

**NAME**

gvgen – generate graphs

**SYNOPSIS**

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gvgen [ -dv? ] [ -in ] [ -cn ] [ -Cx,y ] [ -g/fx,y ] [ -G/fx,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 ] [ -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<sup>*n*</sup> vertices and *n*\*2<sup>(*n*-1)</sup> edges.
- k *n*** Generate a complete graph on *n* vertices with *n*(\**n*-1)/2 edges.
- b <sub>*x,y*</sub>** Generate a complete *x* by *y* bipartite graph. This will have *x*+*y* vertices and *x*\**y* edges.
- B <sub>*x,y*</sub>** 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 <sub>*x,y*</sub>** 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 <sub>*x,y*</sub>** Generate a random graph. The number of vertices will be the largest value of the form 2<sup>*n*</sup>-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<sup>(*n*-1)</sup> + 1)/2 vertices and 3<sup>*n*</sup> edges.
- S <sub>*n,d*</sub>** 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<sup>(*n*-1)</sup> + 1)/2 vertices and 6 \* 4<sup>(*n*-1)</sup> edges.
- t *n*** Generate a binary tree of height *n*. This will have 2<sup>*n*</sup>-1 vertices and 2<sup>*n*</sup>-2 edges.
- t <sub>*h,n*</sub>** Generate a *n*-ary tree of height *h*.
- T <sub>*x,y*</sub>**
- T <sub>*x,y,u,v*</sub>**  
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.

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**SEE ALSO**

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