NAME

neato – preprocessor for drawing undirected graphs

SYNOPSIS

neato [**–G***name=value*] [**–N***name=value*] [–E*name=value*] [**–T***lang*] [**–l** *libfile*] [**–n***[1|2]*] [**–o** *outfile*] [**–v**] [files]

DESCRIPTION

neato draws undirected graphs using ‘‘spring’’ models (see Kamada and Kawai, Information Processing Letters 31:1, April 1989). Input files must be formatted in the *dot* attributed graph language. By default, the output of *neato* is the input graph with layout coordinates appended. To make Postscript, use the **–Tps** option. FrameMaker MIF (**-Tmif**), HPGL (**-Thpgl**), and GIF (**-Tgif**) are other choices.

Here is a brief synopsis of the graph language.

graph *name* **{** *statement-list* **}** is the top level graph. Statements may be:

*name=val***;**
node [*name=val***];**
edge [*name=val***];** Set the default graph, node, or edge attribute *name* to *val*. Any subgraph, node, or edge specified after one of these statements inherits these attributes.

n0 [*name0=val0,name1=val1,...***];** Creates node **n0** if it does not exist, and sets its attributes according to the optional list.

n0 –– n1 –– ... **–– nn [***name0=val0,name1=val1,...***];** Creates edges between nodes **n0**, **n1**, ..., **nn** and optionally sets the given attributes. Creates nodes as necessary.

subgraph *name* **{** *statement-list* **}** Creates a subgraph. A subgraph may appear in place of an individual node within an edge statement. The **subgraph** *name* part is optional. If missing, the subgraph is given an internal name.

While attribute names and values may be arbitrary strings, certain fixed attributes control *neato*’s layout algorithm, as next described.

GRAPH ATTRIBUTES

Refer to *dot*(1) options to control the layout size. In addition, *neato* recognizes the following:

start=*val*. Requests random initial placement and seeds the random number generator. If *val* is not an integer, the process ID or current time is used as the seed.

epsilon=*n*. Sets the cutoff for the solver. The default is 0.1.

splines=*boolean*. Setting this to *true* causes edges to be drawn as splines if nodes don’t overlap. The default is *false*.

NODE ATTRIBUTES

Refer to *dot*(1) for options to control node labels, shapes, sizes, colors, fonts, etc.

EDGE ATTRIBUTES

Refer to *dot*(1) for options to control edge line style and labels. In addition *neato* recognizes the following:

w=*f* sets the weight (spring constant) of an edge to the given floating point value. The default is 1.0; greater values make the edge tend more toward its optimal length.

len=*f* sets the optimal length of an edge. The default is 1.0.

COMMAND LINE OPTIONS

-n*[1|2]* (no-op) If set, neato assumes nodes have already been positioned and all nodes have a pos attribute giving the positions. It then performs an optional adjustment to remove node-node overlap, depending on the value of the overlap attribute, computes the edge layouts, depending on the value of the **splines** attribute, and emits the graph in the appropriate format. If num is supplied, the following actions occur:

num = 1
Equivalent to -n.
num > 1

Use node positions as specified, with no adjustment to remove node-node overlaps, and use any edge layouts already specified by the pos attribute. neato computes an edge layout for any edge that does not have a pos attribute. As usual, edge layout is guided by the **splines** attribute.

–v (verbose) prints delta energy every 100th iteration.

Refer to *dot*(1) for a description of the other command-line options.

EXAMPLE

```
graph test123 {
    a –– b –– c;
    a –– {x y};
    x –– c [w=10.0];
    x –– y [w=5.0,len=3];
}
```

CAVEATS

Because unconstrained optimization is employed, node boxes can possibly overlap or touch unrelated edges. All existing spring embedders seem to have this limitation.

Apparently reasonable attempts to pin nodes or adjust edge lengths and weights can cause instability.

SEE ALSO

dot(1) **circo**(1) **twopi**(1) **fdp**(1)

S. C. North, "NEATO User's Manual". Available on research.att.com in dist/drawdag/neatodoc.ps.Z.