

**1. Queen moves.** This is a short demonstration of how to generate and traverse graphs with the Stanford GraphBase. It creates a graph with 12 vertices, representing the cells of a  $3 \times 4$  rectangular board; two cells are considered adjacent if you can get from one to another by a queen move. Then it prints a description of the vertices and their neighbors, on the standard output file.

An ASCII file called `queen.gb` is also produced. Other programs can obtain a copy of the queen graph by calling `restore_graph("queen.gb")`. You might find it interesting to compare the output of QUEEN with the contents of `queen.gb`; the former is intended to be readable by human beings, the latter by computers.

```
#include "gb_graph.h"      /* we use the GB_GRAPH data structures */
#include "gb_basic.h"      /* we test the basic graph operations */
#include "gb_save.h"        /* and we save our results in ASCII format */

main()
{ Graph *g, *gg, *ggg;
  g = board(3L, 4L, 0L, 0L, -1L, 0L, 0L);    /* a graph with rook moves */
  gg = board(3L, 4L, 0L, 0L, -2L, 0L, 0L);    /* a graph with bishop moves */
  ggg = gunion(g, gg, 0L, 0L);    /* a graph with queen moves */
  save_graph(ggg, "queen.gb");    /* generate an ASCII file for ggg */
  {Print the vertices and edges of ggg 2};
  return 0;    /* normal exit */
}
```

**2. { Print the vertices and edges of ggg 2 }  $\equiv$**

```
if (ggg == NULL) printf("Something went wrong (panic_code=%ld)\n", panic_code);
else {
  register Vertex *v;    /* current vertex being visited */
  printf("Queen_Moves_on_a_3x4_Board\n");
  printf("The graph whose official name is %s\n", ggg->id);
  printf("has %d vertices and %d arcs: \n", ggg->n, ggg->m);
  for (v = ggg->vertices; v < ggg->vertices + ggg->n; v++) {
    register Arc *a;    /* current arc from v */
    printf("%s\n", v->name);
    for (a = v->arcs; a; a = a->next) printf("-%s,%length%ld\n", a->tip->name, a->len);
  }
}
```

This code is used in section 1.

**3. Index.**

*a:* 2.  
**Arc:** 2.  
*arcs:* 2.  
*board:* 1.  
*g:* 1.  
*gg:* 1.  
*ggg:* 1, 2.  
**Graph:** 1.  
*gunion:* 1.  
*id:* 2.  
*len:* 2.  
*main:* 1.  
*name:* 2.  
*next:* 2.  
*panic\_code:* 2.  
*printf:* 2.  
*restore\_graph:* 1.  
*save\_graph:* 1.  
*tip:* 2.  
*v:* 2.  
**Vertex:** 2.  
*vertices:* 2.

$\langle$  Print the vertices and edges of  $ggg\ 2\rangle$  Used in section 1.

# QUEEN

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This file may be freely copied and distributed, provided that no changes whatsoever are made. All users are asked to help keep the Stanford GraphBase files consistent and “uncorrupted,” identical everywhere in the world. Changes are permissible only if the modified file is given a new name, different from the names of existing files in the Stanford GraphBase, and only if the modified file is clearly identified as not being part of that GraphBase. (The **CWEB** system has a “change file” facility by which users can easily make minor alterations without modifying the master source files in any way. Everybody is supposed to use change files instead of changing the files.) The author has tried his best to produce correct and useful programs, in order to help promote computer science research, but no warranty of any kind should be assumed.

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