphabet{0,1} :
Empty String ε
PS C:\Users\Samar Mittal\Desktop\Compiler LAb\lab3> python -u
Enter any string over given alphabet{0,1} : C
Stack top :  Empty
String is accepted at state :  2
PS C:\Users\Samar Mittal\Desktop\Compiler LAb\lab3> python -u
Enter any string over given alphabet{0,1} : C001
Stack top :  Empty
String is rejected at state :  1
```