Divyah Mandavia BE AIDS 10

EXPERIMENT NO.2

Code:

```
# importing Python library
import numpy as np

# define Unit Step Function
def unitStep(v):
    if v >= 0:
        return 1
    else:
        return 0

# design Perceptron Model
def perceptronModel(x, w, b):
    v = np.dot(w, x) + b
    y = unitStep(v)
    return y

# NOT Logic Function
# wNOT = -1, bNOT = 0.5
def NOT_logicFunction(x):
    wNOT = -1
    bNOT = 0.5
    return perceptronModel(x, wNOT, bNOT)
```

```
# AND Logic Function
# here w1 = wAND1 = 1,
# w2 = wAND2 = 1, bAND = -1.5
def AND_logicFunction(x):
        w = np.array([1, 1])
        bAND = -1.5
        return perceptronModel(x, w, bAND)

# OR Logic Function
# w1 = 1, w2 = 1, bOR = -0.5
def OR_logicFunction(x):
        w = np.array([1, 1])
        bOR = -0.5
        return perceptronModel(x, w, bOR)

# XOR Logic Function
# with AND, OR and NOT
# function calls in sequence
def XOR_logicFunction(x):
        y1 = AND_logicFunction(x)
        y2 = OR_logicFunction(x)
        y3 = NOT_logicFunction(y1)
        final_x = np.array([y2, y3])
        finalOutput = AND_logicFunction(final_x)
        return finalOutput

# testing the Perceptron Model
test1 = np.array([0, 1])
```

```
test2 = np.array([1, 1])

test3 = np.array([0, 0])

test4 = np.array([1, 0])


print("XOR({}, {}) = {}".format(0, 1, XOR_logicFunction(test1)))

print("XOR({}, {}) = {}".format(1, 1, XOR_logicFunction(test2)))

print("XOR({}, {}) = {}".format(0, 0, XOR_logicFunction(test3)))

print("XOR({}, {}) = {}".format(1, 0, XOR_logicFunction(test4)))
```

Output:

```
XOR(0, 1) = 1
XOR(1, 1) = 0
XOR(0, 0) = 0
XOR(1, 0) = 1
```