

Offline Graph Visualization Task

Assignment: January 14, 2015
Delivery: January 29, 2015, 23:59 CET

General Information

In this exercise sheet, you are supposed to creatively find suitable graph layouts for three graph visualization examples from application areas. You can work on this sheet in groups of up to three students. You are free to manually create your layouts on paper or electronically using any graph visualization tool or graphics editor that you find useful for the given task.

Submit your layouts and a short description of how they were produced (criteria and process) by email before **Thursday, January 29, 23:59 CET** and include the names of all group members.

1 Circuit Diagram (File: VideoContr.txt)

The graph represents the circuit of a Video controller. The nodes are the elements of the controller, and the edges are the directed connections between them. Note that there can be multiple edges between node pairs. The positions of the nodes are provided. Your task is to produce an edge routing for all edges, by using polylines or curves, or any other way to display edges nicely. Note that no node should be moved at all.

2 Biological Network (File: BioNetwork.txt)

The graph represents a biological network. The nodes are biological entities of different types, e.g. molecules, proteins, reactions, pathways, etc. The edges are interactions between the entities. The types of the nodes are not specified, but are given implicitly by the types of the edges. Thus, the edges are directed and can be of four types:

- **input:** For example, if we have an edge $a \rightarrow b$, then a is an input for the reaction b .
- **output:** Edge $a \rightarrow b$ means that a is the reaction and b is its output.
- **controller:** Edge $a \rightarrow b$ means that a is a controller of an interaction, the output of which is a catalysis b
- **controlled:** Edge $a \rightarrow b$ means that a is a catalysis and b is a final reaction

Finally, in addition to the edges we have *inclusions*, which are given in the format “owner entity” “child entity”. An inclusion means that the child entity is part of the owner entity; for example, a protein (child) is part of a complex (owner), a reaction (child) is part of a pathway (owner).

Your task is to produce a layout of this biological network taking into account the both the graph as given by nodes and edges, as well as the inclusion hierarchy. The focus is on overall aesthetics and readability, you are not limited to a particular drawing convention.

3 Metro Map (File: metromap.pdf)

The file contains a geographic layout of a metro map showing the locations of all stations (without names), the underlying railway network, and the course of six differently colored metro lines (partially sharing some tracks). In addition to being a standard pdf file, the provided file can be opened and edited in the vector graphics editor *ipe*¹.

Your task is to design a visually pleasing schematized layout of the same network showing all metro lines. Be creative and don't be afraid of thinking out of the box, but keep the application and user needs in mind.

¹<http://ipe7.sourceforge.net>