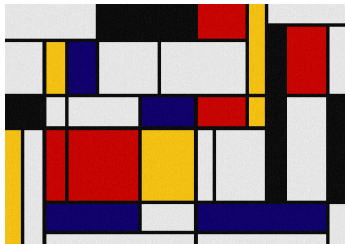# Graph Representations: Rectangles and Squares
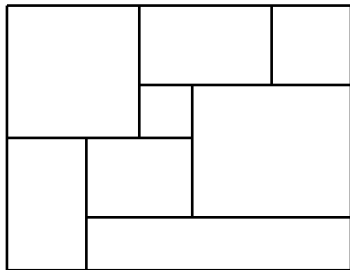

Spring School SGT 2018
Seté, June 11-15, 2018

Stefan Felsner
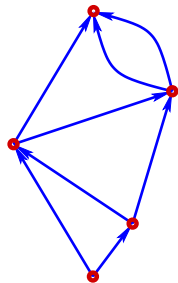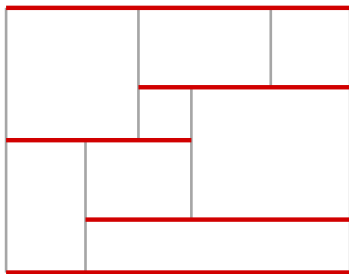
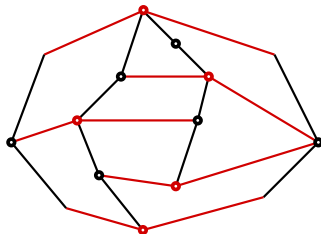Technische Universität Berlin
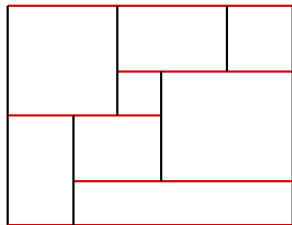felsner@math.tu-berlin.de

A Rectangular Dissection

Rectangular Dissections Induce Graphs
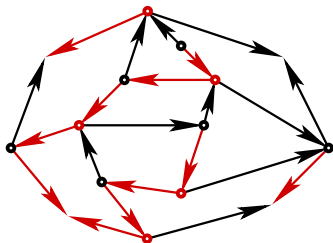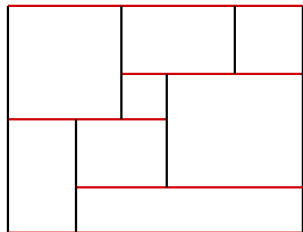

A bipolar graph G induced by R.
(R is a visibility representation of G.)
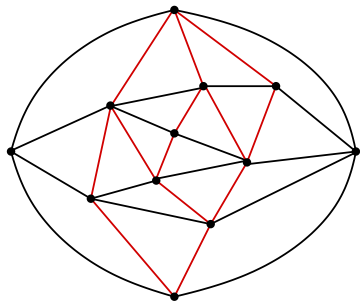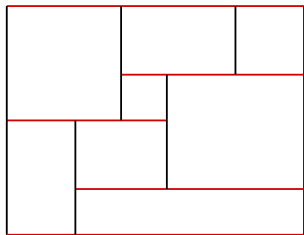
Rectangular Dissections Induce Graphs

A quadrangulation based on segment contacts.
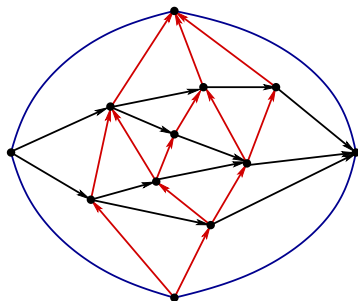
Rectangular Dissections Induce Graphs

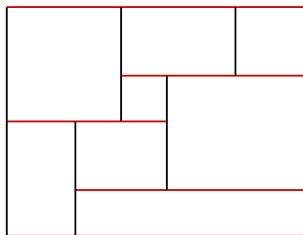A separating decomposition of the quadrangulation.

Rectangular Dissections Induce Graphs

An inner triangualation of a quadrangle.

Rectangular Dissections Induce Graphs

A transversal structure on the inner triangualation of a quadrangle.

Problems

- Find a representation.

- Find an optimal representation.

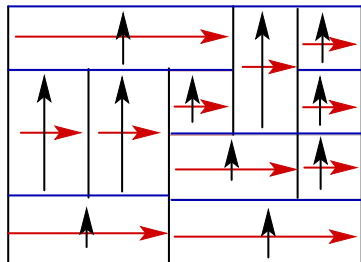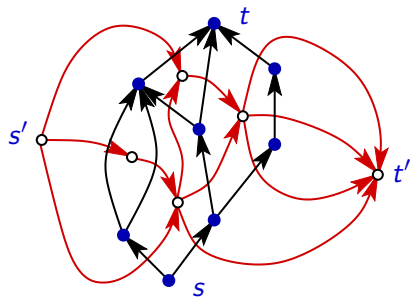- Find representation with additional properties.

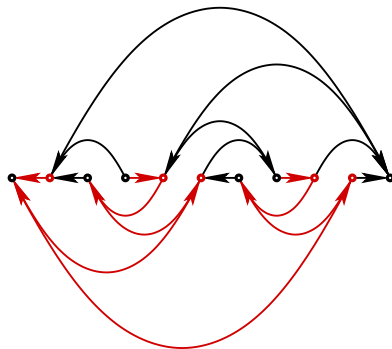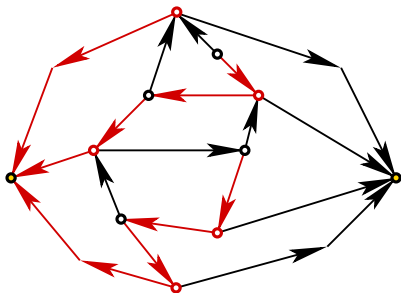Segment contact representations

Sketch: Bipolar Orientation

From the bipolar orientation compute its dual orientation.
Together they yield a rectangular dissection.
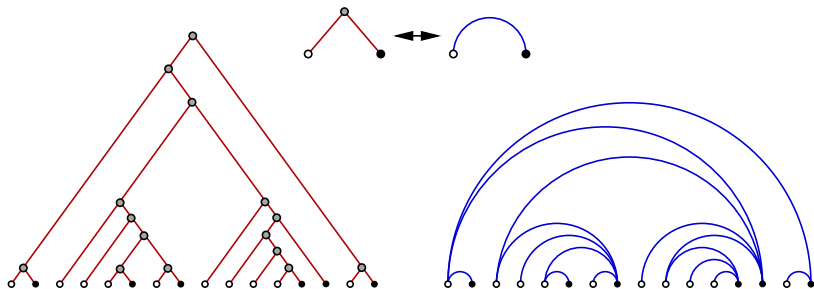

coordinates from longest paths

Sketch: Quadrangulation

- Compute a separating decomposition.

- Separate the two alternating trees.

Alternating and Full Binary Trees

Proposition. There is bijection between alternating and binary trees that preserves types (left/right) of nodes.

Sketch: Quadrangulation

- The two binary trees obtained from the separating decomposition fit together.