

Re: juggling's combinatorics problem with siteswap

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Thanks Owen for suggestions and correction...

some more sketches and ideas...

* siteswap notation is a sequence of numbers, as in {5,3,4,4,4} (4 balls tennis pattern). If each number is single digits, then it can be abbreviated to 53444.

* length of siteswap is the number of numbers in it. i.e. `length[53444]==5`.

* `bs` = number of balls.

* `cp` = a colored period is the number of throws all colored balls return to their position. For example, for pattern 53444, the `cp` is 30.

* `ucp` = uncolored period. The number of throws all uncolored balls return to their position. In 53444, `ucp` = 10.

* `rucp` = reduced uncolored period. Like `ucp`, but consider mirror images are excluded. `rucp` for 53444 is 5. (`rucp` is the number of digits in siteswap.)

* `obs` = the number of orbits in a pattern. (a orbit is the path a ball travels.) In 53444, `obs` = 2. (note: each orbit can have its own `cp`, `ucp`, `rucp` and siteswap notation.)

* `amb` = true if ambidextrous, otherwise false. A pattern is ambidextrous if left and right hand play the same role. (if length of siteswap is odd, then `amb` is true for sure. 8448 is a counter example. It is ambidextrous.)

I haven't studied the siteswap notation much... will have to spent time on it. And, some of the algorithms and examples suggested here should be incorporated...

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some of the above idea also needs to be refined. For example, in Steve Bennett's 8448 example, although it is ambidextrous but note some balls never goes to the other hand. i.e. the orbits are single node loops, but the whole pattern does contain balls that change hands.

here's some interesting siteswap patterns i've jotted down in my notes...

- * 3 ball on one hand, 2 on the other. (64)
- * 3 balls snake (55050, 7070700)
- * single handed 3 balls (60)
- * continuous 3 balls flash (55500, 7770000)
- * 4 balls tennis (53444);
- * 4 balls shower. (71)
- * 3 balls shower (51)
- * 2 balls shower (31)
- * 4 balls cascade (55550)

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http://xahlee.org/PageTwo_dir/more.html

owenjonesuk wrote:

- > *I have recently done some research into the history of siteswap and I*
- > *found a multitude of papers on the internet. Probably the best source*
- > *is*
- > *the Mathematics of Juggling by Burkard Polster. I haven't read it,*
- > *but*
- > *several people who have and a very good review online all say that it*
- > *is*
- > *completely aimed at mathematical audience and that it has a great*
- > *list*
- > *of references.*
- >
- > *Owen*
- >
- > *PS Siteswap was devised in 1984 or 85, although it didn't take off in*
- > *popularity for a while.*