AI & Pattern Recognition   Classwork 01   Support Vector Machine

ID： _____   Name： _____   **March 12, 2025**

1. Utilize the provided code to produce a dataset comprising 1000 XOR samples. Seventy percent of this dataset is allocated for the training set, while the remaining thirty percent constitutes the test set.

   np.random.seed(1)

   X_xor = np.random.randn(1000, 2)

   y_xor = **np.logical_xor**(X_xor[:, 0] > 0, X_xor[:, 1] > 0)

   y_xor = np.where(y_xor, 1, -1)

   Utilize the training set to construct two nonlinear Support Vector Machines (SVMs) employing polynomial and radial basis function kernels, respectively. Experiment with two different levels of regularization strength for each SVM. Visualize the decision boundaries and compute accuracy to evaluate the performance of predicting the test set data.

2. Perform the same procedure outlined in Problem 1, but this time utilize decision tree and random forest algorithms.