

Name: .....

Student ID#: .....

**Statistical Pattern Recognition (CE-725)**  
**Department of Computer Engineering**  
**Quiz #6 (LDF and non-parametric modeling) - Spring 2012**

**1. (30 points)** Given the following set of prototypes:

$$S1:\{(0,1), (0,2)\}, \quad S2:\{(1,0), (2,0)\}$$

Apply pseudo-inverse procedure to find a solution vector for a linear discriminant function.

Hint: if  $A = \begin{bmatrix} 5 & 0 & 3 \\ 0 & 5 & 3 \\ 3 & 3 & 4 \end{bmatrix}$ , then,  $A^{-1} = \begin{bmatrix} 1.1 & 0.9 & -1.5 \\ 0.9 & 1.1 & -1.5 \\ -1.5 & -1.5 & 2.5 \end{bmatrix}$

**2. (30 points)** What is the most critical parameter in the Parzen window approach to density estimation? What procedure would you adopt to select this parameter?

**3. (40 points)** Consider a set of one-dimensional values sampled from an unknown density  $p(x)$ : 1, 1.5, 1.75, 2, 2.5, 2.75, 3, 5, 6, 6.25, 6.5, 7, 7.5. Estimate the value of the density function,  $\hat{P}(x)$  at  $x=0, 1, 3, 5, 7$  and  $9$ , using a Parzen window with window width 1.