Homework#2

Due in Two Weeks (12/2)

Problem:

The neural network is known for solving the regression and classification problem. Each neuron output is obtained by multiplying and accumulating the input of previous layer and correspond weight, as shown in Fig.1 (a). After accumulating, the Y is obtained through the activation function operation. The activation function we use is sigmoid, the formula of sigmoid is as follow. Please design a neural network to simulate the XOR operation, weights are shown in Table I. The architecture of neural network is shown in Fig.1 (b). The truth table of XOR is shown in Fig. 2.

$$Sigmoid(x) \approx \frac{1}{2} + \frac{1}{4}x - \frac{1}{48}x^3 + \frac{1}{480}x^5$$

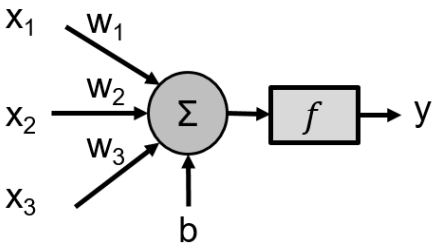


Fig.1 (a)

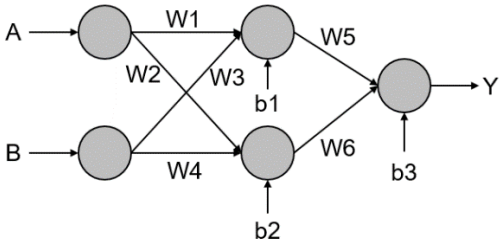
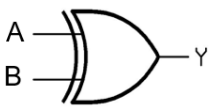


Fig.1 (b)



A	B	Y
0	0	0
1	0	1
0	1	1
1	1	0

Fig.2

Table I

	W1	W2	W3	W4	W5	W6	b1	b2	b3
value	10	-10	-10	10	10	10	-5	-5	-5

Requirements:

Complete the Neural Network block. The Neural Network block will contain three neurons as sub-modules. The Pattern block is used to generate the testing patterns to verify your design. The Monitor block is used to print your output result on the screen to help you confirm the answer. Please use the Platform Architect (PA) to simulate the system and show the simulation result.

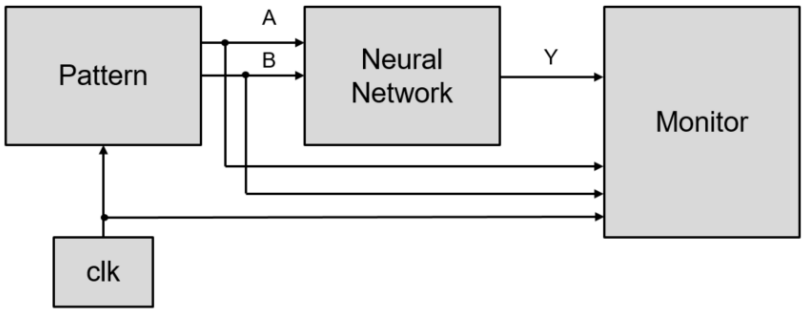


Fig.3

Please upload the compressed file (.zip or .rar) which including following files to Cyber University (Compressed File Name: Student ID_HW2)

1. Source code
2. Report (Word file Include design ideas, block diagram, and simulation result of PA)