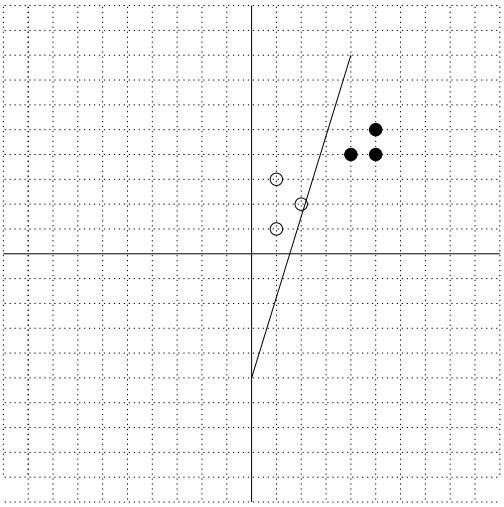
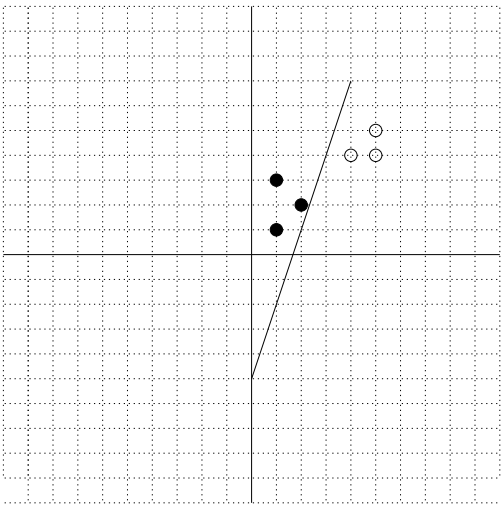
CS4811 Perceptron Training Example

Consider a training set with the positive examples at $(4, 4), (5, 4)$, and $(5, 5)$ and the negative examples at $(1, 1), (2, 2)$, and $(1, 3)$. With a bias input of $-1i$, and all the weights initialized to 1, the weights converge to represent the line $2x - 0.5y - 4$. This line along with the examples is shown below:



When we switch the negative and positive examples, the weights converge to represent the line $-3x + y + 5$. This line along with the examples is shown below:



Now, consider a training set with the positive examples at $(1, 0, 0), (1, 1, 0)$, and $(1, 0, 1)$ and the negative examples at $(0, 1, 1), (1, 1, 1)$, and $(0, 0, 1)$. Form a group with the people at the same table with you, and draw a 3-D cube with the above examples as vertices. Sketch a separating plane that could be learned by a perceptron with 3 inputs and a bias.