

PROGRAM 8

AIM: Write a program in Python to implement Adaline Neural Network.

CODE:

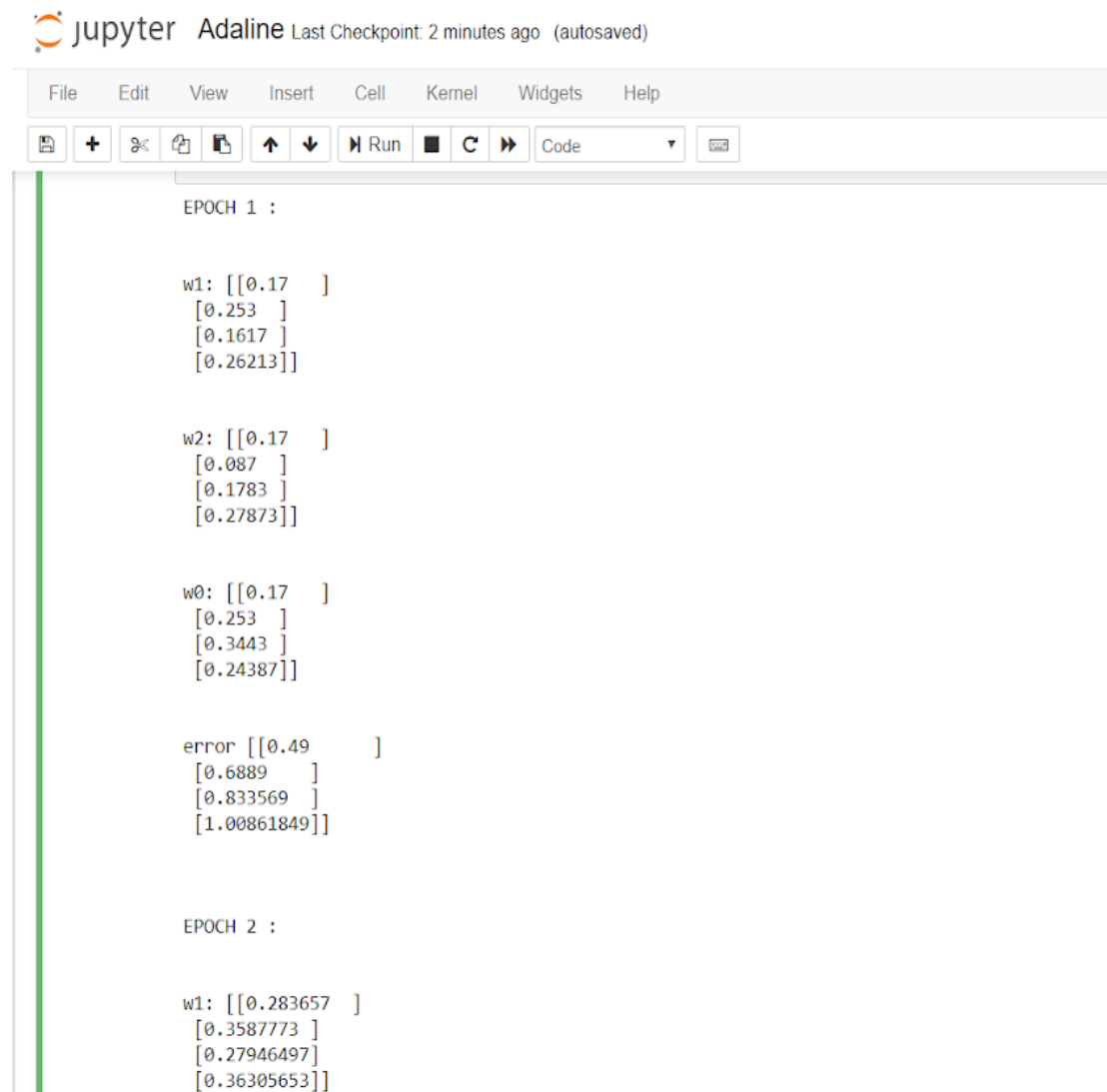
```
Import numpy as np
x1=np.array([[1,1,-1,-1]])
x2=np.array([[1,-1,1,-1]])
t=np.array([[1],[1],[1],[-1]])
w11=0.1
w21=0.1
w01=0.1
alpha=0.1
i=0
bias=1
w1=np.zeros((4,1))
w2=np.zeros((4,1))
w0=np.zeros((4,1))
Yin=np.zeros((4,1))
y=np.zeros((4,1))
error=np.zeros((4,1))
count=0
while(count!=3):
    i=0
    if(count!=0):
        w11=w1[3]
        w21=w2[3]
        w01=w0[3]
    while(i!=4):
        if(i==0):
            Yin[i]= (x1[0][i]*w11)+(x2[0][i]*w21)+(bias*w01)
            y[i]=t[i][0]-Yin[i]
            w1[i]=w11+(alpha*y[i]*x1[0][i])
            w2[i]=w21+(alpha*y[i]*x2[0][i])
            w0[i]=w01+(alpha*y[i]*bias)
        else:
            if(i>0 & i<=4):
                Yin[i]= (x1[0][i]*w1[i-1])+(x2[0][i]*w2[i-1])+(bias*w0[i-1])
                y[i]=t[i][0]-Yin[i]
                w1[i]=w1[i-1]+(alpha*y[i]*x1[0][i])
                w2[i]=w2[i-1]+(alpha*y[i]*x2[0][i])
                w0[i]=w0[i-1]+(alpha*y[i]*bias)

            error[i]=(y[i])**2
            i=i+1
    print('EPOCH',(count+1),':')
    print('\n')
    print('w1:',w1)
    print('\n')
    print('w2:',w2)
```

