Exercises

Algorithm theory

Winter term 2008/09

Exercise sheet 4

TASK 1 (1 point)**:**

Let array $A[0, n-1]$ be instantiated by

$$A = (20, 1, 10, 15, 5, 7, 14)$$

Quicksort A and choose $A[\ell + m \mod (r - \ell + 1)]$ as pivot element where m is the immatriculation number of the creator of the solution.

1. Show the input and output sequence and the pivot element of each divide step.

2. Present your solution as execution tree.

3. Consider the following variant of a randomized Quicksort algorithm. In every even round a random position is chosen as pivot element in every other round the last element is chosen as pivot element.

   Analyze the expected worst case runtime of this (half-) randomized Quicksort algorithm.

TASK 2 (0 points)**:**

Let m be your immatriculation number.

1. Is m a pseudoprime to the bases 2, 3, and 17?

2. Check whether m is a Carmichael number.

3. Is m a prime number?