

Week 4 Preparation

Instructions to the students: The preparation problems are not assessed, but we strongly recommend that you try to solve them before your applied class this week. These preparation problems test your basic knowledge of the contents taught in the seminar of the previous week. The problems in the applied class assume that you have this basic knowledge and will build on top of it. You might find it helpful to try these problems before doing the quiz that is due this week.

Problem 1. What are the worst-case time complexities of Quicksort assuming the following pivot choices:

- (a) Select the first element of the sequence.
- (b) Select the minimum element of the sequence.
- (c) Select the median element of the sequence.
- (d) Select an element that is greater than exactly 10% of the others.

Describe a family of inputs that cause Quicksort to exhibit its worst case behaviour for each of these pivot choices.