

**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> ≡
if (ggg ≡ Λ) 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\n");
    printf("\t\tThe_graph_whose_official_name_is\n%s\n",ggg->id);
    printf("\t\thas_%ld_vertices_and_%ld_arcs:\n\n",ggg->n,ggg->m);
    for (v = ggg->vertices; v < ggg->vertices + ggg->n; v++) {
        register Arc *a; /* current arc from v */
        printf("\t\t%s\n",v->name);
        for (a = v->arcs; a; a = a->next) printf("\t\t->%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.

⟨Print the vertices and edges of  $ggg\ 2$ ⟩ Used in section 1.

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# QUEEN

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