GOBLIN Project overview

Goblin is a full-featured tool chain for handling **graphs**. The project provides code from the following areas:

- **Optimization**: Nearly all algorithms described in textbooks on graph optimization are implemented.
- **Layout**: The most common models (**orthogonal**, **layered**, **force directed**) are supported.
- **Composition**: Especially for planar graphs, a lot of rules are implemented to derive one graph from another.
- **File import and export**: Graphs can be read from Dimacs, Tsplib and Steinlib formats. Layouts can be exported to nearly arbitrary bitmap and vectorial formats by implicit use of the fig2dev and the netpbm packages.
- **Manipulation**: Graph incidence structures can be edited and attributes can be assigned to nodes and edges in the graphical front end.

While all algorithms are implemented in a C++ class library (libgoblin.a), the editor code and partially the file I/O code are written in the Tcl/Tk scripting language and use a Tcl wrapper of the C++ library.

Users can choose from the following interfaces:

- A C++ programming interface (API) described here
- A Tcl/Tk programming interface which is less efficient, but sometimes more convenient
- A graphical user interface (GUI) to manipulate graphs, but also to run problem solvers and to visualize the (intermediate) results
- Solver executables for several optmization problems

Intended audience

Any general software on graph optimization can be considered a loose collection of solvers for more or less related combinatorial problems. Other than for LP solvers, the interface is ample and often requires to choose a particular optimization method which is adequate for a certain class of graph instances. Many applications require a programming interface instead of a graphical user interface. In that sense, Goblin is expert software.

Originally, the library has been designed to visualize graph algorithms. While it takes special efforts to produce good running examples and snap shots, the final output can be interpreted by every undergraduate student who has been instructed with the algorithm's key features. The GUI has been prepared to fiddle about with algorithms.

Of course, the library is also suited for practical computations. A general statement on the performance is difficult: Some solvers have been added only for sake of completeness (like max-cut), others can solve large-scale instances (like min-cost flow).

Licence

GOBLIN is open source software and licenced by the GNU Lesser Public License (LGPL). That is, GOBLIN may be downloaded, compiled and used for scientific, educational and other purposes free of

charge. For details, in particular the statements about redistribution and changes of the source code, observe the LGPL document which is attached to the package.

Project state

The project state permanently toggles between stable and beta: There are frequent functional extensions, and these sometimes require revisions of the internal data structures and even the C++ programming interface.

Here are some more detailed remarks on the development state:

- The optimization stuff is very comprehensive and, in general, stable. Future releases will come up with alternative methods and performance improvements rather than solvers for additional problems.
- The drawing codes are mostly stable, but several general features are missing (3D support, infinite nodes and edges, free-style display features). The orthogonal methods lack strong compaction rules.
- The internal graph representations still do not allow for node hierarchies and arbitrary tags on nodes and edges.
- Tracing is supported for many but not for all methods. This functionality is still difficult to control.