register int d, j, k, jmax, kmax, t;

 \langle Check the command line $2 \rangle$; Open the auxiliary output file 3);

 $\langle \text{Input the raster 4} \rangle;$ $\langle \text{ Output the counts 5} \rangle$; INTRO

1

Intro. This is a trivial program to make data for SAT-TOMOGRAPHY. It uses the first m rows and first n columns of the image supplied on stdin. That image is like the ones accepted by LIFE: It has asterisks where pixels are to be 1.

```
It also produces an additional output file /tmp/list, containing "ixj" for every asterisk in row i, column j.
#define mmax 100
                          /* max rows */
                         /* max columns */
#define nmax 100
#define bufsize nmax + 2 /* leave room for '\n' and '\0' */
#include <stdio.h>
#include <stdlib.h>
  char rast[mmax][nmax];
  char buf[nmax + 2];
               /* command-line parameters */
  int m, n;
  FILE *list_file;
  main(\mathbf{int} \ argc, \mathbf{char} * argv[])
```

} **2.** \langle Check the command line $2\rangle \equiv$ $\textbf{if} \ (\mathit{argc} \neq 3 \lor \mathit{sscanf} \, (\mathit{argv} \, [1], \texttt{"%d"}, \& m) \neq 1 \lor \mathit{sscanf} \, (\mathit{argv} \, [2], \texttt{"%d"}, \& n) \neq 1) \ \ \{ \mathsf{argv} \, [2], \mathsf{"%d"}, \& n \} \neq 1 \}$ $fprintf(stderr, "Usage: _\%s_m_n_<_foo.dots_>_foo.tom\n", argv[0]);$

This code is used in section 1.

3. (Open the auxiliary output file 3) \equiv list_file = fopen("/tmp/list", "w"); **if** $(\neg list_file)$ { $fprintf(stderr, "I_{\square}can't_{\square}open_{\square}'/tmp/list'_{\square}for_{\square}writing!\n");$ exit(-999);}

This code is used in section 1.

```
4. \langle \text{Input the raster 4} \rangle \equiv
  kmax = 0;
  for (j = 0; j < mmax; j ++) {
     if (\neg fgets(buf, bufsize, stdin)) break;
     for (k = 0; k < nmax; k++) {
       if (buf[k] \equiv '\n') break;
       rast[j][k] = (buf[k] \equiv ",");
       if (rast[j][k]) fprintf (list\_file, "~%dx%d\n", j + 1, k + 1);
       if (k > kmax \wedge rast[j][k]) kmax = k;
  jmax = j - 1;
  fprintf(stderr, "OK, LI've_linput_lan_limage_lwith_l%d_lrows_land_l%d_lcolumns. \n", jmax + 1, kmax + 1);
  if (m \le 0 \lor m > jmax + 1) {
     fprintf(stderr, "So\_your\_m\_is\_out\_of\_range! \n"), exit(-2);
  if (n < 0 \lor n > kmax + 1) {
     fprintf(stderr, "So_{\sqcup}your_{\sqcup}n_{\sqcup}is_{\sqcup}out_{\sqcup}of_{\sqcup}range! \n"), exit(-3);
This code is used in section 1.
5. \langle \text{ Output the counts 5} \rangle \equiv
  for (j = 0; j < m; j ++) {
     for (t = 0, k = 0; k < n; k++) t += rast[j][k];
     printf("r%d=%d\n", j+1, t);
  for (k = 0; k < n; k ++) {
     for (t = 0, j = 0; j < m; j++) t += rast[j][k];
     printf("c%d=%d\n", k+1, t);
  for (d = 1; d < m + n; d \leftrightarrow) {
     for (t = 0, j = 0; j < m; j ++) {
       k = d - 1 - j;
       if (k \ge 0 \land k < n) t += rast[j][k];
     printf("a%d=%d\n", d, t);
  for (d = 1; d < m + n; d \leftrightarrow) {
     for (t = 0, j = 0; j < m; j ++) {
       k = j + n - d;
       if (k \ge 0 \land k < n) t += rast[j][k];
     printf("b\%d=\%d\n",d,t);
  }
This code is used in section 1.
```

6. Index.

 $\begin{array}{ccc} argc: & \underline{1}, & 2. \\ argv: & \underline{1}, & 2. \\ buf: & \underline{1}, & 4. \end{array}$

bufsize: $\underline{1}$, 4.

d: $\underline{1}$.

exit: 2, 3, 4.

fgets: 4.

fopen: 3.

fprintf: 2, 3, 4.

j: $\underline{1}$.

 $jmax: \underline{1}, 4.$

 $k: \underline{1}.$

 $kmax: \underline{1}, 4.$

 $list_file: \underline{1}, 3, 4.$

 $m: \underline{1}.$

 $main: \underline{1}.$ $mmax: \underline{1}, 4.$

 $n: \underline{1}.$

 $nmax\colon \ \underline{1},\ 4.$

print f: 5.

 $rast: \underline{1}, 4, 5.$

sscanf: 2.

stderr: 2, 3, 4.

stdin: 1, 4.

t: $\underline{1}$.

4 NAMES OF THE SECTIONS

SAT-TOMOGRAPHY-PREP

```
\begin{array}{ll} \langle \ Check \ the \ command \ line \ 2 \, \rangle & Used \ in \ section \ 1. \\ \langle \ Input \ the \ raster \ 4 \, \rangle & Used \ in \ section \ 1. \\ \langle \ Open \ the \ auxiliary \ output \ file \ 3 \, \rangle & Used \ in \ section \ 1. \\ \langle \ Output \ the \ counts \ 5 \, \rangle & Used \ in \ section \ 1. \end{array}
```

SAT-TOMOGRAPHY-PREP

	Section	$Pag\epsilon$
Intro	 1	1
Index	6	3