§1 SETSET-RANDOM INTRO 1

November 24, 2020 at 13:24

This code is used in section 1.

```
Intro. This little program makes empirical tests by which I can check the accuracy of the SETSET
program. (See that program for explanations.)
#define m 12
                       /* size of each hand */
#define n 100000000
                               /* number of random trials */
#include <stdio.h>
#include "gb_flip.h"
                               /* use the Stanford GraphBase random number routines */
  char deck [81];
  char occ[81];
  char z[3][3] = \{\{0, 2, 1\}, \{2, 1, 0\}, \{1, 0, 2\}\};
                                                  /* x + y + z \equiv 0 \pmod{3} */
  char third [81][128];
  main()
     register int j, k, t;
    int reps, count;
     \langle \text{Initialize 2} \rangle;
     while (1) {
       count = 0;
       for (reps = 0; reps < n; reps ++) {
          \langle Shuffle the deck 4\rangle;
          \langle \text{Increase } count \text{ if there are no SETs } 3 \rangle;
       printf("%d/%d\n", count, n);
  }
     #define pack(a, b, c, d) (((a) * 3 + (b)) * 3 + (c)) * 3 + (d)
\langle \text{Initialize 2} \rangle \equiv
  gb\_init\_rand(0);
  for (k = 0; k < 81; k++) deck[k] = k;
  for (k = 81 - m; k < 81; k++) occ[k] = 1;
    int a, b, c, d, e, f, g, h;
    for (a = 0; a < 3; a ++)
       for (b = 0; b < 3; b ++)
         for (c = 0; c < 3; c++)
            for (d = 0; d < 3; d++)
              for (e = 0; e < 3; e ++)
                 for (f = 0; f < 3; f ++)
                   for (g = 0; g < 3; g ++)
                      for (h = 0; h < 3; h ++)
                        third[pack(a, b, c, d)][pack(e, f, g, h)] = pack(z[a][e], z[b][f], z[c][g], z[d][h]);
```

2 INTRO

 $\S 3$

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3. \langle \text{Increase } count \text{ if there are no SETs } 3 \rangle \equiv
  for (j = 81 - m; j < 80; j ++)
     for (k = j + 1; k < 81; k ++)
       if (occ[third[deck[j]][deck[k]]]) goto set\_found;
  count ++;
set\_found:
This code is used in section 1.
4. \langle \text{Shuffle the deck 4} \rangle \equiv
  for (j = 81; j > 81 - m; j --) {
     t = deck[j-1];
     occ[t] = 0;
     k = gb\_unif\_rand(j);
     deck[j-1] = deck[k];
     occ[deck[k]] = 1;
     deck[k] = t;
This code is used in section 1.
```

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a: \underline{2}.
b: <u>2</u>.
c: \underline{2}.
count: \underline{1}, \underline{3}.
d: \underline{2}.
deck: \underline{1}, 2, 3, 4.
e: \underline{2}.
f: \frac{\overline{2}}{\underline{2}}.
g: \underline{2}.
gb\_init\_rand: 2.
gb\_unif\_rand: 4.
h: \underline{2}.
j: \underline{1}.
k: \underline{1}.
m: \underline{1}.
main: \underline{1}.
n: \underline{1}.
occ: \underline{1}, \underline{2}, \underline{3}, \underline{4}.
pack: \underline{2}.
print f: 1.
reps: \underline{1}.
set\_found: \underline{3}.
t: \underline{1}.
third: \underline{1}, \underline{2}, \underline{3}.
z: \underline{1}.
```

4 NAMES OF THE SECTIONS

SETSET-RANDOM

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\begin{array}{ll} \left\langle \, \text{Increase} \,\, count \,\, \text{if there are no SETs 3} \, \right\rangle & \text{Used in section 1.} \\ \left\langle \, \text{Initialize 2} \, \right\rangle & \text{Used in section 1.} \\ \left\langle \, \text{Shuffle the deck 4} \, \right\rangle & \text{Used in section 1.} \end{array}
```

SETSET-RANDOM

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