

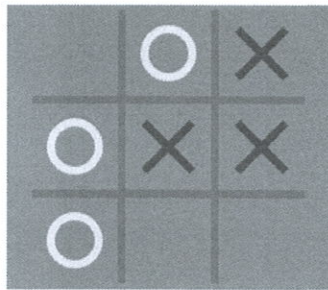
HUL381/ELL457: Mind, Machines and Language
 Minor Test I, Maximum marks: 15

Section 1. (SM)

1. What is the major argument of the physical symbol system hypothesis? [2]
2. If one claims that symbol processing and production systems are sufficient to realize intelligence and consciousness, what would be your response/counter-argument/acceptance for such a claim? [4]
3. What is the meaning of the terms: (a) *non-reductive materialism* and (b) *reductive materialism*? [2]

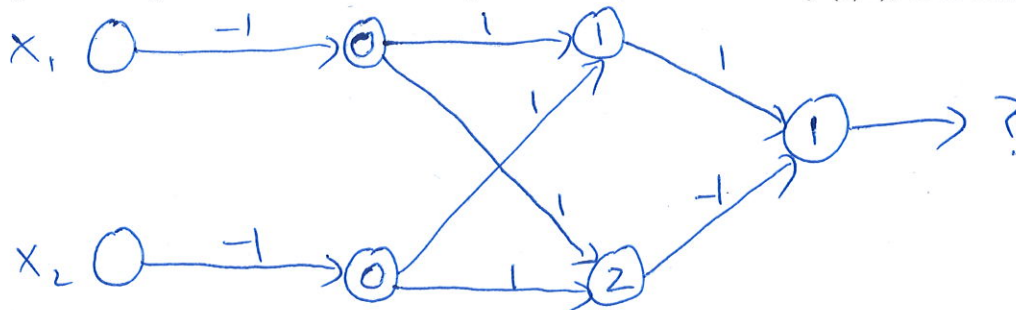
Section 2. (SA)

4. Suppose you are playing the game of tic-tac-toe with a friend. This game involves both players iteratively placing a symbol on a 3×3 grid. One player uses the 'cross' symbol (X) and the other player uses the 'nought' symbol (O). At each turn, you can only place your symbol in an empty square on the grid. The objective is to get 3 copies of your symbol in a straight line on the grid (horizontal, vertical, or diagonal), before the other player does so. Below is an example of a partially-complete game, after both players have taken 3 turns each.



We would like to think of the process of playing this game as a production system. Recall from class that we can think of production systems as having 3 components: (i) a global database, (ii) a set of production rules, and (iii) a control structure.

- (i) What should the global database consist of here? Try to describe it as precisely as you can. [2]
 - (ii) Give two examples of what you think might be reasonable production rules used by the players of the game. [2]
 - (iii) What do you think constitutes the control structure for this production system? [1]
5. Consider the below connectionist model, where the numbers on the edges/arrows denote the weights or synaptic strengths applied to each input, and the numbers inside the neural units denote their respective firing thresholds. Assume all inputs and outputs to be binary (0/1), as in class.



What function of the inputs is this connectionist network computing? Draw a truth table (a table which shows the network output for all possible settings of the inputs) for the network. [2]