

Demo: VoxelCAD

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What is VoxelCAD?

- Collaborative voxel-based CAD tool
- In the browser
- Programmable with a functional DSL
- Written in Elm + Haskell (+ TypeScript)
- Work in progress

Some context

- People use Minecraft as an artistic canvas
- These tend to get very big



Some context

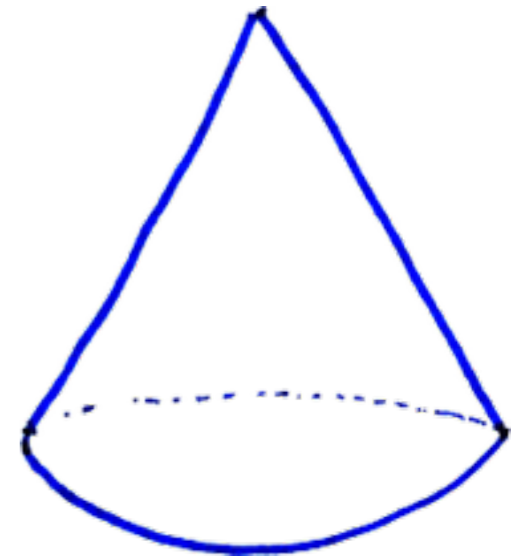
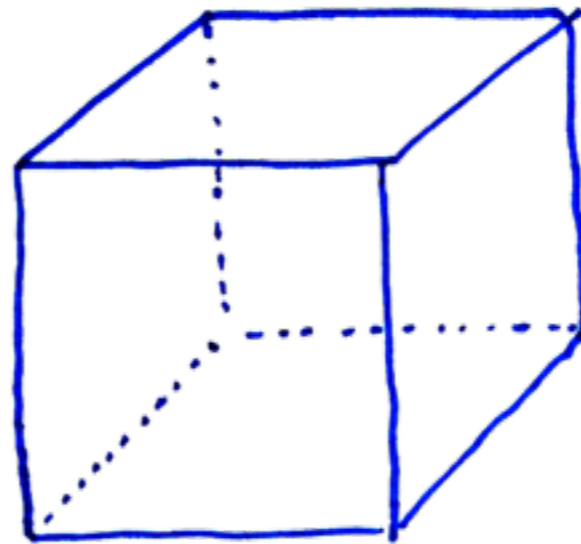
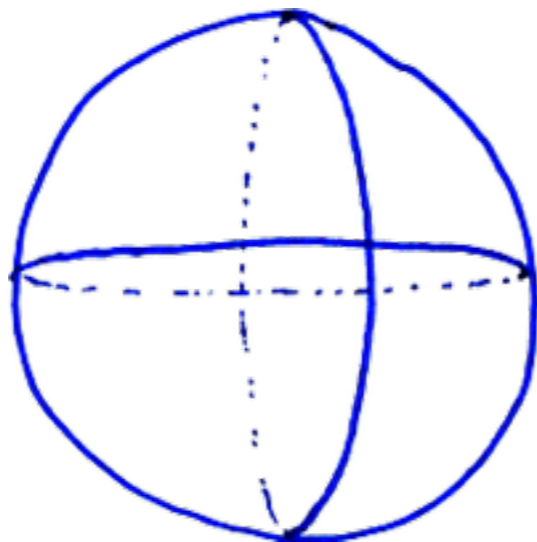
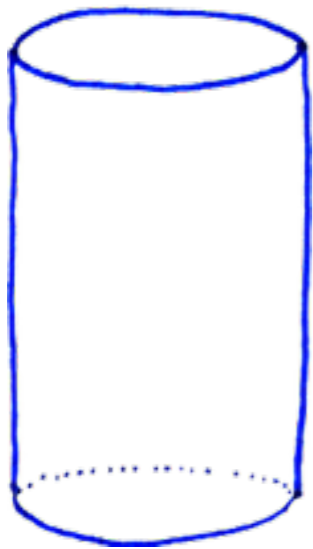
- People use Minecraft as an artistic canvas
- These tend to get very big
- There are some tools, but they are not very intuitive:
 - clunky
 - slow
 - no immediate feedback

Functional DSL

- Pure - no global state, idempotent scripts
- Nicely composes
- Easy to understand, even without programming knowledge
- “We’ll write a parser later” => lisp

