Week 3 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. Show the steps taken by radix sort when sorting the integers 4329, 5169, 4321, 3369, 2121, 2099.

Problem 2. Consider the following algorithm that returns the number of occurrences of *target* in the sequence A. Identify a useful invariant that is true at the beginning of each iteration of the **while** loop. Prove that it holds, and use it to prove that the algorithm is correct.

```
1:  function COUNT(A[1..n], target)
2:      count = 0
3:      i = 1
4:      while i ≤ n do
5:          if A[i] = target then
6:              count = count + 1
7:          end if
8:          i = i + 1
9:      end while
10:     return count
11: end function
```