```
and_gate = {
    'X1' : [1,1,-1,-1],
    'X2' : [1,-1,1,-1],
    'y' : [1,-1,-1,-1]
}


x1=int(input("Enter value of x1 : "))
x2= int (input("Enter value of x2 : "))
w1= int (input("Enter value of w1 : "))
w2=int (input("Enter value of w2 : "))
bias=int (input("Enter value of bias : "))

alpha=1
j=0
i=0
count=1
yin=x1*w1+x2*w2+bias
print("i\tj\tX1\t X2\t W1\t W2\t BIAS\tACT\n")
# print(and_gate['X1'][i],"\t",and_gate['X2'][i],"\t",w1,"\t",w2,"\t",bias)
result=0


while result!=1:
  yin=and_gate['X1'][i]*w1+and_gate['X2'][i]*w2+bias
  print("yin : ",yin)
  if(yin<0):
   act=-1
  elif(yin==0):
    act=0
  else:
    act=1

#  for i in range(0,4):

  print(i,"\t",j,"\t",and_gate['X1'][i],"\t",and_gate['X2'][i],"\t",w1,"\t",w2,"\t",bias,"\t",act)

  # if(x1==and_gate['X1'][i] and x2==and_gate['X2'][i] ):
  if(act==and_gate['y'][j]):
    result=1
    break
    # else:
    #   result = 0
    #   i=i+1



  if(result==0): #updating weights and bias
    print("c: ",count,"\n")
    count+=1

    w1n=w1+alpha*and_gate['y'][j]*and_gate['X1'][j]
    w2n=w2+alpha*and_gate['y'][j]*and_gate['X2'][j]
    bias_new=bias+alpha*and_gate['y'][j]
    j+=1
    i+=1
    w1=w1n
    w2=w2n
    bias=bias_new
```

```
Enter value of x1 : 1
Enter value of x2 : 1
Enter value of w1 : 0
Enter value of w2 : 0
Enter value of bias : 0
i       j       X1       X2      W1      W2      BIAS   ACT

yin :  0
0        0       1       1       0       0       0       0
c:  1

yin :  1
1        1       1       -1      1       1       1       1
c:  2

yin :  2
2        2       -1      1       0       2       0       1
c:  3
```

```
yin :  -3
3        3       -1      -1      1       1       -1      -1
```

```
and_gate = {
    'X1' : [1,1,0,0],
    'X2' : [1,0,1,0],
    'y' : [1,0,0,0]
}
```

```
x1=int(input("Enter value of x1 : "))
x2= int (input("Enter value of x2 : "))
w1= float (input("Enter value of w1 : "))
w2=float(input("Enter value of w2 : "))
bias=float (input("Enter value of bias : "))

alpha=0.5
j=0
i=0
count=1
yin=x1*w1+x2*w2+bias
print("i\tj\tX1\t X2\t W1\t W2\t BIAS\tACT\n")
# print(and_gate['X1'][i],"\t",and_gate['X2'][i],"\t",w1,"\t",w2,"\t",bias)
result=0


while (result!=1 and i<=3):
  yin=and_gate['X1'][i]*w1+and_gate['X2'][i]*w2+bias
  print(yin)
  # if(yin<0):
  #  act=-1
  # elif(yin==0):
  #   act=0
  # else:
  #   act=1
  if(yin>1):
    act=1
  else:
    act=0


  print(i,"\t",j,"\t",and_gate['X1'][i],"\t",and_gate['X2'][i],"\t",w1,"\t",w2,"\t",bias,"\t",act)


  if(act==and_gate['y'][j]):
    result=1
    break




  if(result==0): #updating weights and bias
    print("c: ",count,"\n")
    count+=1

    w1n=w1+alpha*and_gate['y'][j]*and_gate['X1'][j]
    w2n=w2+alpha*and_gate['y'][j]*and_gate['X2'][j]
    bias_new=bias+alpha*and_gate['y'][j]
    j+=1
    i+=1
    w1=w1n
    w2=w2n
    bias=bias_new
```

```
 Enter value of x1 : 1
 Enter value of x2 : 1
 Enter value of w1 : 3.2
 Enter value of w2 : 1.5
 Enter value of bias : -5.3
 i       j       X1       X2      W1      W2      BIAS   ACT

 -0.5999999999999996
 0       0       1       1       3.2     1.5     -5.3    0
 c:  1

 -1.0999999999999996
 1       1       1       0       3.7     2.0     -4.8    0
```

```
or_gate = {
    'X1' : [1,1,0,0],
    'X2' : [1,0,1,0],
    'y' : [1,1,1,0]
}


# x1=int(input("Enter value of x1 : "))
# x2= int (input("Enter value of x2 : "))
w1= float (input("Enter value of w1 : "))
w2=float(input("Enter value of w2 : "))
bias=float (input("Enter value of bias : "))

alpha=1
j=0
i=0
count=1

print("i\tj\tX1\t X2\t W1\t W2\t BIAS\tACT\n")
# print(and_gate['X1'][i],"\t",and_gate['X2'][i],"\t",w1,"\t",w2,"\t",bias)
result=0


while (result!=1 and i<=3):
  yin=or_gate['X1'][i]*w1+or_gate['X2'][i]*w2+bias
  print(yin)
  # if(yin<0):
  #  act=-1
  # elif(yin==0):
  #   act=0
  # else:
  #   act=1
  if(yin>1):
