The `threeddice` package

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2010/11/30

1 Introduction

Running `mpost` on `threeddice.mp` produces 26 figure files. Six of them are are
`die3d-1.mps`[1] through `die3d-6.mps`. These are pictures of a single die face
with the number of dots indicated by the numerical part. Three of these would
look the same if rotated by multiples of 90 degrees. The other three could look
different. It is up to the users to perform this rotation if they want a different
view.

The twelve files with 2-digit numerical part are 3D pictures of dice with two
faces showing, as if your were looking directly at a horizontal edge. You will
have to rotate it ±90 degrees if you want the edge to be vertical, or 180 degrees
if you prefer the positions of the top and front face to be exchanged.

The eight files with 3-digit numerical suffix are 3D pictures of dice with three
faces showing, as if your were looking directly at one of the corners. They show
a top face and a left and right face flanking a vertical edge. You can get 16
other views by rotating them ±120 degrees. These rotations put one of the side
faces on top.

2 Modifications

These figures were taken from an actual right handed die, and are all the per-
missable views of such a die, apart from size of dots and the actual orientation
of the patterns of dots. As near as I could determine from internet searches,
there are no official standards for the following.

- The 2-spot face has dots in opposite corners, but which two corners? On
  my die, if the 1-spot is on top, the 2-spot to the left and the 3-spot to the
  right (figure `die3d-123.mps`), the dots on the 2-spot face are in upper left
  and lower right. It seems it could just as well have been the other two
  corners.

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[1] If your `mpost` version is less that 0.9, you will get figure files with names like `threeddice.1`.
You should update your TeX system.

- Similar question for the 3-spot face: three dots in a diagonal between opposite corners, but which two corners? In the previous example (figure `die3d-123.mps`), the diagonal is from lower left to upper right.

- The 6-spot face has two lines of three, parallel to two edges, but which two edges? In `die3d-246.mps` the lines of dots are horizontal, but it seems they could just as well have been vertical.

If you want some other orientation of these faces you will need to edit `threeddice.mp`: for the 2-spot face exchange the definitions of `pips2` and `pips7`; for the 3-spot face exchange `pips3` and `pips8`; for the 6-spot face exchange `pips6` and `pips11`.

You can also change the size of the dots by giving a different value to `dot_diam`. The dice have rounded corners, you can change their radius by changing `corner_rad`. The dots are placed so there is at least `face_margin` of space between the dots and the straight edge of the face. You can change this variable as well.

For other effects, you are on your own. A common requirement is that faces with fewer dots have larger dots. This is relatively easy to do, but requires changing the definitions of the 9 picture variables `pips1` through `pips11`.
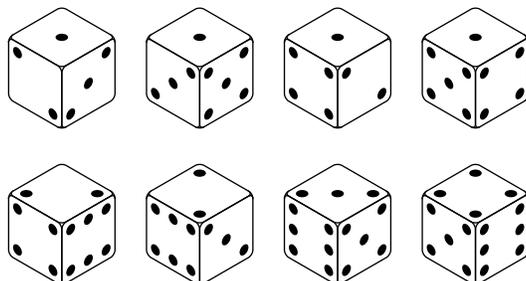
Naturally, the `graphics` and `graphicx` packages let you scale these as you want. If you would prefer to change the unscaled sizes, edit `threeddice.mp` to change `die_size` from 1cm to the desired size.

3 Appendix

These are the six single faces:
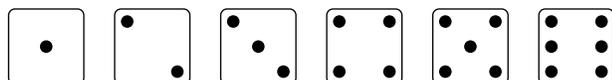
The two-faced dice are ugly, so let me first show you the eight three-faced dice:

Finally, the twelve two-faced dice: