

# Zen Languages

by Sven Nilsen, 2021

*In this paper I introduce a simplified domain specific language that resembles the philosophy of Zen.*

Zen<sup>[1]</sup> is a school of thought within Buddhism that has a large impact on Eastern philosophy and which ideas were popularized in Western philosophy in previous century.

As a researcher of mathematical languages, I try to both grasp the ideas in philosophy but also capture some of their structure as mathematical objects. I have previously related Zen philosophy to rationality in the form of higher order utility<sup>[2]</sup>. Here I will try to construct a simple category<sup>[3]</sup>-like domain specific language that uses the power set operation as semantical building block.

mem	membership morphism
pow	power set morphism
id	identity morphism
.	composition operator

Zen languages are of the following form:

$$\text{mem}^N . \text{pow}^N$$

Where `N` is a natural number.

For example:

id	N = 0	identity
mem . pow	N = 1	subset
mem <sup>2</sup> . pow <sup>2</sup>	N = 2	construction
mem <sup>3</sup> . pow <sup>3</sup>	N = 3	design

A power set contains every possible set of some original set.

A subset `A` of some set `B` is necessarily a member of the power set of `B`.

Therefore, in Zen language `N = 1` one talks about how objects are part of other objects.

A power set of a power set of some original set contains every subset of the original's power set.

A constraint `A` of some set `B` is necessarily a member of the power set of the power set of `B`.

When `B` is a subset of the constraint `A`, this is a proof that `B` is a solution.

Hence, `B` is a constructive proof of the constraint `A`, which can be thought of as a type.

Therefore, in Zen language `N = 2` one talks about how objects are proofs of other objects.

When talking about design, one is taking one step further, where `N = 3`.

This is because real world feedback is used to improve the language of constraints.

The design of language determines which constraints that are possible to express.

Therefore, in Zen language `N = 3` one talks about how objects are expressed in terms of other objects.

## References:

- [1] “Zen”  
Wikipedia  
<https://en.wikipedia.org/wiki/Zen>
- [2] “Zen Rationality”  
Sven Nilsen, 2018  
[https://github.com/advancedresearch/path\\_semantics/blob/master/papers-wip/zen-rationality.pdf](https://github.com/advancedresearch/path_semantics/blob/master/papers-wip/zen-rationality.pdf)
- [3] “Category theory”  
Wikipedia  
[https://en.wikipedia.org/wiki/Category\\_theory](https://en.wikipedia.org/wiki/Category_theory)
- [4] “Power set”  
Wikipedia  
[https://en.wikipedia.org/wiki/Power\\_set](https://en.wikipedia.org/wiki/Power_set)