

## IMLPR Homework #2 (Computer Assignment)

You are given the following sample points in a 2-class problem:

<u>Prototypes(augmented)</u>	<u>Class</u>	<u>Desired Condition</u>
<u>y<sub>1</sub></u> 1 1 -1 0 2 1	S <sub>2</sub>	$\underline{\mathbf{w}}^T \underline{\mathbf{y}}_1 < 0$
<u>y<sub>2</sub></u> 0 0 1 2 0 1	S <sub>1</sub>	$\underline{\mathbf{w}}^T \underline{\mathbf{y}}_2 > 0$
<u>y<sub>3</sub></u> -1 -1 1 1 0 1	S <sub>2</sub>	$\underline{\mathbf{w}}^T \underline{\mathbf{y}}_3 < 0$
<u>y<sub>4</sub></u> 4 0 1 2 1 1	S <sub>1</sub>	$\underline{\mathbf{w}}^T \underline{\mathbf{y}}_4 > 0$
<u>y<sub>5</sub></u> -1 1 1 1 0 1	S <sub>1</sub>	$\underline{\mathbf{w}}^T \underline{\mathbf{y}}_5 > 0$
<u>y<sub>6</sub></u> -1 -1 -1 1 0 1	S <sub>1</sub>	$\underline{\mathbf{w}}^T \underline{\mathbf{y}}_6 > 0$
<u>y<sub>7</sub></u> -1 1 1 2 1 1	S <sub>2</sub>	$\underline{\mathbf{w}}^T \underline{\mathbf{y}}_7 < 0$

- (1) With the given example of Perceptron, apply the perceptron algorithm by hands (i.e., run more epochs until the correct weight is found). Find its discriminant function (i.e., decision boundary) for two classes.
- (2) Now, write a Matlab program of Perceptron for (1). Find the correct weight vector and compare to your solution in (1).
- (3) Try a different initialization of the weight, run your Perceptron program and check your resulting weight. Does it still classify two classes correctly?