

NAME _____

gvgen – generate graphs

SYNOPSIS

gvgen [**-dv?**] [**-in**] [**-cn**] [**-Cx,y**] [**-gf**/x,y] [**-G**/f,x,y] [**-hn**] [**-kn**] [**-b**x,y] [**-B**x,y] [**-mn**] [**-M**x,y] [**-pn**] [**-r**x,y] [**-R**x] [**-sn**] [**-Sn**] [**-Sn,d**] [**-tn**] [**-td,n**] [**-Tx,y**] [**-T**x,y,u,v] [**-wn**] [**-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.

$$-\mathbf{g} \left[\mathbf{f} \right]_{x,y}$$

Generate an x by y grid. If \mathbf{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.

$$-\mathbf{G} [\mathbf{f}]_{x,y}$$

Generate an x by y partial grid. If \mathbf{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 $n \cdot 2^{(n-1)}$ 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 $3 \cdot (3^{n-1} + 1)/2$ 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 .

$$-\mathbf{T}_{x,y}$$
$$-\mathbf{T}_{x,y,u,v}$$

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.

–**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)