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```
print('\n')
print('w0:',w0)
print('\n')
print('error',error)
print('\n\n')
count=count+1
```

OUTPUT:



```
Jupyter Adaline Last Checkpoint: 2 minutes ago (autosaved)
File Edit View Insert Cell Kernel Widgets Help
[Icons] [Run] [Code]
EPOCH 1 :

w1: [[0.17   ]
     [0.253   ]
     [0.1617  ]
     [0.26213]]

w2: [[0.17   ]
     [0.087   ]
     [0.1783  ]
     [0.27873]]


w0: [[0.17   ]
     [0.253   ]
     [0.3443  ]
     [0.24387]]

error [[0.49   ]
       [0.6889  ]
       [0.833569]
       [1.00861849]]












EPOCH 2 :

w1: [[0.283657 ]
     [0.3587773 ]
     [0.27946497]
     [0.36305653]]
```

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Jupyter Adaline Last Checkpoint: 2 minutes ago (autosaved)  Logout

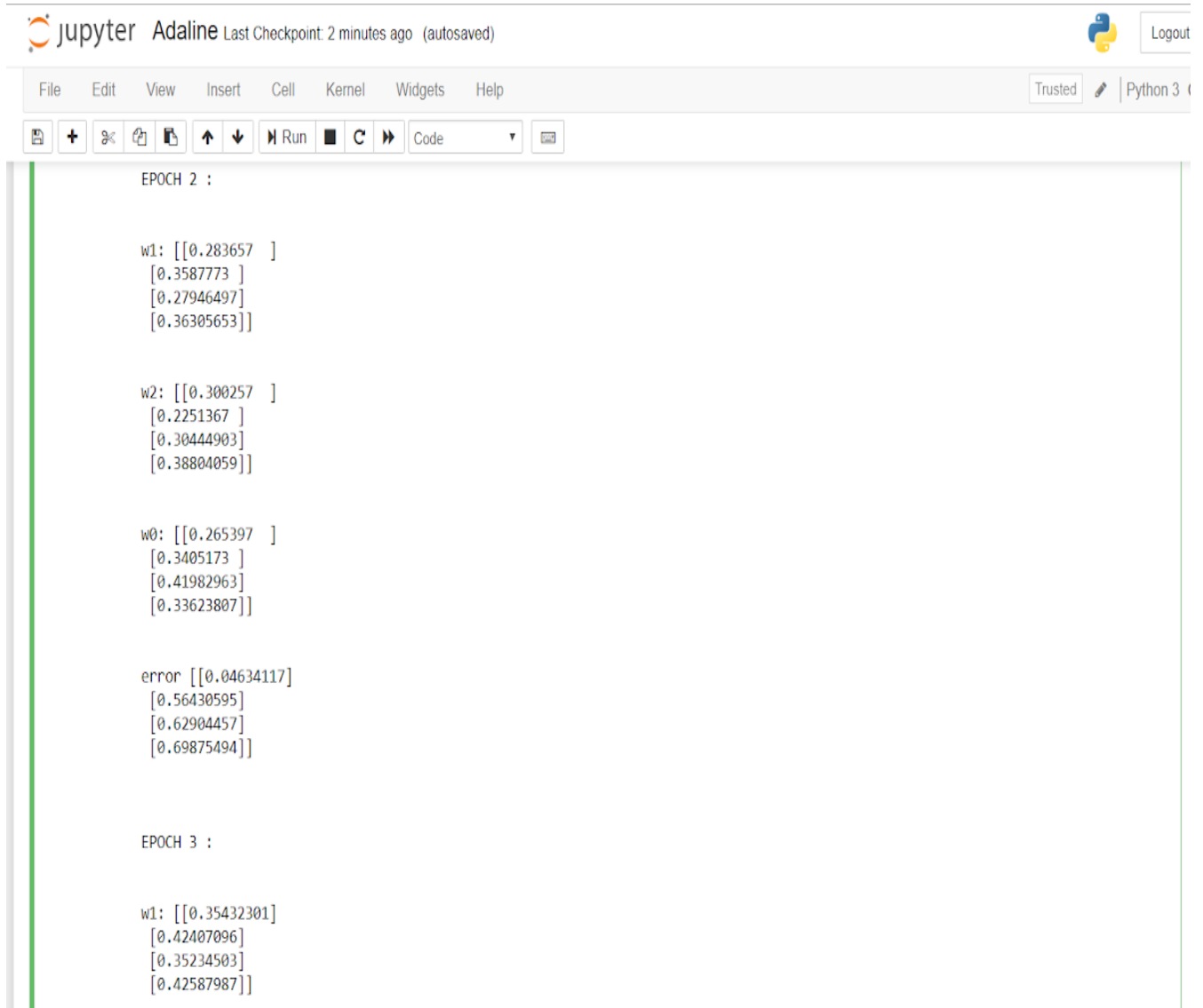
File Edit View Insert Cell Kernel Widgets Help Trusted Python 3

          Code 

```
EPOCH 3 :  
  
w1: [[0.35432301]  
      [0.42407096]  
      [0.35234503]  
      [0.42587987]]  
  
w2: [[0.37930707]  
      [0.30955912]  
      [0.38128506]  
      [0.45481989]]  
  
w0: [[0.32750455]  
      [0.3972525 ]  
      [0.46897843]  
      [0.3954436 ]]  
  
error [[0.00762744]  
        [0.48647767]  
        [0.51446097]  
