COMP3411 Tutorial - Week 9
Neural Nets and ILP

Question 1

a) Construct by hand a Perceptron which correctly classifies the following data; use your knowledge of plane geometry to choose appropriate values for the weights w_0, w_1 and w_2.

Training Example	x_1	x_2	Class
a.	0	1	-1
b.	2	0	-1
c.	1	1	+1

b) Demonstrate the Perceptron Learning Algorithm on the above data, using a learning rate of 1.0 and initial weight values of

$w_0 = -0.5$

$w_1 = 0$

$w_2 = 1$

Question 2

Explain how each of the following could be constructed:

1. Perceptron to compute the OR function of *m* inputs Set the bias weight to -½, all other weights to 1.
2. Perceptron to compute the AND function of *n* inputs
3. 2-Layer Neural Network to compute any (given) logical expression, assuming it is written in Conjunctive Normal Form.

Question 3

a) Find the least general generalisation of the following terms:

```
f(g(a, b), [1, 2, [3, 4], 5], 1 + 2 * 3)
f(g(a, h(x, y)), [1, 2, [3, 4, 5]], 1 + 6)
```

b) Find the least general generalisation of the following clauses:

```
q(f(a)) :- p(a, b), r(b, c), r(b, e).
q(f(x)) :- p(x, y), r(y, z), r(w, z).
```