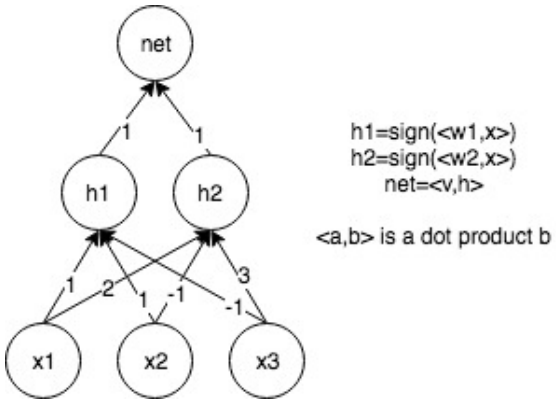
CS691 Quiz 7 Name _____

For the following problems, use the network given below.



1. What would the neural network below predict for the following test data? That is, what is *net* for each test input? (2 points)
   $t_1 = (1, 1, 1)$
   $t_2 = (-5, -2, 1)$

2. Give an equation for the output of the network above, *net*, in terms of the inputs x_1, x_2, x_3. Do not use dot product notation. (2 points)

3. We are trying to train the network above. Ignore the weights on the figure. We start with all $w_{ij} = 0$ and $v_i = 0$. Remember the w are the weights for the first layer and the v are the weights for the second layer. Assume the loss function is $L = \frac{1}{2}(y - net)^2$.

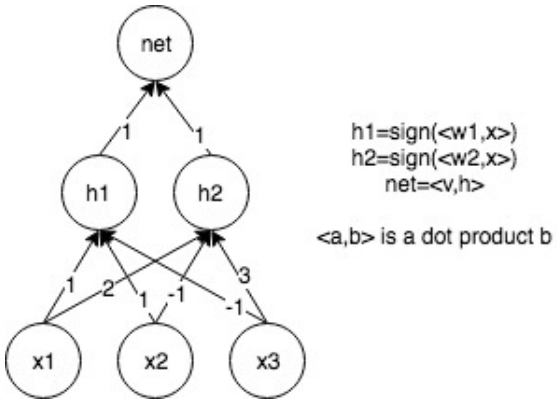
   (a) How do h_1 and h_2 behave in this setting? Why? (2 points)

   (b) What is the value of *net* for the first input sample? (1 points)

   (c) Give the equation for the weight update for v. (3 points)

CS491 Quiz 7 Name _____

1. What would the neural network below predict for the following test data? That is, what is *net* for each test input? (3 points)
   $t_1 = (1, 1, 1)$
   $t_2 = (-5, -2, 1)$
   $t_3 = (3, 1, 4)$



2. Give an equation for the output of the network above, *net*, in terms of the inputs x_1, x_2, x_3. Do not use dot product notation. (2 points)

3. Let's say I have a two layer neural network, with w_{ij} being the weight between the j^{th} input and the i^{th} hidden unit, and v_i being the weight between the i^{th} hidden unit and the final output unit. Each hidden unit applies the same non-linear function to its input: $h_i = f(w_i \bullet x)$. The loss function we are trying to minimize is $L = e^{-ynet}$ where *net* is the output of the network: $net = v \bullet h$. What are $\nabla_w L$ and $\nabla_v L$? Show your work. (5 points)