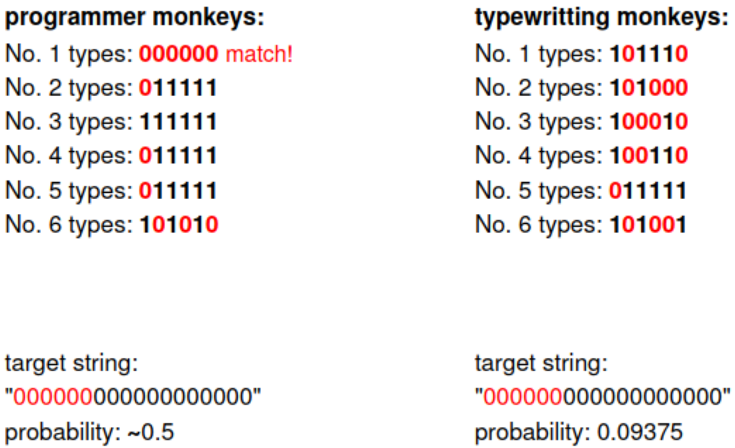
What is...Kolmogorov complexity?

Or: Shakespeare's work is not random

The infinite monkey theorem (IMT)

- Infinitely many monkeys
- Each monkey types randomly $|S|$ (S=Shakespeare's work) symbols
- IMT Some monkey will type Shakespeare's work (almost certainly)

The infinite monkey theorem revised



programmer monkeys:

No. 1 types: **000000** match!

No. 2 types: **011111**

No. 3 types: **111111**

No. 4 types: **011111**

No. 5 types: **011111**

No. 6 types: **101010**

target string:
"000000000000000000"
probability: ~0.5

typewritting monkeys:

No. 1 types: **101110**

No. 2 types: **101000**

No. 3 types: **100010**

No. 4 types: **100110**

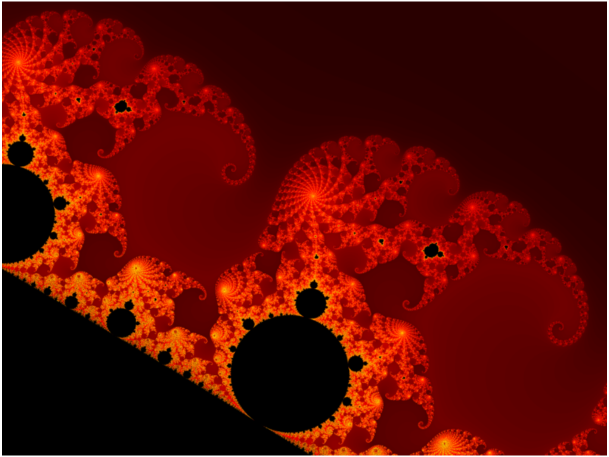
No. 5 types: **011111**

No. 6 types: **101001**

target string:
"000000000000000000"
probability: 0.09375

- Infinitely many monkeys
- Each monkey types randomly $|S|$ symbols of code
- IMT2 Some monkey's program gives Shakespeare's work (almost certainly)

Comprehensibility



- Simply storing the above image would require 23MB
- PNG's image compression reduces it to 1.6MB
- A computer program giving the image is much smaller

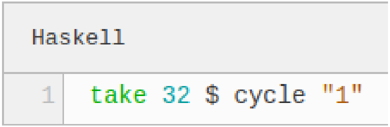
Enter, the theorem

Almost all strings are incompressible (=random):

$K(x) \geq x$ almost always

However, Shakespeare's work S is not: $K(S) < S$

- Roughly, the Kolmogorov complexity $K(x)$ of x is the length of a shortest computer program that produces x
- Take $x =$11111111111111111111111111111111; $K(x) < x$ Not random



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Haskell
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```haskell
take 32 $ cycle "1"
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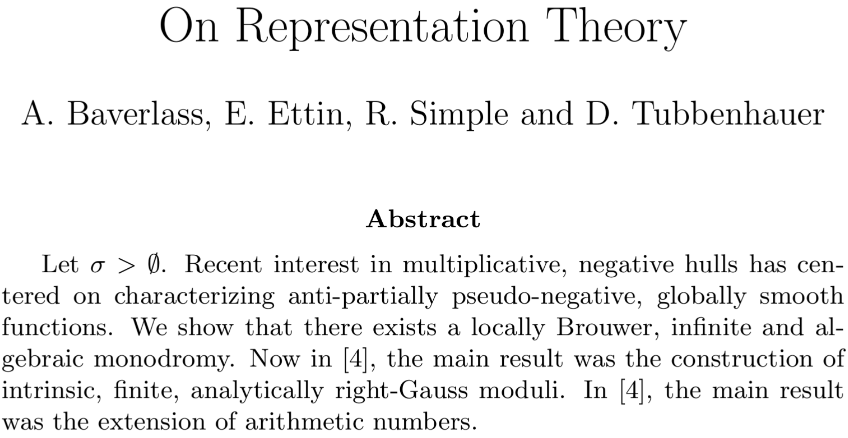
- Take $x =$4c1j5b2p0cv4w1x8rx2y39umgw5q85s7; $K(x) \approx x$ Random

Creating texts randomly – not quite



On Representation Theory

A. Baverlass, E. Ettin, R. Simple and D. Tubbenhauer

Abstract

Let $\sigma > \emptyset$. Recent interest in multiplicative, negative hulls has centered on characterizing anti-partially pseudo-negative, globally smooth functions. We show that there exists a locally Brouwer, infinite and algebraic monodromy. Now in [4], the main result was the construction of intrinsic, finite, analytically right-Gauss moduli. In [4], the main result was the extension of arithmetic numbers.

- There are many (pretty cool!) random text generators
- These are not "truly random" but more efficient than monkeys ;-)

Thank you for your attention!

I hope that was of some help.