

NAME

gvgen – generate graphs

SYNOPSIS

```
gvgen [ -dv? ] [ -in ] [ -cn ] [ -Cx,y ] [ -g/f/x,y ] [ -G/f/x,y ] [ -hn ] [ -kn ] [ -bx,y ] [ -Bx,y ] [ -mn ]
[ -Mx,y ] [ -pn ] [ -rx,y ] [ -Rx ] [ -sn ] [ -Sn ] [ -Sn,d ] [ -tn ] [ -td,n ] [ -Tx,y ] [ -Tx,y,u,v ] [ -useed ]
[ -wn ] [ -nprefix ] [ -Nname ] [ -ooutfile ]
```

DESCRIPTION

gvgen generates a variety of simple, regularly-structured abstract graphs.

OPTIONS

The following options are supported:

- c *n*** Generate a cycle with *n* vertices and edges.
- C *x,y*** Generate an *x* by *y* cylinder. This will have *x***y* vertices and 2**x***y* - *y* edges.
- g /_f/_{x,y}**
Generate an *x* by *y* grid. If **f** is given, the grid is folded, with an edge attaching each pair of opposing corner vertices. This will have *x***y* vertices and 2**x***y* - *y* - *x* edges if unfolded and 2**x***y* - *y* - *x* + 2 edges if folded.
- G /_f/_{x,y}**
Generate an *x* by *y* partial grid. If **f** is given, the grid is folded, with an edge attaching each pair of opposing corner vertices. This will have *x***y* vertices.
- h *n*** Generate a hypercube of degree *n*. This will have 2^{*n*} vertices and *n**2^(*n*-1) edges.
- k *n*** Generate a complete graph on *n* vertices with *n**(*n*-1)/2 edges.
- b _{x,y}** Generate a complete *x* by *y* bipartite graph. This will have *x*+*y* vertices and *x***y* edges.
- B _{x,y}** Generate an *x* by *y* ball, i.e., an *x* by *y* cylinder with two "cap" nodes closing the ends. This will have *x***y* + 2 vertices and 2**x***y* + *y* edges.
- m *n*** Generate a triangular mesh with *n* vertices on a side. This will have (*n*+1)**n*/2 vertices and 3*(*n*-1)**n*/2 edges.
- M _{x,y}** Generate an *x* by *y* Moebius strip. This will have *x***y* vertices and 2**x***y* - *y* edges.
- p *n*** Generate a path on *n* vertices. This will have *n*-1 edges.
- r _{x,y}** Generate a random graph. The number of vertices will be the largest value of the form 2^{*n*}-1 less than or equal to *x*. Larger values of *y* increase the density of the graph.
- R *x*** Generate a random rooted tree on *x* vertices.
- s *n*** Generate a star on *n* vertices. This will have *n*-1 edges.
- S *n*** Generate a Sierpinski graph of order *n*. This will have 3*(3^(*n*-1) + 1)/2 vertices and 3^{*n*} edges.
- S _{n,d}** Generate a *d*-dimensional Sierpinski graph of order *n*. At present, *d* must be 2 or 3. For *d* equal to 3, there will be 4*(4^(*n*-1) + 1)/2 vertices and 6 * 4^(*n*-1) edges.
- t *n*** Generate a binary tree of height *n*. This will have 2^{*n*}-1 vertices and 2^{*n*}-2 edges.
- t _{h,n}** Generate a *n*-ary tree of height *h*.
- T _{x,y}**
-T _{x,y,u,v}
Generate an *x* by *y* torus. This will have *x***y* vertices and 2**x***y* edges. If *u* and *v* are given, they specify twists of that amount in the horizontal and vertical directions, respectively.
- u *seed***
Specify the initial state for the random number generator. If this option is not given, the current time is used to derive a seed.

- w *n*** Generate a path on *n* vertices. This will have *n-1* edges.
- i *n*** Generate *n* graphs of the requested type. At present, only available if the **-R** flag is used.
- n *prefix***
Normally, integers are used as node names. If *prefix* is specified, this will be prepended to the integer to create the name.
- N *name***
Use *name* as the name of the graph. By default, the graph is anonymous.
- o *outfile***
If specified, the generated graph is written into the file *outfile*. Otherwise, the graph is written to standard out.
- d** Make the generated graph directed.
- v** Verbose output.
- ?** Print usage information.

EXIT STATUS

gvgen exits with 0 on successful completion, and exits with 1 if given an ill-formed or incorrect flag, or if the specified output file could not be opened.

AUTHOR

Emden R. Gansner <erg@research.att.com>

SEE ALSO

gc(1), acyclic(1), gvpr(1), gvcolor(1), ccomps(1), sccmap(1), tred(1), libgraph(3)