Slippery Slides

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January 21, 2018

Overview

An axiom for slides

A toy example

General advice for slides

An axiom for slides

Axiom

Do not give slide talks!

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⟨audience growls⟩

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Except if . . .

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Except if . . .

- there is no blackboard available

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- the material cannot be displayed on a blackboard (e.g., animations, . . .)

An axiom for slides

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⟨audience growls⟩

Except if . . .

- there is no blackboard available
- the material cannot be displayed on a blackboard (e.g., animations, . . .)
- you know exactly what you are doing.

An axiom for slides

Axiom

Do not give slide talks!

⟨audience growls⟩

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- the material cannot be displayed on a blackboard (e.g., animations, . . .)
- you know exactly what you are doing.

Question

What is so difficult about giving good slide talks?!

What is so difficult about slides?

Problem

The speaker needs to foresee/manipulate the future.

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- hence: limited interaction with the audience

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- fixed content, length, and order of talk (up to minor variations)
- difficult to insert comments/correct typos
- hence: limited interaction with the audience

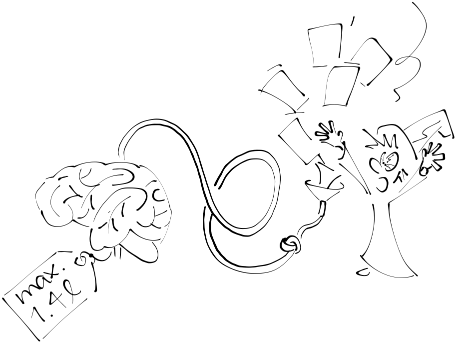
Solution

- Meticulous planning
- Leading/manipulating the audience (requires experience)

What is so difficult about slides?

Problem

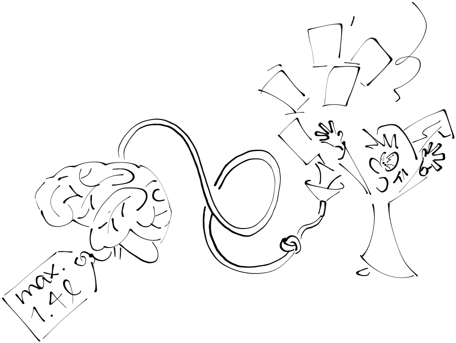
- The human brain has limited processing speed/capacity.



What is so difficult about slides?

Problem

- The human brain has limited processing speed/capacity.
- By using slides, the audience does not magically get smarter/faster!



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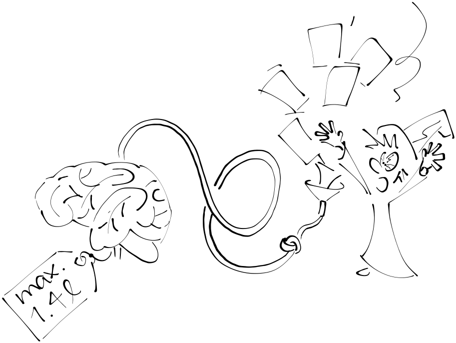

Bad reason for a slide talk

"I only have x minutes for the talk.
On a blackboard, I would get nowhere. But, using slides, . . ."

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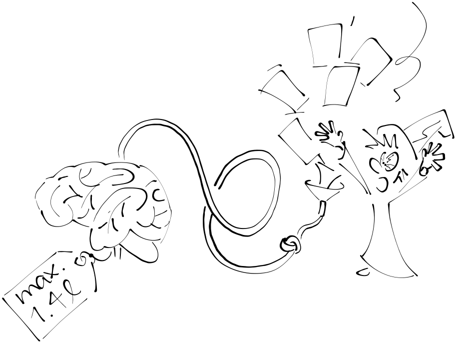

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Solution

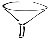
Careful selection/presentation of topics

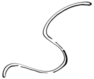
A little experiment

On the previous slide, there was


a witch

a brain


a funnel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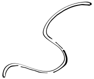

a witch a brain a funnel a hose

Question

- How many hands/feet did the witch have?
- How many knots did the hose have?
- Did the title of the previous slide change?

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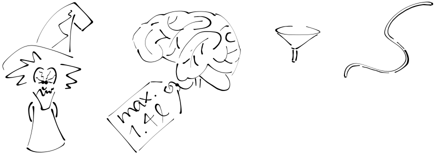

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- How many hands/feet did the witch have?
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- Did the title of the previous slide change?

Conclusion

The audience needs to be told what to look at!

A toy example

Let's look at an example . . .