        [0.54073719]]
```

In []:

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The image shows a Jupyter Notebook interface. At the top, the header bar includes the Jupyter logo, the name 'Adaline', and a status message 'Last Checkpoint: 2 minutes ago (autosaved)'. On the right side of the header, there is a 'Logout' button. Below the header is a menu bar with options: File, Edit, View, Insert, Cell, Kernel, Widgets, and Help. To the right of the menu bar, there is a 'Trusted' status indicator and a 'Python 3' version indicator. Below the menu bar is a toolbar with icons for saving, adding a new cell, undo, redo, running the cell, and other standard Jupyter actions. The main area of the notebook contains a single code cell with the following Python code:

```
EPOCH 2 :  
  
w1: [[0.283657 ]  
      [0.3587773 ]  
      [0.27946497]  
      [0.36305653]]  
  
w2: [[0.300257 ]  
      [0.2251367 ]  
      [0.30444903]  
      [0.38804059]]  
  
w0: [[0.265397 ]  
      [0.3405173 ]  
      [0.41982963]  
      [0.33623807]]  
  
error [[0.04634117]  
        [0.56430595]  
        [0.62904457]  
        [0.69875494]]  
  
EPOCH 3 :  
  
w1: [[0.35432301]  
      [0.42407096]  
      [0.35234503]  
      [0.42587987]]
```