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runner% cat ranwalk.c
/* Random walk in the plane.
 * Written by NR Wagner, 23 April 1997
 */
#include <stdio.h>
#include <stdlib.h>
#include <time.h>
#define MAXP 75

void blank_plane(char plane[][MAXP]);
void one_step(int x, int y, int *new_x, int *new_y);
void print_plane(char plane[][MAXP], int steps);

void main(void)
{
        char plane[MAXP][MAXP];
        char alf[] = "ABCDEFGHIJKLMNOPQRSTUVWXYZ"
             "abcdefghijklmnopqrstuvwxyz";
        int steps = 0;
        int x = 40, y = 40; /* initial location */
        int new_x, new_y;
        srand48((long)time(NULL));
        blank_plane(plane);
        while( x >= 0 && x < MAXP && y >= 0 && y < MAXP) {
                steps++;
                plane[x][y] = alf[(steps/50)%52];
                one_step(x, y, &new_x, &new_y);
                x = new_x; y = new_y;
        }
        print_plane(plane, steps);
}

void blank_plane(char plane[][MAXP])
{
        int i, j;
        for(i = 0; i < MAXP; i++)
                for(j = 0; j < MAXP; j++)
                        plane[i][j] = ' ';
}

void one_step(int x, int y, int *new_x, int *new_y)
{
        if (drand48() < 0.5) { /* change x */
                *new_y = y;
                if (drand48() < 0.5) *new_x = x + 1.0;
                else *new_x = x - 1.0;
        }
        else { /* change y */
                *new_x = x;
                if (drand48() < 0.5) *new_y = y + 1.0;
                else *new_y = y - 1.0;
        }
}

void print_plane(char plane[][MAXP], int steps)
{
        int i, j;
        printf("Number of steps to the boundary: %i\n",
                steps);
        printf("   ");
        for(j = 0; j < MAXP; j++)
                printf("%i", j/10);
        printf("|\n");
        printf("   ");
        for(j = 0; j < MAXP; j++)
                printf("%i", j%10);
        printf("|\n");
        printf("   ");
        for(j = 0; j < MAXP; j++)
                printf("-");
        printf("|\n");
        for(i = 0; i < MAXP; i++) {
                printf("%2i|", i);
                for(j = 0; j < MAXP; j++)
                        printf("%c", plane[i][j]);
                printf("|\n");
        }
        printf("   ");
        for(j = 0; j < MAXP; j++)
```

```
            printf("-");
        printf("|\n");
}
runner% cc -o ranwalk ranwalk.c
runner% ranwalk
Number of steps to the boundary: 2756
   000000000011111111112222222223333333333444444444455555555556666666666777777
   012345678901234567890123456789012345678901234567890123456789012345678901234
   --------------------------------------------------------------------------------
 0|
 1|
 2|
 3|
 4|
 5|
 6|
 7|
 8|
 9|
10|
11|
12|                                          KK
13|                                          KKKK
14|                                         KKKKL
15|                                            KLL      NN
16|                                           KKLLL   NNN
17|                                           KLLLL   NNN
18|                                           K LL    N N
19|                                  G        KK LL   NN NN
20|                                  GGG     KKKJLLPPPPP  N
21|                               EE     GGGG   KKKJJJOPPPQRRRRM
22|                                EEEDDGGG G  KKKKJJJOPLLRRRRPUP
23|                               DEEEEDGG  G   KJKKJJ feeRRRRUUTQQ
24|                               DEDEEGGG FGG   JKKI OffeSeURUUTQQ
25|                                DDEEEFFFFFGGGGIKKI ffSeeeUUUUUQ
26|                               DDDEEEF  F   GIIIIIfffSeeeUUUU
27|                                  DFFFFFF    IIIIffHfSeeeUUU
28|                                 CCCFEFF        IffHffeefeeXXX X
29|                                 CCCFFFF        HHfffffffedXXXXX
30|                                  CCCFFF           fffffWddWXX X
31|                                  CCCCCC            ff  Wdd VVVXV
32|                                  CCC              fffWWWWdVVVVXV
33|                                 BBCC             gg WWWdddd  VXV
34|                               BBBB               g  ddWWWddd  X
35|                                 BB               gggggddddd   X
36|                                 AA                 ggg    d  XX
37|                                AAA               gggggd   X  XXX
38|                                AAAA              cgggcdd  Y   XX
39|                               AAAAA               ccggg   YYXXXX
40|                               A AAA                  gg  YYYY
41|                                  AA                ggg Z YYY
42|                                                    ggccZZYYY
43|                                                     gccZZZZY
44|                                                     gccjZaaa
45|                                                     gkkkjaaaa
46|                                                    bgkkkjaj
47|                                    rqq             ggbbkkaj
48|                                   qrrqpp      h  hhbgbhhkkkkj
49|                                   qrrqpp      hhhhhhnhhbkjhjj
50|                                   qrrrqpwwwo  o hhnnnnaakjljj
51|                                   qrttuuwowoooo nnnnnninnlllj
52|                                  sqqttuuwwww   oooo  mnnnnlllj
53|                                  sssttvuwvov     oo  mmnnnllljj
54|                                  ssqtvvvwwwww       nnnn llljj
55|                                  ss tvuuwwwww       nmm llll
56|                               sss s uvuwwwwxw       mmmmml
58|                               s svvvvvv rxxxyy        mmll
59|                               sssvvv yy  xxyyy
60|                                    yyyyyyxxyzz
61|                                    yyyyyyBBz
62|                                          ABBB
63|                                          ABBBB
64|                                          ABBBBB
65|                                         AABBBBB
66|                                         AACCCBz
67|                                    CCCCCCCCCCCzzzz
68|                                      CCC   AC  Azz
69|                                    CCC      AA AAz
70|                                     CCC      AAAz
71|                                      CCCCC   AAA
72|                                       CCCC
73|                                      DD
74|                                      D
   --------------------------------------------------------------------------------
```