Danny Xia
DSC 255R

Homework Assignment #1

1. The grayscale image is mapped to a 100-dimensional vector, so d = 100.
2. $\sqrt{\sum_{i \text{ to } d} 1^2} = \sqrt{d}$
3. The Euclidean Distance between the two points: $\sqrt{(1-3)^2 + (2-2)^2 + (3-1)^2} = \sqrt{8}$.
4.
    a. P(error) = $1 - (\frac{1}{4} * 0.5 + \frac{1}{4} * 0.2 + \frac{1}{4} * 0.2 + 1/4 * 0.1) = 0.75$

    b. It should return Label A because it is the most frequently occurring label. Its error rate will be 0.5.
5.
    a. Star
    b. Square
    c. Square
6. The size of each training set is 10000 / 4 = 2500
7. The LOOCV error for 1-NN is 0.5, while the LOOCV error for 3-NN is 0.25.