GUC
German University in Cairo

CSEN 703/707 - Analysis and Design of Algorithms

Midterm Revision

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Outline

Recursion Tree Method

Exercise 4

Use the recursion tree method to get an upper bound for the following recurrence.

$$T(n) = T(\frac{n}{3}) + T(\frac{2n}{3}) + \Theta(n)$$

Master Method

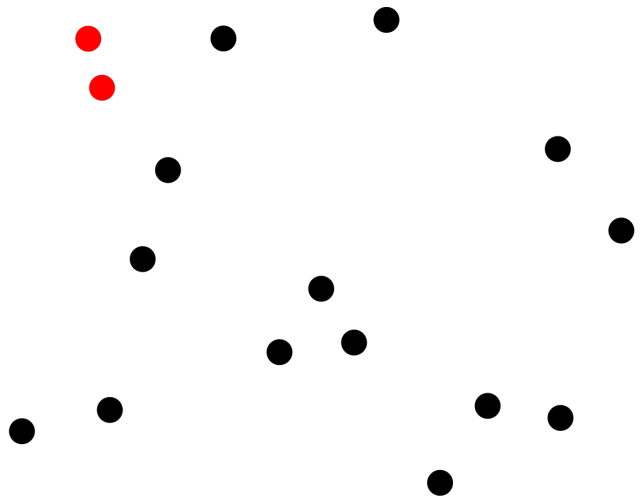
Exercise 5

Consider the following recurrence.

$$\begin{aligned} T(n) &= T(n/2) + 5^{\lfloor \log_5 n \rfloor} \\ T(1) &= \Theta(1) \end{aligned}$$

Can you solve it using the master method? If yes, solve it. If not, explain why.