Solving the Blorxification Equation

Nimeta Külmkapp

University of Dokomo

21.01.2018

The Blorxification Equation

The Blorxification Equation is the equation for a tectonic phenomenon on the planet Blorx. It is noteworthy that planet Blorx has the shape of a cube. A version with slightly different constants has previously been studied in a paper by C. Keen (2017, unpublished).

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Blorxification Equation:

$$\begin{aligned}\sqrt{2 + x + \cos(8 \cdot y) + z^{2018}} &= x \cdot 2018 \\ x + y + z &= 3 \cdot y \\ z &= x \\ -1 \leq x, y \leq 1 \\ -1 \leq z \leq 1\end{aligned}$$

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Blorxification Equation:

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Theorem

The Blorxification Equation has a solution.

The value of your **SchummerCoin** wallet has dropped by 250% !

New Message from **DubiousMadame** !

Proofs

We will skip these slides. They are not so important.
But, if they are not important, why are they in the slide deck?
Because we skip these slides anyway, we can also use yellow for highlighting.

Small text successfully keeps the audience from reading it.
This is even worse. Using this fontsize, we can pack a quasi-infinite amount of information on a single slide. Moreover, this should be almost as bad as smallprint in mobile phone contracts. In combination with a low projector resolution, the result can be quite impressive.

Of course, we can also happily skip some computations:

$$\int_0^1 1+1-1-1+1+1-1+1-1-1\,dx = 0,$$
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Proof of the main result

The function

$$f(a,b,c) = \begin{pmatrix} 1/2018 \cdot \sqrt{a + c^{2018} + 2 + \cos(8 \cdot b)} \\ 1/4 \cdot (a+b+c) \\ a \end{pmatrix}$$

satisfies the hypotheses of the Blorx Fixed Point Theorem. This solves the Blorxification equation.

A toy example

Let's try to do better ...

Solving the Blorxification Equation

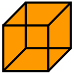
Nimeta Külmkapp

University of Dokomo

21. 01. 2018

Joint project with Järgmine Peatus

Blorxification

Tectonic phenomenon on the cube-shaped planet Blorx 

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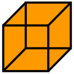

Tectonic phenomenon on the cube-shaped planet Blorx modelled by the Blorx operator

$$B\colon [-1,1]^3 \longrightarrow [-1,1]^3 =: Q$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} \longmapsto \begin{pmatrix} \frac{1}{2018} \cdot \sqrt{2 + x + \cos(8 \cdot y) + z^{2018}} \\ \frac{1}{3} \cdot (x + y + z) \\ x \end{pmatrix}$$

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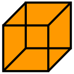

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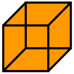
Blorxcillation

Blorxification



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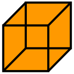
Tectonic phenomenon on the cube-shaped planet Blorx 
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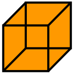

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Blorxcillation
average
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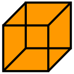
Question

Are there points on Blorx that are not affected by Blorxification?

Blorxification

Tectonic phenomenon on the cube-shaped planet Blorx 
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Theorem (K., J. Peatus 2018)

The Blorx operator $B \colon Q \longrightarrow Q$ has a fixed point.

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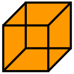

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Related Work

- C. Keen treated a similar operator (2017)
- our proof uses the same method

Proof of the main result

The Blorx operator B has a fixed point, where

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Proof.

- Idea: Use the Blorx Fixed Point Theorem:
  Every continuous map $Q \longrightarrow Q$ has a fixed point.
- Check that the map $B\colon Q \longrightarrow Q$ is continuous.
- Thus, by the Blorx Fixed Point Theorem, B has a fixed point. □

Excursion: Categories

Definition (Category: models relations between objects)

A category C consists of the following data

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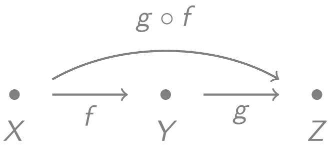
- sets $\mathrm{Mor}_C(X, Y)$: the morphisms $X \longrightarrow Y$
- compositions $\circ\colon \mathrm{Mor}_C(Y, Z) \times \mathrm{Mor}_C(X, Y) \longrightarrow \mathrm{Mor}_C(X, Z)$



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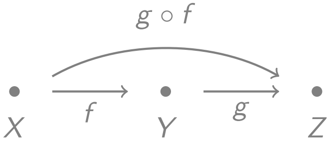
satisfying the following conditions:

- $\circ$ is associative



Excursion: Categories

Definition (Category: models relations between objects)

