Another Layer: Developing Recursive Die Encoding Operations

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1 INTRODUCTION

While many different operations have been created w.r.t. the encoding of die faces for various tricks, traps, mathematic lectures, and general enjoyment, there is still much work to be done in regards to utilizing previously-exisiting die blocks. By doing so, much more complex die encoding could be created in a fraction of a time (measured in the 1/1000ths) that it currently takes, as well as reducing the fervent demand for new primes in the industry.

In this paper, we introduce **Koopa Kid's Law of Dice Recursion**, a novel method of encoding die faces to other arbitrary values based off pre-encoded dices. By taking one or multiple dice with their face numbers encoded into arbitrary faces (see Figure 1 on the right), a standard mathematical theorem tangentially similar to Ally Sum Reduction can be applied onto each of them in sequence in order to provide an exceedingly strong protection to the face of another dice for a fraction of the traditional computation cost.

The input for the computation in this case would be taking the sum of each face multiplied by its pre-determined face order. That means to decoded it, an attacking party would need to figure out both what the values of each die face on the sub-die is, as well as the correct order of the die (adding 720 times complexity for a d6, or 2.4e18 times complexity for a d20). This also means that the attacking party would also have to obtain the sub die (or sub dice) in the first place, allowing for a more secure distributed system than what would be possible with a single computed die, without sacrificing basic accessibility for legitimate users.

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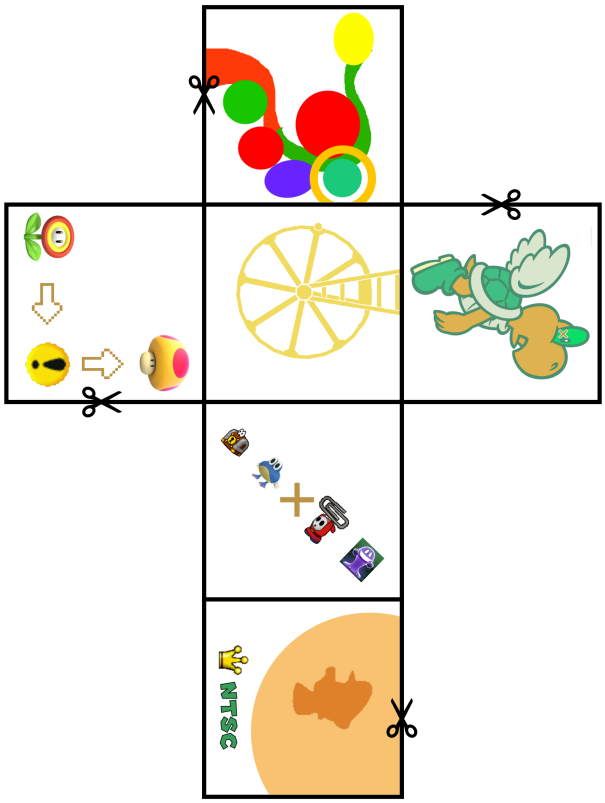

Figure 1: A standard numbered die already constructed such that its faces are encoded in the form of representative pictures. We've also made it so you can print it out and try this at home! Be sure to look at the supplied numbered face cutout as well. The total equation for this would be equivalent to

$$\sum_{n=1}^{6} n * face(n)$$

NOTE: ADD NUMBERED FACE CUTOUT TO PAPER BEFORE SUBMITTING

2 RELATED WORK

2.1 Inverse-Accelerated Large Numbers

But first, to understand the logic behind all of this, we have to talk about parallel universes.