

ADS 1 - problem sheet 2

Excercise 1: Design an algorithm to decide whether a given graph G is a tree.

Excercise 2: Assume that we have a map of an acient castle in the form of a square grid where some squares are occupied by walls. A ghost travels from A to B and has the ability to pass through walls (but does not like to do so). Find a path from given point A to B that minimises number of crossed walls.

Excercise 3: Let G be a connected graph. We want to erase vertices one by one so that the remainder of the graph remains connected. How to find such an order?

Excercise 4: Modify BFS algorithm to find shortest path in a graph where every edge has an integer length in the range $1 \dots K$.

Excercise 5: Consider streets on Manhattan except for the broadway (so they form a square grid) with some streets blocked. We have broken car only go forward and on every intersection it can either continue forward or turn to left (by 90 degrees). How to find shortest path to a service?

Excercise 6: Design algorithm to find a cycle in a given oriented graph.

Please hand in your solutions before **Friday March 13** either in paper form or by email to hubicka@kam.mff.cuni.cz. Please add **ADS-I** into the subject.