

Exercises
Algorithm theory
 Winter term 2008/09
 Exercise sheet 1

TASK 1 (1 point):

1. Let $S = \{p_1, p_2, \dots, p_8\}$ be a set of 8 points in \mathbb{R}^2 given the euclidean norm.

$$p_1 = (5, 3), p_2 = (8, 2), p_3 = (3, 1), p_4 = (0, 7),$$

$$p_5 = (10, 5), p_6 = (7, 6), p_7 = (3, 8), p_8 = (2, 10)$$

Find the *closest pair* using the algorithm proposed in the lectures. Specify all recursive calls of `mindist()`, the corresponding results for S_{left} , S_{right} , d_{left} , d_{right} , the bounds d used in the respective merge steps, as well as the closest pair and the corresponding distance for each call.

2. Some geometric algorithms fail if the given objects are not in general position, i.e. they lay in degenerated case like they share the same x- and y-coordinate.

Consider the closest-pair algorithm of the lecture for such a degenerated case of points having the same x- or/and y-coordinates. Does it work correctly then? Is the running time still $O(n \log n)$?

***Submission Guidelines**

1. Solutions must be submitted electronically to

`algtheory08@informatik.uni-freiburg.de`

until the following Monday 11:59:59 am. Please note also the submission formatting rules stated below.

2. PDF submissions are mandatory: We accept only electronical submissions in PDF (e.g. scanned, photographed handwritten documents are allowed as well as Word or LaTeX documents exported in PDF).
3. Correct subject required:

`XX-Y-MMMMMMM Firstname Lastname`

where XX = sheet number, Y = group letter, $MMMMMMMM$ = matriculation number.

`01-C-7913821 Buster Keaton`

is a correct subject line for the exercise solution of the first sheet of Buster Keaton in the group C (of Stefan Rührup) with matriculation number 7913821.

4. Only original work is accepted.

If a copied submission shows up, both, the original and copied submission will be rejected. Deadline of Monday, 11:59:59 am must be obeyed. Later submissions will be forwarded to the tutor, but are not eligible for bonus points.