Pattern recognition (CSE-586) 12 June 2001
Name [ ] Student-ID [ ]

1. Obtain boundary when $p(\omega_1) = p(\omega_2)$, $\mu_1 = (0, 0)$, $\mu_2 = (1, 1)$, and $\Sigma_1 = \Sigma_2 = \begin{pmatrix} 0.1 & 0 \\ 0 & 0.1 \end{pmatrix}$.

2. Obtain boundary when $p(\omega_1) = p(\omega_2)$, $\mu_1 = (0, 1)$, $\mu_2 = (1, 0)$, $\Sigma_1 = \begin{pmatrix} 0.1 & 0 \\ 0 & 0.3 \end{pmatrix}$, and $\Sigma_2 = \begin{pmatrix} 0.2 & 0 \\ 0 & 0.1 \end{pmatrix}$.

3. Clasify $\mathbf{x} = (5/2, 5/2)$ with the Bayesian classifier when we have two classes ω_1 and ω_2 where $p(\omega_1) = p(\omega_2)$, $\mu_1 = (0, 0)$, $\mu_2 = (5, 5)$, and $\Sigma_1 = \Sigma_2 = \begin{pmatrix} 1.2 & 0.4 \\ 0.4 & 1.8 \end{pmatrix}$.

4. When the samples from ω_1 are $(3, 6)$, $(5, 5)$ and $(7, 7)$ and the samples from ω_2 are $(6, 8)$, $(6, 7)$ and $(8, 5)$, clasify $\mathbf{x} = (6, 6)$ in the following two algorithms under the Eucledian distance with describing the reason breifly.

   (1) Nearest Neighbor Algorithm (NN)

   (1) 3NN