

---

## Exercise Sheet 10

Submit until Wednesday, July 18 at 4:00pm

### Exercise 1 (6 points)

Prove that the elements of an arbitrary Pareto-set  $C$  of two-criteria costs, can always be ordered such that the first components form a strictly increasing sequence while the second components form a strictly decreasing sequence. For example, for the Pareto-set  $C = \{(1, 5), (2, 4), (7, 1), (4, 3)\}$  this (unique) order is  $(1, 5), (2, 4), (4, 3), (7, 1)$ .

### Exercise 2 (12 points)

Implement a function that, given an arbitrary Pareto-set  $C$  of two-criteria costs in the ordering described in Exercise 1, and an arbitrary additional cost  $c$ , computes the Pareto-set of  $C \cup \{c\}$ , again in the described ordering.

Make use of the ordering so that your function makes fewer comparisons than would be necessary if the set was not ordered.

Write a unit test for your function, with at least three different test cases.

### Exercise 3 (2 points)

As usual, commit your solution to our SVN (code as usual, for Exercise 1 please commit a PDF) and check that everything works on Jenkins, and also commit a text file *feedback-exercise-sheet-10.txt* where you briefly describe your experiences with this exercise sheet and the corresponding lecture.