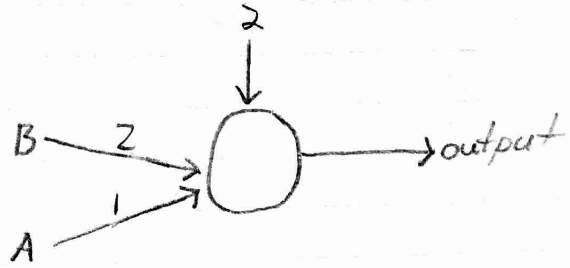
Problem 2

a)



1 = True 0 = False

$(A \wedge B) \Leftrightarrow (A \wedge B)$

A	B	O
T	T	

b) i) Input $A = X1(wx1a) + X2(wx2a) + X3(wx3a) + 1(wh1a)$

$= .3(.4) + .8(.4) + .1(.4) + .3$

$= .78$

Output $A = \frac{1}{1+e^{-input}} = \frac{1}{1+e^{-.78}} = \boxed{.686}$

Input $B = X1(wx1b) + X2(wx2b) + X3(wx3b) + 1(wh1b)$

$= .3(-.2) + .8(-.2) + .1(-.2) + .3$

$= -.06 + -.16 - .02 + .3 = .06$

Output $B = \frac{1}{1+e^{-input}} = \frac{1}{1+e^{-.06}} = \boxed{.515}$

Input $C = A(wac) + B(wbc) + 1(wh2c)$

$= .686(.4) + .515(-.2) + .3$

$= .2744 + -.103 + .3$

$= .4714$

Output $C = \frac{1}{1+e^{-input}} = \frac{1}{1+e^{-.4714}} = \boxed{.616}$

ii) a) $\Delta C = (1-.616).616 =$ $\Delta A = (.685)(1-.685)(.4)(.0908) = \boxed{.6078}$

$\Delta B = (.515)(1-.515)(-.2)(.0908) = \boxed{-.00454}$

b) $\Delta W_{ac} = .2(.0908)(.685) = .0124 + .4 = \boxed{.4124}$

$\Delta W_{bc} = .2(.0908)(.515) = .0093 + -.2 = \boxed{-.1907}$

.00038365

$\Delta_{wh2c} = .2(1)(.0908) = .0182 + .3 = \boxed{.3182}$

c) $\Delta_{wx3a} = .2(.1).685(1-.685)(.4124)(.0908) = .0001616 + .4 = \boxed{.4001}$

$\Delta_{wx2b} = (.2)(.8)(.515)(1-.515)(-.1907)(.0908) = -.000692 - .2 = \boxed{-.2006}$

$\Delta_{wx1a} = .2(.4124)(.0908)(1-.685)(.686)(.3) = .0004848 + .4 = \boxed{.40004848}$

$\Delta_{wx1b} = .2(.4)(.515)(1-.515)(-.1907)(.0908) = -.000346 - .2 = \boxed{-.2003}$

$\Delta_{wx2a} = .2(.8)(.686)(1-.685)(.4124)(.0908) = .0012928 + .4 = \boxed{.40129}$

$\Delta_{wx3b} = .2(.1)(.515)(1-.515)(-.1907)(.0908) = -.000087 \cdot 2 = \boxed{-.200087}$

$\Delta_{wh1a} = .2(.685)(1-.685)(.4124)(.0908) = .00162 \cdot 3 = \boxed{.30162}$

$\Delta_{wh1b} = .2(.515)(1-.515)(-.1907)(.0908) = -.000865 - .3 = \boxed{-.300865}$