Implementation:

Perceptron Learning: I updated w once violation appears, the number of violation in each iteration for all points is random. It doesn’t decrease in a linear form as but finally, the violation numbers decrease to zero.

Pocket algorithm: because there is no line can correct separate the points into two clusters( label 1 and label -1), let the algorithm iterate 7000 times and stop. From the figure, we can see the violation numbers doesn’t decrease to zero and we even didn’t end at the local minimum point. But this happens in the pocket algorithm.

Logistic Regression: the w is used to calculate the possibility of one point is classified to 1 or -1. In my algorithm, If the possibility is >0.5, I consider this point is classified as 1, if the possibility is <0.5, I consider this point is classified as -1. During the 7000 iterations, I record the violation numbers in each iteration. And figure out the violation figure.

Linear Regression: the linear regression is calculated by the formula: