nimsticks v1.1

Peter Rowlett

July 19, 2020

1 Background

`nimsticks` is a package for LaTeX that draws sticks for representing games of multi-pile Nim.

Nim objects could be anything, of course, but conventionally sticks or stones are used. There are various types of dot in LaTeX that might look like stones, but somehow a line of dots didn't seem satisfactory. There are various ways to draw a line (e.g. just typing IIIII), including some tally markers (e.g. in hhcount). My problem with these (call me picky) is that they are all identical lines, and a 'heap' of them just looks very organised. Really, I want a set of lines that looks like someone just threw them into heaps (though probably without crossings for the avoidance of ambiguity).

The way this works is it draws a thick vertical line in TikZ with a little wobble added so each one doesn't look extremely well-lined-up with its neighbour, achieved by adding or subtracting a small random number to the top and bottom coordinate.

It does this by providing two commands:

- `\drawnimstick`: draws a single Nim stick with a little random wobble;

- `\nimgame`: takes a comma-separated list of numbers and draws a line of Nim heaps holding those number of sticks.

2 Usage

N.B. The precise look of example output in this section is affected by random wobble in the sticks.

For example, the input `\nimgame{5,3,4}` will produce output like this:

$$|/||/ \qquad /|/ \qquad \backslash|||$$

This is designed to look like a 3-pile Nim game with 5 sticks in the first pile (or heap), 3 in the second and 4 in the third.

`\nimgame` will happily work with one heap, so for example the input `\nimgame{7}` will produce output like this:

\/||||//

The command `\nimgame` presents the Nim game within `\begin{center}...\end{center}`. An optional flag `inline` can be used to produce the Nim game without the `center` environment. For example, the command `\nimgame[inline]{5,3,4}` will produce outline like this: |\\\|/ /|| \\|\

One reason for this is that `\nimgame` will not work in a `standalone` document with the `crop` option unless the `inline` option is used.

It is likely the user will want to use `\nimgame` and not `\drawnimstick` directly, but the input `\drawnimstick` will produce output like this: |

3 Issues

There is no limit in the code to the number of piles or the number in a pile, but this code doesn't do anything to cope when line breaks start happening, and presumably there is a computational limit.

In principle, if you add lots of piles it will just wrap onto multiple lines, though it will start to look less clear. For example, the input

`\nimgame{1,2,3,4,5,6,7,8,9,10,9,8,7,6,5,4,3,2,1}`

will produce the output:

/   \| \|/   \/|\   /\//|\   /||\\\| \|/\\\| //\\/||
\\| \\|/\\/|\\| ||/||\\\\\ ||\\\|//| \\\\/|\\| /\|\\\\
       \|/|\\   \\\|/ |\\\ ||/ || \
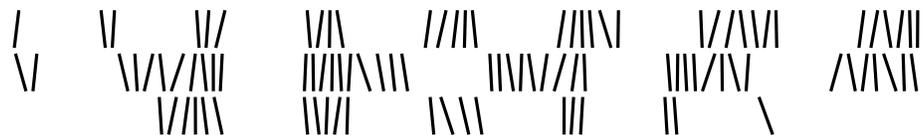
Similarly, if you have a lot of sticks in the same heap, it will wrap and look confusing, for example the input `\nimgame{128}` will produce the output:

|\\|||/\|\\\|/|\|\\/|\|\|\\\\||//\/||\\\||/\|/\|\\\|\\\/||/|||||\\\\|\/\\\\|/\\
|\//\/||\\\\\\\\/\|/|||\\\\|/|\|/\\\\/||\\/|||\\/|/|\\\\\|/\/\/||/||\\\|\\|//\\\\\\\|
|||\\|//\\|/\\|\\\\\\|/\\/\\\||||///|\\\\||\\\\\||||||//////\\/\|/\|||\\\\\\|\/\\\\|/
\\\/||\\|\\\\\|/\\\\\|/