

## Problem Solving

### Homework #2

Due: April-03 (Wed.) (before 03:00pm)

#### Instruction:

- a. You have 1 problem in this homework.
- b. Submit your report at the class on April-03.
- c. Any work that you turn in should be your own.
- d. Any late submission will not be accepted.

#### Problem #1. Two Sets (10 pts)

We have a set of  $N$  points  $P = \{p_1, p_2, \dots, p_n\}$  and a distance matrix  $D[i, j]$  representing the distance  $d(p_i, p_j)$  between two points  $p_i$  and  $p_j$ . Given a distance threshold  $T$ , we want to partition the set  $P$  into two sets  $X = \{x_1, x_2, \dots\}$  and  $Y = \{y_1, y_2, \dots\}$  such that:

- 1)  $X \cap Y = \emptyset$  and  $X \cup Y = P$
- 2) For all  $x_i, x_j \in X$ ,  $d(x_i, x_j) < T$
- 3) For all  $y_i, y_j \in Y$ ,  $d(y_i, y_j) < T$

Design an algorithm that 1) determines whether such partitioning is possible or not and 2) computes a partitioning result when it is possible. Provide the time complexity of your algorithm.