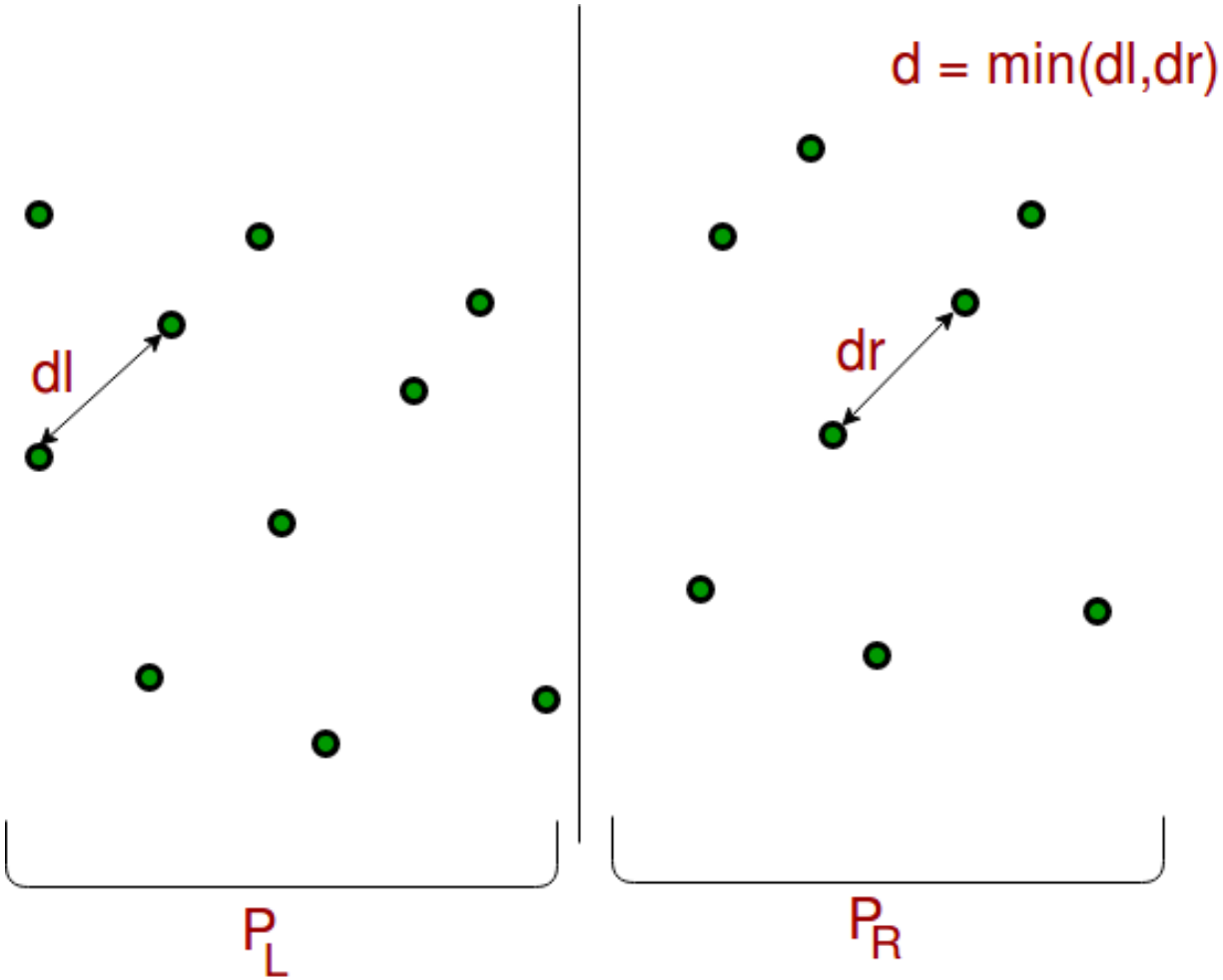
Divide and Conquer Algorithms Design



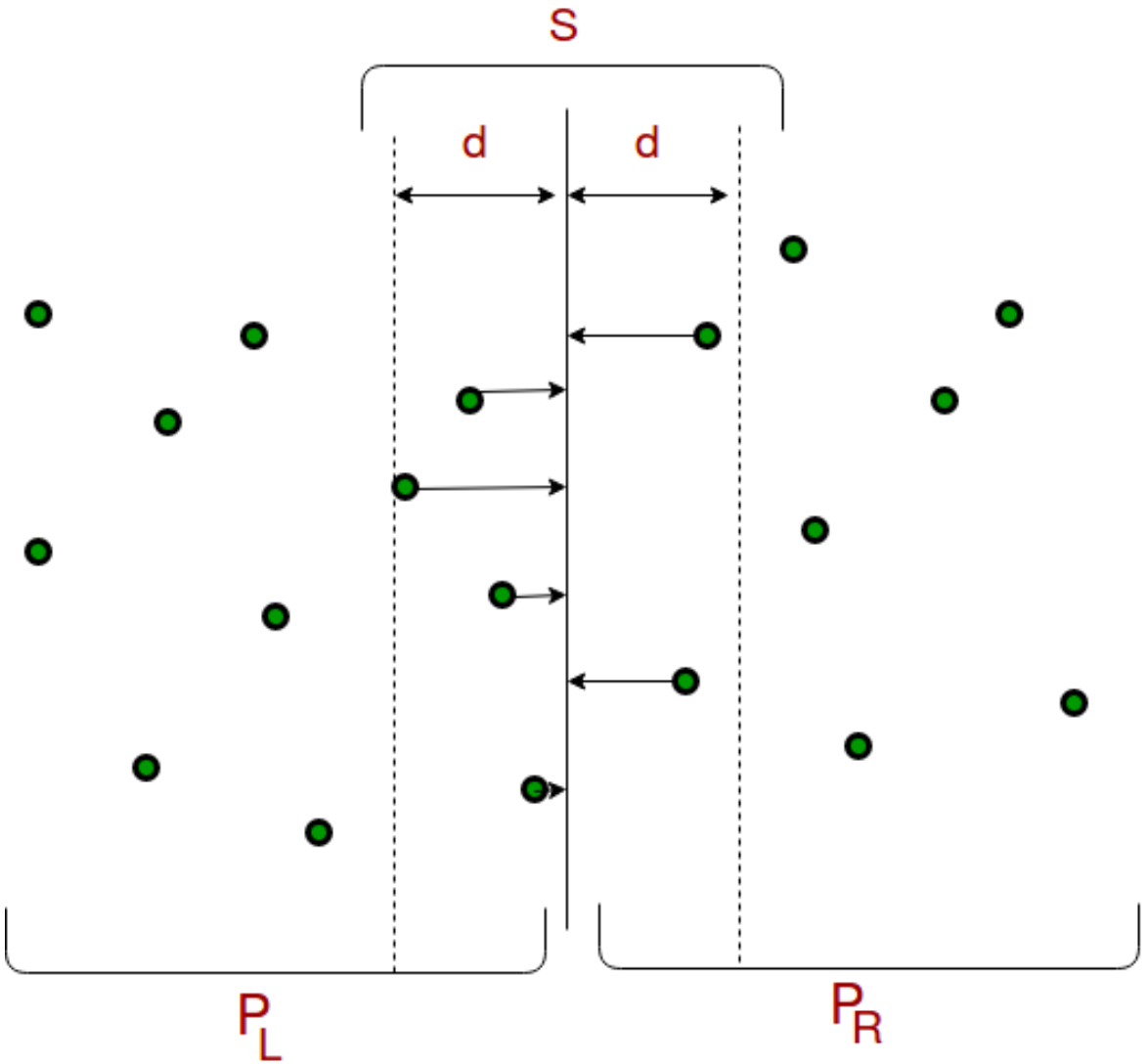
Exercise 6

You are given an array of n points in a 2D plane. Design a divide and