5. Scatter plot below depicts two dimensional real valued training data points, $X = [x_1\ x_2]$, from two classes. The training set has 200 data points, 100 from each class. Figure 1: Scatter plot of data points from Classes 1 and 2. Data points are provided as

two separate text files, C1_pts.txt and C2_pts.txt .

i. Are these classes linearly separable, or not? Comment. (5 points)

ii. Propose and implement a method to find a linear classifier to classify them. On the same scatter plot, plot the separating hyperplane you find with your method. (10 points) - *(Take Home Part-1)*

iii. Add a zero mean, 0.1 variance Gaussian noise to data points in both classes. Obtain the new set of data points. Propose and implement a method to find a linear classifier to classify them. On the same scatter plot, plot the separating hyperplane you find with your method. You may use your favorite programming language for implementation. Provide your codes. (10 points) – *(Take Home Part-2)*