Online Motion Planning
Problem Set 7
Universität Bonn, Institut für Informatik I

To be solved until the 13th of December

Problem 1:

Suppose a polygon P with two boundary points s and t is given.

a) Prove or disprove: P is a street for s and t if and only if from every point of both chains P_L and P_R there is one point of the shortest path from s to t visible.

b) Give an *offline* algorithm, that decides if P is a street for s and t.

Problem 2:

A polygon P is called *star-shaped* if there is a point in P that sees the whole polygon. The set of such points is called *kernel* of P.

a) Show that every star-shaped polygon is a street for appropriately chosen points s and t.

b) For which pairs of points on the boundary of P is the street property fullfilled? Give a precise criterion that is related to the kernel.

Problem 3:

Give an algorithm for exploring an unknown rectilinear polygon with a factor better than 10 and prove the factor.