

Discrete and Computational Geometry Winter term 2016/2017  
Exercise Sheet 11  
University Bonn, Institute of Computer Science I

Deadline: Tuesday 24.1.2016, until 12:00 Uhr

Discussion: 30.01. - 3.02.

- *Please give your solutions directly to the tutor or put them in the postbox at LBH next to E.01 until the deadline. Write your names well visible and readable on the first page. If your solutions consists of multiple pages, make sure they are well connected.*
- *It is possible to submit in groups of up to three people.*

**Aufgabe 1: Fire Fighting on a graph (4 Points)**

Consider the following tree, in which a fire starts in the root.

As presented in the lecture, a fire fighter can protect parts of the tree, by blocking a node before the fire expands to all adjacent unblocked vertices.

Answer for both the optimal and the greedy strategy: Which nodes are blocked by the strategy? How many nodes are protected in total?

What are the resulting values for a, b and g?

**Aufgabe 2: Fire fighting in a grid (4 Points)**

Consider the problem of fire fighting in a grid (lion-and-man-problem) as modelled in the lecture.

Assume  $n$  is odd and the central piece of the grid is a lake, that can be passed by neither fire nor fire fighters. Can you then formulate a strategy that uses only  $n - 1$  fighters to put out the fire?

What about when the lake is placed on a random space of the grid?