

Intuitionistic Logic (and Planar Heyting Algebras) for Children

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In this talk we will see a way to interpret Intuitionistic Logic *visually*.

One great way to make the expression “for children” precise in mathematical titles is to define “children” as “people without mathematical maturity”, in the sense that they are not able to understand structures that are too abstract straight away — they need particular cases first.

The structures in which we can interpret operations like ‘and’, ‘or’ and ‘implies’ and they obey the rules of intuitionistic logic are called Heyting Algebras. It turns out that finite, planar Heyting Algebras (“ZHAs”) can be drawn as subsets of rectangles, and we will see how the operations ‘and’, ‘or’ and ‘implies’ can be calculated visually on them, and why they have to behave in that way. We will also see how ZHAs can be a tool for understanding Heyting Algebras in general and several other related concepts, like deduction trees, simply typed lambda-calculus, and categories.

(Note: this material has been tested on real children — young Computer Science students! — and they liked it a lot)

Paper, slides and links:

<http://angg.twu.net/math-b.html#ebl-2017>

<http://angg.twu.net/math-b.html#zhas-for-children-2>