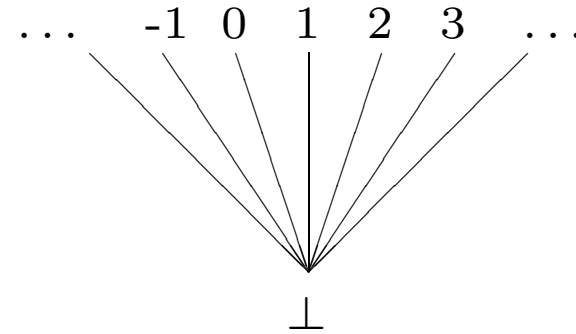


Flat Base-Domains

$(\mathbb{Z}_\perp, \mathbb{B}_\perp, C_\perp, F_\perp)$

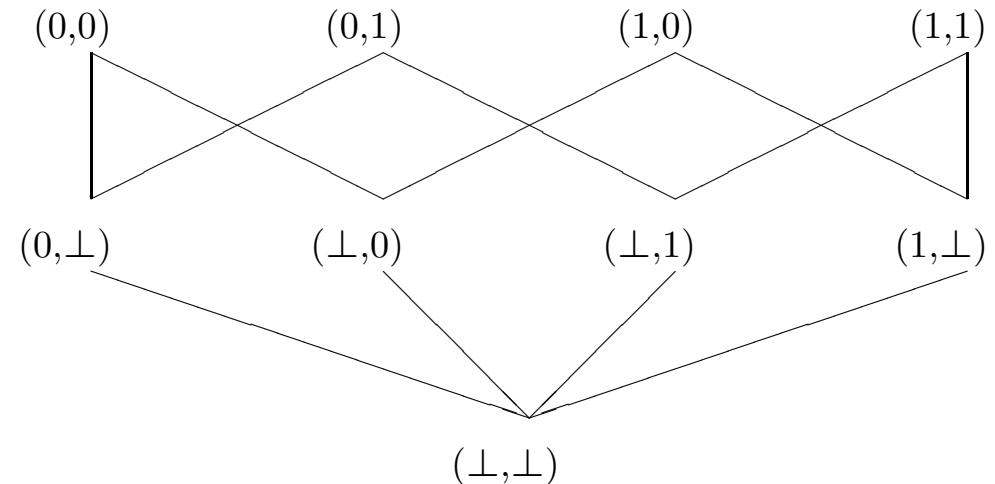
$$d \sqsubseteq_D d' \quad \text{iff} \quad d = \perp_D \text{ or } d = d'$$



Product Domains

$(\mathbb{Z}_\perp \times \mathbb{Z}_\perp, \text{etc.})$

$$(d_1, \dots, d_n) \sqsubseteq_D (d'_1, \dots, d'_n) \quad \text{iff} \\ d_i \sqsubseteq_{D_i} d'_i \text{ for all } 1 \leq i \leq n$$



Function Domains

(subset of $\mathbb{Z}_\perp \rightarrow \mathbb{Z}_\perp$, etc.)

$$f \sqsubseteq_{D_1 \rightarrow D_2} g \quad \text{iff} \quad f(d) \sqsubseteq_{D_2} g(d) \text{ for all } d \in D_1.$$

Strict and Non-Strict Functions

$f : D_1 \times \dots \times D_n \rightarrow D$ is *strict* iff
 $f(d_1, \dots, d_n) = \perp_D$ whenever $d_i = \perp_{D_i}$ for some i .

```
one :: Int -> Int
one x = 1
```

Choices for the semantics of one:

- (a) $f_1(x) = 1$ for $x \in \mathbb{Z}$ $f_1(\perp) = 1$ (non-strict)
- (b) $f_2(x) = 1$ for $x \in \mathbb{Z}$ $f_2(\perp) = \perp$ (strict)
- (c) $f_3(x) = 1$ for $x \in \mathbb{Z}$ $f_3(\perp) = 0$ (not computable)