1. (25 points)
   Consider two data sets: data1_1.csv and data1_2.csv.

   (a) (8 points) Use the linear soft SVM (LSSVM) model to do binary classification. Evaluate your results and plot the outcome.

   (b) (8 points) Use the kernel-based soft SVM (KSSVM) model for binary classification with homogeneous k-th order polynomial kernel function when k=2,3. Evaluate your results and plot the best outcome.

   (c) (9 points) Use the kernel-based soft SVM (KSSVM) model for binary classification with Gaussian kernel with different parameters. Evaluate your results and plot the best outcome.

2. (25 points)
   Consider the data set: data2.csv.

   (a) (10 points) Use the linear soft SVM (LSSVM) model to do binary classification. Evaluate your results and plot the outcome.

   (b) (10 points) Use the linear TWSSVM model for binary classification. Evaluate your results and plot the outcome.

   (c) (5 points) From (a) and (b), compare the quality of solutions and computational efficiency of LSSVM and TWSSVM.

3. (20 points)
   Consider the data set: data3.csv.

   (a) (10 points) Use LSSVM model and OVO approach to do multi-classification. Evaluate your results and plot the outcome.

   (b) (10 points) Use Gaussian kernel-based soft SVM model with different parameters and OVO approach for multi-classification. Evaluate your results and plot the best outcome.

4. (20 points)
   Consider the data set: data4.csv.

   (a) (10 points) Use LSSVM model and OVA approach to do multi-classification. Evaluate your results and plot the outcome.

   (b) (10 points) Use Gaussian kernel-based soft SVM model with different parameters and OVA approach for multi-classification. Evaluate your results and plot the best outcome.

5. (10 points)

Putting problems 3 and 4 together, what do you learn from doing this exercise in terms of LSSVM VS. KSSVM and OVA VS. OVO?