```
# Import Python Libraries
import numpy as np
# Take two sets of patterns:
# Set A: Input Pattern
x1 = np.array([1, 1, 1, 1, 1, 1]).reshape(6, 1)
x2 = np.array([-1, -1, -1, -1, -1, -1]).reshape(6, 1)
x3 = np.array([1, 1, -1, -1, 1, 1]).reshape(6, 1)
x4 = np.array([-1, -1, 1, 1, -1, -1]).reshape(6, 1)
# Set B: Target Pattern
y1 = np.array([1, 1, 1]).reshape(3, 1)
y2 = np.array([-1, -1, -1]).reshape(3, 1)
y3 = np.array([1, -1, 1]).reshape(3, 1)
y4 = np.array([-1, 1, -1]).reshape(3, 1)

'''
print("Set A: Input Pattern, Set B: Target Pattern")
print("\nThe input for pattern 1 is")
print(x1)
print("\nThe target for pattern 1 is")
print(y1)
print("\nThe input for pattern 2 is")
print(x2)
print("\nThe target for pattern 2 is")
print(y2)
print("\nThe input for pattern 3 is")
print(x3)
print("\nThe target for pattern 3 is")
print(y3)
print("\nThe input for pattern 4 is")
print(x4)
print("\nThe target for pattern 4 is")
print(y4)
print("\n------------------------------")
'''
# Calculate weight Matrix: W
inputSet = np.concatenate((x1, x2, x3, x4), axis = 1)
targetSet = np.concatenate((y1.T, y2.T, y3.T, y4.T), axis = 0)
print("\nWeight matrix:")
weight = np.dot(inputSet, targetSet)
print(weight)
print("\n------------------------------")
# Testing Phase
# Test for Input Patterns: Set A
print("\nTesting for input patterns: Set A")
def testInputs(x, weight):
  # Multiply the input pattern with the weight matrix
  # (weight.T X x)
  y = np.dot(weight.T, x)
  y[y < 0] = -1
  y[y >= 0] = 1
  return np.array(y)
print("\nOutput of input pattern 1")
print(testInputs(x1, weight))
print("\nOutput of input pattern 2")
print(testInputs(x2, weight))
print("\nOutput of input pattern 3")

print(testInputs(x3, weight))
print("\nOutput of input pattern 4")
print(testInputs(x4, weight))
# Test for Target Patterns: Set B
print("\nTesting for target patterns: Set B")
def testTargets(y, weight):
# Multiply the target pattern with the weight matrix
# (weight X y)
  x = np.dot(weight, y)
  x[x <= 0] = -1
  x[x > 0] = 1
  return np.array(x)
print("\nOutput of target pattern 1")
print(testTargets(y1, weight))
print("\nOutput of target pattern 2")
print(testTargets(y2, weight))
print("\nOutput of target pattern 3")
print(testTargets(y3, weight))
print("\nOutput of target pattern 4")
print(testTargets(y4, weight))
```

```
Testing for input patterns: Set A

Output of input pattern 1
[[1]
 [1]
 [1]]

Output of input pattern 2
[[-1]
 [-1]
 [-1]]

Output of input pattern 3
[[ 1]
 [-1]
 [ 1]]

Output of input pattern 4
[[-1]
 [ 1]
 [-1]]

Testing for target patterns: Set B

Output of target pattern 1
[[1]
 [1]
 [1]
 [1]
 [1]
 [1]]

Output of target pattern 2
[[-1]
 [-1]
 [-1]
 [-1]
 [-1]
 [-1]]

Output of target pattern 3
[[ 1]
 [ 1]
 [-1]
 [-1]
 [ 1]
 [ 1]]

Output of target pattern 4
[[-1]
 [-1]
 [ 1]
 [ 1]
```