NAME

gvgen – generate graphs

SYNOPSIS

gvgen [**−dv?**] [**−i***n*] [**−c***n*] [**−C***x,y*] [**−g***[***f***]x,y*] [**−G***[***f***]x,y*] [**−h***n*] [**−k***n*] [**−b***x,y*] [**−B***x,y*] [**−m***n*] [**−M***x,y*] [**−p***n*] [**−r***x,y*] [**−R***x*] [**−s***n*] [**−S***n*] [**−S***n,d*] [**−t***n*] [**−t***d,n*] [**−T***x,y*] [**−T***x,y,u,v*] [**−u***seed*] [**−w***n*] [**−n***prefix*] [**−N***name*] [**−o***outfile*]

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)