

1. Intro. A trivial program to create an SGB graph. The first line of standard input lists the vertex names; the remaining lines list the (undirected) edges, as pairs of names separated by blanks.

An optional command-line argument gives the name of the graph. For example, if the name is `test`, the graph is saved as `/tmp/test.gb`.

```
#define maxn 100000 /* at most this many vertices */
#define maxl 7 /* maximum length of vertex name */
#define bufsize (maxl + 1) * maxn + 2

#include <stdio.h>
#include <stdlib.h>
#include "gb_graph.h"
#include "gb_save.h"

char buf[bufsize + 1];
char names[maxn][maxl + 2];
char nbuf[maxl + 1];
char filenamebuf[ID_FIELD_SIZE + 8] = "/tmp/makegraph.gb";

int main(int argc, char *argv[])
{
    register int j, k, m, n;
    Graph *g;
    Vertex *u, *v;

    ⟨Input the vertices 2⟩;
    ⟨Input the edges 3⟩;
    ⟨Output the graph 4⟩;
}

2. ⟨Input the vertices 2⟩ ≡
buf[bufsize] = '\n';
if (!fgets(buf, bufsize, stdin)) {
    fprintf(stderr, "Couldn't read the variable-name line!\n");
    exit(-1);
}
for (n = k = 0; n < maxn; n++) {
    while (buf[k] == ' ') k++;
    if (buf[k] == '\n') break;
    for (j = 0; buf[k] != ' ' & buf[k] != '\n' & j ≤ maxl; k++) names[n][j++] = buf[k];
    if (names[n][maxl]) {
        fprintf(stderr, "Vertex name is too long! %s\n", names[n]);
        exit(-2);
    }
}
g = gb_new_graph(n);
for (k = 0; k < n; k++) (g->vertices + k)-name = gb_save_string(names[k]);
hash_setup(g);
printf("I've created a graph with %d vertices...\n", n);
```

This code is used in section 1.

3. $\langle \text{Input the edges } 3 \rangle \equiv$

```

for ( $m = 0$ ; ;  $m++$ ) {
    if ( $\neg fgets(buf, bufsize, stdin)$ ) break;
    for ( $k = 0$ ;  $buf[k] \equiv '\_'$ ;  $k++$ ) ;
    for ( $j = 0$ ;  $buf[k] \neq '\_'$   $\wedge j < maxl$ ;  $j++, k++$ )  $nbuf[j] = buf[k]$ ;
     $nbuf[j] = '\0'$ ;
     $u = hash\_out(nbuf)$ ;
    if ( $\neg u$ ) {
         $fprintf(stderr, "Unknown\_first\_vertex:\_s", buf)$ ;
         $exit(-3)$ ;
    }
    for ( ;  $buf[k] \equiv '\_'$ ;  $k++$ ) ;
    for ( $j = 0$ ;  $buf[k] \neq '\_'$   $\wedge buf[k] \neq '\n'$   $\wedge j < maxl$ ;  $j++, k++$ )  $nbuf[j] = buf[k]$ ;
     $nbuf[j] = '\0'$ ;
     $v = hash\_out(nbuf)$ ;
    if ( $\neg v$ ) {
         $fprintf(stderr, "Unknown\_second\_vertex:\_s", buf)$ ;
         $exit(-4)$ ;
    }
     $gb\_new\_edge(u, v, 1)$ ;
}
 $printf("\_and\_d\_edges...\n", m)$ ;

```

This code is used in section 1.

4. $\langle \text{Output the graph } 4 \rangle \equiv$

```

if ( $argc > 1$ ) {
     $sprintf(g\_id, "\_s", ID\_FIELD\_SIZE - 1, argv[1])$ ;
     $sprintf(filenamebuf, "/tmp/\_s.gb", ID\_FIELD\_SIZE - 1, argv[1])$ ;
}
 $save\_graph(g, filenamebuf)$ ;
 $printf("\_and\_file\_s\_holds\_the\_result.\n", filenamebuf)$ ;

```

This code is used in section 1.

5. Index.*argc*: 1, 4.*argv*: 1, 4.*buf*: 1, 2, 3.*bufsize*: 1, 2, 3.*exit*: 2, 3.*fgets*: 2, 3.*filenamebuf*: 1, 4.*fprintf*: 2, 3.*g*: 1.*gb_new_edge*: 3.*gb_new_graph*: 2.*gb_save_string*: 2.**Graph**: 1.*hash_out*: 3.*hash_setup*: 2.*id*: 4.

ID_FIELD_SIZE: 1, 4.

j: 1.*k*: 1.*m*: 1.*main*: 1.*maxl*: 1, 2, 3.*maxn*: 1, 2.*n*: 1.*name*: 2.*names*: 1, 2.*nbuf*: 1, 3.*printf*: 2, 3, 4.*save_graph*: 4.*sprintf*: 4.*stderr*: 2, 3.*stdin*: 2, 3.*u*: 1.*v*: 1.**Vertex**: 1.*vertices*: 2.

⟨Input the edges 3⟩ Used in section 1.
⟨Input the vertices 2⟩ Used in section 1.
⟨Output the graph 4⟩ Used in section 1.

MAKEGRAPH

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