1. Consider a neural network composed of three Perceptrons. Two of the Perceptrons compute \([x_1 \text{ OR } x_2]\) and \([x_1 \text{ AND } x_2]\), as shown below. The third receives the outputs of the first two as inputs.

Determine the values of the weights \(w_{11}\) and \(w_{12}\) and the threshold \(\theta\) for the third Perceptron which would make this neural network perform the operation \([x_1 \text{ XOR } x_2]\). Consider that:

- Zero is false;
- One is true;
- Perceptron’s input function is the weighted sum of the inputs; and
- Perceptron’s activation function is step/threshold.
- Perceptron’s activation states are 0 or 1 (see slide 10 of lecture 8 on Perceptrons).

Obs.: You don’t need to worry about the weights and threshold for the Perceptrons that compute OR and AND in the scheme above. You can just assume that these Perceptrons compute these functions given the inputs \(x_1\) and \(x_2\). (1%)

2. Here is the payoff matrix for a two player simultaneous game with three choices:
(a) There is no Pure Strategy Nash equilibrium for this game. Explain why. (0.5%)

(b) Nash showed that there must exist at least one Mixed Strategy Nash Equilibrium for every game. What is the Mixed Strategy Nash Equilibrium for this game. Explain your reasoning. (0.5%)