    act=1
  else:
    act=0


  print(i,"\t",j,"\t",or_gate['X1'][i],"\t",or_gate['X2'][i],"\t",w1,"\t",w2,"\t",bias,"\t",act)


  if(act==or_gate['y'][j]):
    result=1
    break




  if(result==0): #updating weights and bias
    print("c: ",count,"\n")
    count+=1

    w1n=w1+alpha*or_gate['y'][j]*or_gate['X1'][j]
    w2n=w2+alpha*or_gate['y'][j]*or_gate['X2'][j]
    bias_new=bias+alpha*or_gate['y'][j]
    j+=1
    i+=1
    w1=w1n
    w2=w2n
    bias=bias_new



     Enter value of w1 : .5
     Enter value of w2 : 0.2
     Enter value of bias : 0.2
     i       j       X1       X2      W1      W2      BIAS   ACT

     0.8999999999999999
     0       0       1       1       0.5     0.2     0.2     0
     c:  1

     2.7
     1       1       1       0       1.5     1.2     1.2     1


nand_gate = {
    'X1' : [1,1,0,0],
    'X2' : [1,0,1,0],
    'y' : [0,1,1,1]
}
```

```
x1=int(input("Enter value of x1 : "))
x2= int (input("Enter value of x2 : "))
w1= float (input("Enter value of w1 : "))
w2=float(input("Enter value of w2 : "))
bias=float (input("Enter value of bias : "))

alpha=1
j=0
i=0
count=1
yin=x1*w1+x2*w2+bias
print("i\tj\tX1\t X2\t W1\t W2\t BIAS\tACT\n")
# print(and_gate['X1'][i],"\t",and_gate['X2'][i],"\t",w1,"\t",w2,"\t",bias)
result=0


while (result!=1 and i<=3):
  yin=nand_gate['X1'][i]*w1+nand_gate['X2'][i]*w2+bias
  print(yin)
  # if(yin<0):
  #  act=-1
  # elif(yin==0):
  #   act=0
  # else:
  #   act=1
  if(yin>3):
    act=1
  else:
    act=0


  print(i,"\t",j,"\t",nand_gate['X1'][i],"\t",nand_gate['X2'][i],"\t",w1,"\t",w2,"\t",bias,"\t",act)


  if(act==nand_gate['y'][j]):
    result=1
    break




  if(result==0): #updating weights and bias
    print("c: ",count,"\n")
    count+=1

    w1n=w1+alpha*nand_gate['y'][j]*nand_gate['X1'][j]
    w2n=w2+alpha*nand_gate['y'][j]*nand_gate['X2'][j]
    bias_new=bias+alpha*nand_gate['y'][j]
    j+=1
    i+=1
    w1=w1n
    w2=w2n
    bias=bias_new



     Enter value of x1 : 1
     Enter value of x2 : 0
     Enter value of w1 : 2
     Enter value of w2 : 4
     Enter value of bias : -3
     i       j       X1       X2      W1      W2      BIAS   ACT

     3.0
     0        0       1       1       2.0     4.0     -3.0    0


nor_gate = {
    'X1' : [1,1,0,0],
    'X2' : [1,0,1,0],
    'y' : [0,0,0,1]
}


x1=int(input("Enter value of x1 : "))
x2= int (input("Enter value of x2 : "))
w1= float (input("Enter value of w1 : "))
w2=float(input("Enter value of w2 : "))
bias=float (input("Enter value of bias : "))

alpha=1.2
j=0
i=0
```

```
count=1

print("i\tj\tX1\t X2\t W1\t W2\t BIAS\tACT\n")
# print(and_gate['X1'][i],"\t",and_gate['X2'][i],"\t",w1,"\t",w2,"\t",bias)
result=0


while (result!=1 and i<=3):
  yin=nor_gate['X1'][i]*w1+nor_gate['X2'][i]*w2+bias
  print(yin)
  # if(yin<0):
  #  act=-1
  # elif(yin==0):
  #   act=0
  # else:
  #   act=1
  if(yin>2.3):
    act=1
  else:
    act=0


  print(i,"\t",j,"\t",nor_gate['X1'][i],"\t",nor_gate['X2'][i],"\t",w1,"\t",w2,"\t",bias,"\t",act)


  if(act==nor_gate['y'][j]):
    result=1
    break




  if(result==0): #updating weights and bias
    print("c: ",count,"\n")
    count+=1

    w1n=w1+alpha*nor_gate['y'][j]*nor_gate['X1'][j]
    w2n=w2+alpha*nor_gate['y'][j]*nor_gate['X2'][j]
    bias_new=bias+alpha*nor_gate['y'][j]
    j+=1
    i+=1
    w1=w1n
    w2=w2n
    bias=bias_new



     Enter value of x1 : 0
     Enter value of x2 : 0
     Enter value of w1 : 5
     Enter value of w2 : 2
     Enter value of bias : -2
     i       j       X1       X2      W1      W2      BIAS   ACT

     5.0
     0       0       1       1       5.0     2.0     -2.0    1
     c:  1

     3.0
     1       1       1       0       5.0     2.0     -2.0    1
     c:  2

     0.0
     2       2       0       1       5.0     2.0     -2.0    0
```