

**NAME**

gvgen – generate graphs

**SYNOPSIS**

**gvgen** [ **-dv?** ] [ **-in** ] [ **-cn** ] [ **-C<sub>x,y</sub>** ] [ **-g/f<sub>x,y</sub>** ] [ **-G/f<sub>x,y</sub>** ] [ **-hn** ] [ **-kn** ] [ **-b<sub>x,y</sub>** ] [ **-B<sub>x,y</sub>** ] [ **-mn** ] [ **-M<sub>x,y</sub>** ] [ **-pn** ] [ **-r<sub>x,y</sub>** ] [ **-R<sub>x</sub>** ] [ **-sn** ] [ **-Sn** ] [ **-Sn,d** ] [ **-tn** ] [ **-td,n** ] [ **-T<sub>x,y</sub>** ] [ **-T<sub>x,y,u,v</sub>** ] [ **-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<sub>x,y</sub>**     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<sub>x,y</sub>**     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

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## SEE ALSO

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