(See https://cs.stanford.edu/~knuth/programs.html for date.)

1. Intro. This program simply generates data for GDANCE to solve the problem of placing MacMahon's 24 triangles into a regular hexagon, as discussed in Martin Gardner in Chapter 16 of *Mathematical Magic Show*. But instead of making the outside edge a solid color, I'm trying for a solution with 180° symmetry when we map the colors `a` ↔ `d`, `b` ↔ `c`.

And it should tile the plane too.

```
char piece[24][4] = {{'a','a','a',0},{'d','d','d',0},{'b','b','b',0},{'c','c','c',0},{'a',
    'a','d',0},{'d','d','a',0},{'a','a','b',0},{'d','d','c',0},{'a','a','c',0},{'d','d',
    'b',0},{'b','b','a',0},{'c','c','d',0},{'b','b','c',0},{'c','c','b',0},{'b','b','d',
    0},{'c','c','a',0},{'a','b','c',0},{'b','d','c',0},{'a','b','d',0},{'a','d','c',0},
    {'a','c','d',0},{'a','d','b',0},{'a','c','b',0},{'b','c','d',0},};
char pos[36][4] = {{2,3,8,0},{3,0,4,0},{4,5,9,0},{5,1,6,0},{6,7,10,0},{11,12,19,0},{12,8,13,0},
    {13,14,20,0},{14,9,15,0},{15,16,21,0},{16,10,17,0},{17,18,22,0},};
char map[23] = {0,0,11,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,7,19,20,20,19};
main()
{
  register int j, k;
  for (k = 12; k < 36; k++)
    pos[k][0] = pos[k-12][1], pos[k][1] = pos[k-12][2], pos[k][2] = pos[k-12][0];
  ⟨Output the first line of dance data 3⟩;
  for (j = 0; j < 24; j++)
    for (k = 0; k < (j ≥ 4 ? 36 : 12); k++) ⟨Generate rows for piece j in position k 2⟩;
}
```

2. ⟨Generate rows for piece *j* in position *k* 2⟩ ≡

```
{
  printf("%s␣P%02d", piece[j], k % 12);
  if (map[pos[k][0]] ≡ pos[k][0]) printf("␣%02d:%c", pos[k][0], piece[j][0]);
  else printf("␣%02d:%c", map[pos[k][0]], 'a' + 'd' - piece[j][0]);
  if (map[pos[k][1]] ≡ pos[k][1]) printf("␣%02d:%c", pos[k][1], piece[j][1]);
  else printf("␣%02d:%c", map[pos[k][1]], 'a' + 'd' - piece[j][1]);
  if (map[pos[k][2]] ≡ pos[k][2]) printf("␣%02d:%c", pos[k][2], piece[j][2]);
  else printf("␣%02d:%c", map[pos[k][2]], 'a' + 'd' - piece[j][2]);
  printf("␣%s\n", piece[j ⊕ 1]);
}
```

This code is used in section 1.

3. ⟨Output the first line of dance data 3⟩ ≡

```
for (j = 0; j < 24; j++) printf("%s␣", piece[j]);
for (k = 0; k < 12; k++) printf("P%02d␣", k);
printf("|");
for (k = 0; k < 21; k++)
  if (k ≠ 1 ∧ k ≠ 2 ∧ k ≠ 18) printf("␣%02d", k);
printf("\n");
```

This code is used in section 1.

4. Index.

MACMAHON-TRIANGLES-SYM-TILE