
Advanced Algorithms and Data Structures

Spring 2017

Wolfgang Jeltsch
Tiina Zingel

Homework 1

Submission on 13 February 2017

Task 1 (Implementation of bubble sort)

4 points

Write an Ada procedure *Bubble_Sort* that implements the well-know bubble sort algorithm, and add it to the package *ITI8590.Sorting* as a public¹ member. The procedure should have the same interface as the *Selection_Sort* and *Merge_Sort* procedures shown in the classes.

Task 2 (Termination of the bubble sort implementation)

2 points

Proof that your *Bubble_Sort* procedure terminates for every input.

Task 3 (Time complexity of the bubble sort implementation)

3 points

Proof that your *Bubble_Sort* procedure performs at most n^2 comparisons of array elements for an array of size n .

Task 4 (Correctness of the bubble sort implementation)

4 bonus points

Show that after executing your *Bubble_Sort* procedure, the parameter array contains the same elements as before, and the elements are in ascending order.

¹To make the procedure public, you have to declare it in the package specification.