

## PROGRAM 20

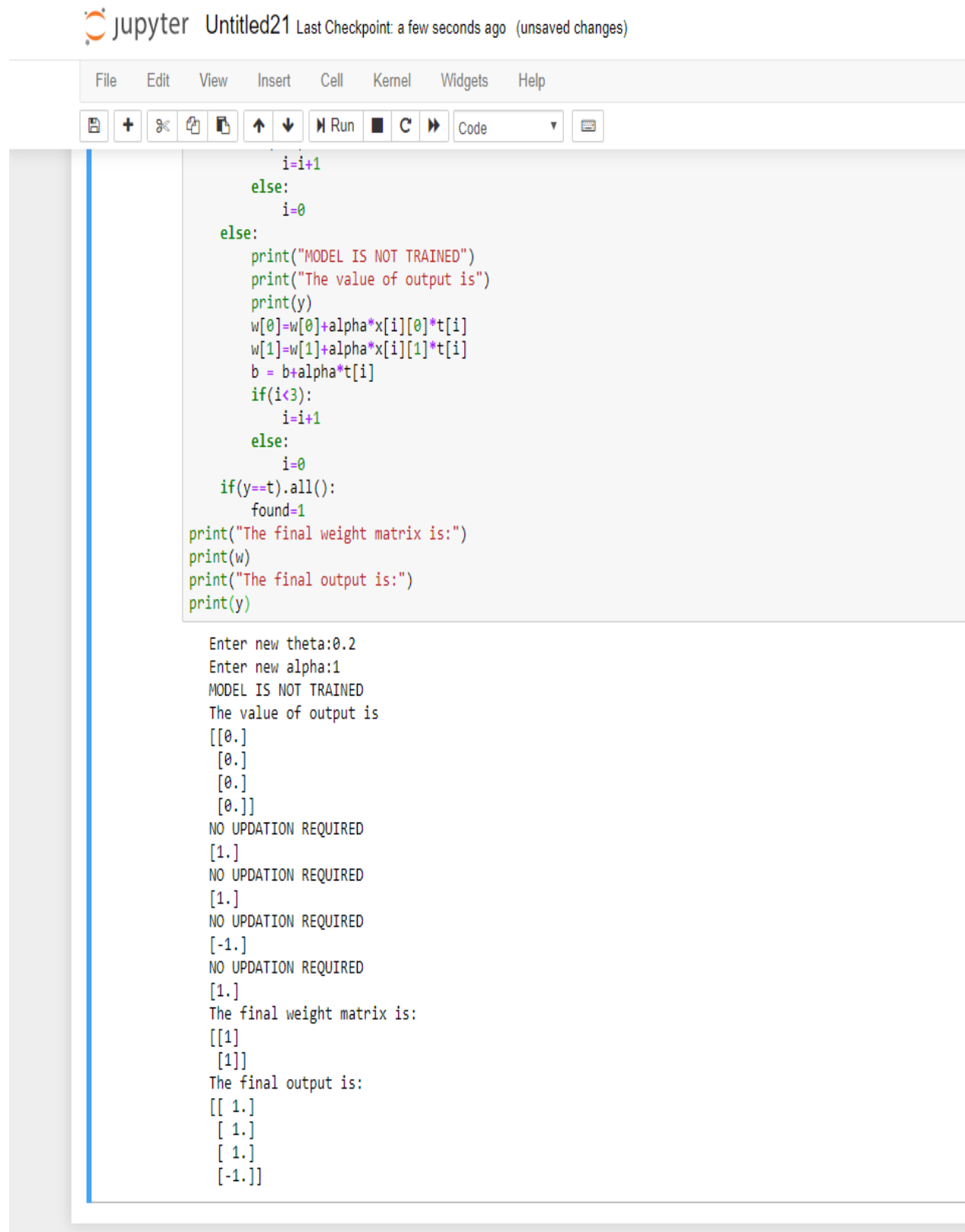
**AIM:** Write a program in Python to implement single layer perceptron for AND function.

### CODE:

```
import numpy as np
x=np.array([[1,1],[1,-1],[-1,1],[-1,-1]])
t=np.array([[1],[1],[1],[-1]])
w=np.array([[0],[0]])
b=0
theta=float(input("Enter new theta:"))
alpha=float(input("Enter new alpha:"))
yin=np.zeros(shape=(4,1))
y=np.zeros(shape=(4,1))
i=0
found=0
while(found==0):
    yin=x[i][0]*w[0]+x[i][1]*w[1]
    yin = yin+b
    if(yin>theta):
        y[i] = 1
    elif(yin<=theta and yin>=-theta):
        y[i]=0
    else:
        y[i]=-1
    if (y[i]==t[i]):
        print("NO UPDATION REQUIRED")
        print(y[i])
        if(i<3):
            i=i+1
        else:
            i=0
    else:
        print("MODEL IS NOT TRAINED")
        print("The value of output is")
        print(y)
        w[0]=w[0]+alpha*x[i][0]*t[i]
        w[1]=w[1]+alpha*x[i][1]*t[i]
        b = b+alpha*t[i]
        if(i<3):
            i=i+1
        else:
            i=0
    if(y==t).all():
        found=1
print("The final weight matrix is:")
print(w)
print("The final output is:")
print(y)
```

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### OUTPUT:



```
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File Edit View Insert Cell Kernel Widgets Help
Run Code

i=i+1
else:
    i=0
else:
    print("MODEL IS NOT TRAINED")
    print("The value of output is")
    print(y)
    w[0]=w[0]+alpha*x[i][0]*t[i]
    w[1]=w[1]+alpha*x[i][1]*t[i]
    b = b+alpha*t[i]
    if(i<3):
        i=i+1
    else:
        i=0
    if(y==t).all():
        found=1
print("The final weight matrix is:")
print(w)
print("The final output is:")
print(y)

Enter new theta:0.2
Enter new alpha:1
MODEL IS NOT TRAINED
The value of output is
[[0.]
 [0.]
 [0.]
 [0.]]
NO UPDATION REQUIRED
[1.]
NO UPDATION REQUIRED
[1.]
NO UPDATION REQUIRED
[-1.]
NO UPDATION REQUIRED
[1.]
The final weight matrix is:
[[1]
 [1]]
The final output is:
[[ 1.]
 [ 1.]
 [ 1.]
 [-1.]]
```