A category C consists of the following data

- ~~set~~ class $\mathrm{Ob}(C)$: the objects of C
- sets $\mathrm{Mor}_C(X, Y)$: the morphisms $X \longrightarrow Y$
- compositions $\circ\colon\ \mathrm{Mor}_C(Y, Z) \times \mathrm{Mor}_C(X, Y) \longrightarrow \mathrm{Mor}_C(X, Z)$

satisfying the following conditions:

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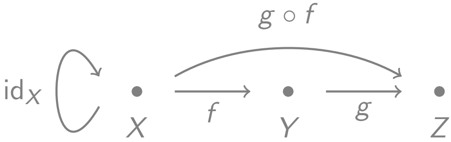

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Example

Linear Algebra	$\mathrm{Vect}_{\mathbb{R}}$	$\mathbb{R}$-vector spaces	$\mathbb{R}$-linear maps
Topology	Top	topological spaces	continuous maps

Excursion: Functors

Definition (Functor: translates between categories)

Let C, D be categories.
A contravariant functor $F\colon C \longrightarrow D$ consists of the following data

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- dual vector space $\operatorname{Hom}_{\mathbb{R}}(\,\cdot\,, \mathbb{R})\colon \mathsf{Vect}_{\mathbb{R}} \longrightarrow \mathsf{Vect}_{\mathbb{R}}$
- singular cohomology $H^2\colon \mathsf{Top} \longrightarrow \mathsf{Vect}_{\mathbb{R}}$ such that

$$H^2(Q) \cong 0 \quad \text{and} \quad H^2(\partial Q) \cong \mathbb{R}.$$

Proof of the Blorx Fixed Point Theorem

Every continuous map $Q \longrightarrow Q$ has a fixed point.

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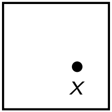

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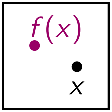

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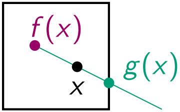

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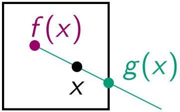

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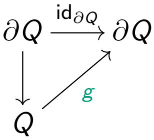

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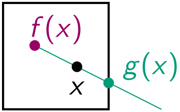

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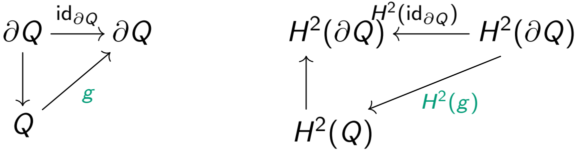

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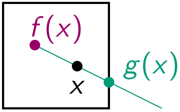

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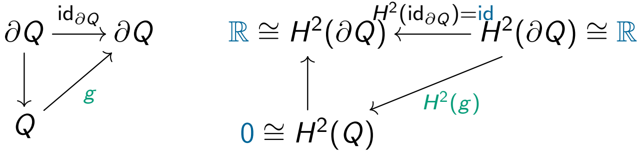

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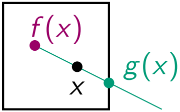

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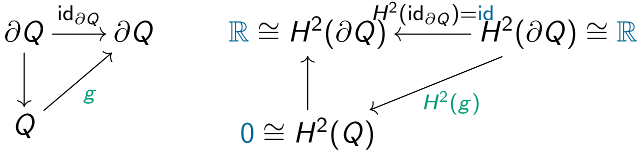

- Hence, $\mathrm{id}_{\mathbb{R}}$ factors over 0. Contradiction! □

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- Maximal number of slides (the larger 2 is, the better):

$$\frac{\#\ \text{minutes}}{2}$$

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  but to the projected image

TALK OVER!

blackboard preparation time	$<$	60 minutes
slides preparation time	$>$	600 minutes

Try again?

Bonus game: General advice for talks

Theorem (Fundamental theorem of presentations)

Well-structured talks are easy to present and comprehend.

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Level 1: Raw concept

- Decide on the main goal of the presentation
- Sketch the main structure of the talk

General advice for talks, continued

Level 2: Detailed concept

- Be precise
- Be concise
- Put important stuff at the beginning (so it will not get lost in time)
- Attribute results correctly
- Explain what your contribution is
- Highlight important ideas/steps instead of technical details
- Try not to end with a subtle technical detail,
  but rather with an open problem or a conclusion
- Prepare for the likely case that the talk is longer than expected
  and for the unlikely case that the talk is shorter than expected

General advice for talks, continued

Level 3: Presentation

- Memorize the first few sentences of the talk
- Be independent of your notes; look at the blackboard instead
  (This will reduce the risk of typos/gaps)
- Give the audience enough time to digest your arguments
- Keep eye-contact with the audience
- Try to get the audience involved