conquer algorithm to find out the closest pair of points in the array.

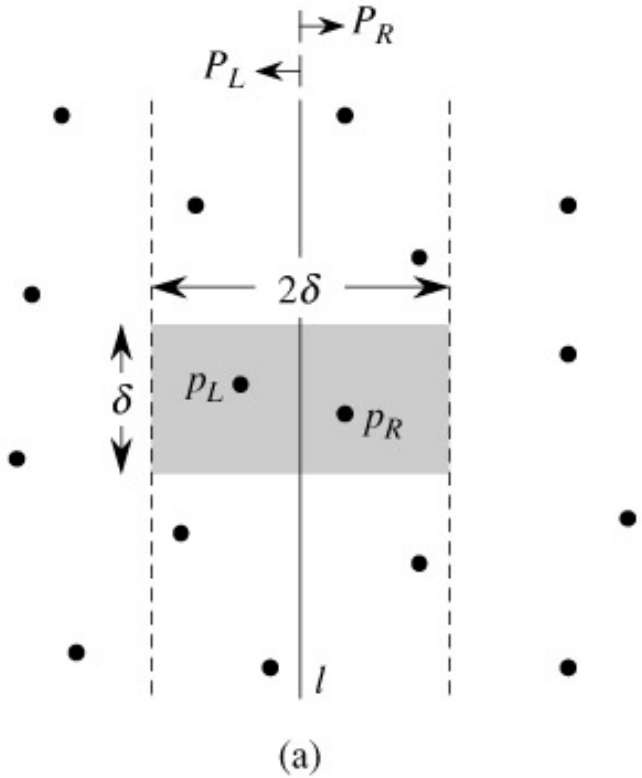
Closest Pair



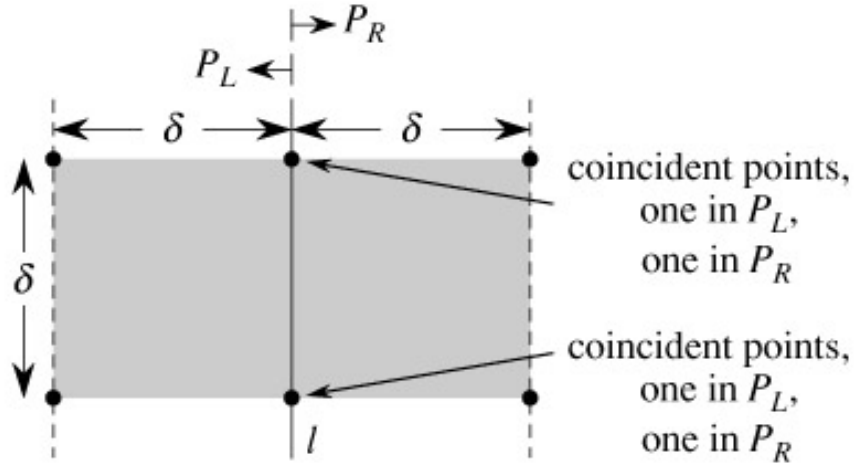
Closest Pair



Closest Pair



(a)



(b)