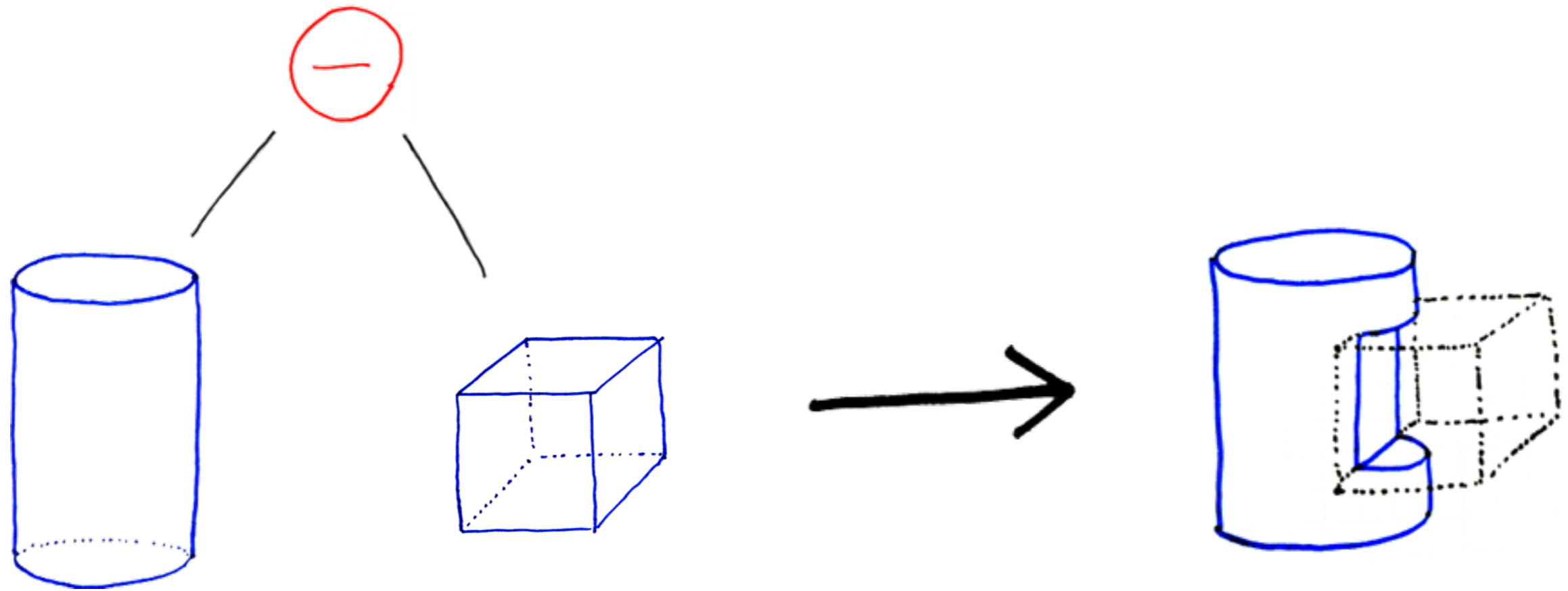
DEMO

Constructive Solid Geometry



```
type Primitive
  = Cylinder
  | Sphere
  | Cube
  | Cone
```


Combine primitive solids with boolean operations

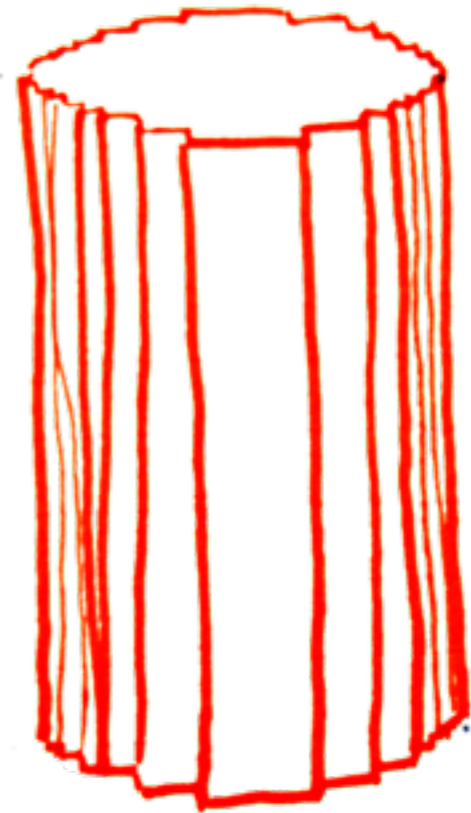
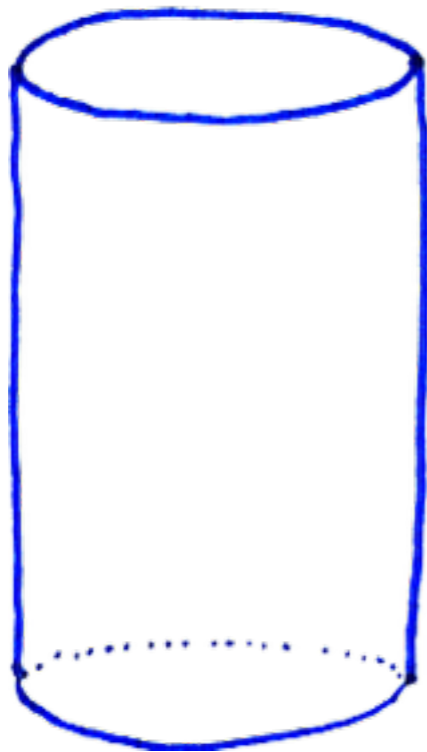


```
type Op  
= Union  
| Intersect  
| Subtract
```

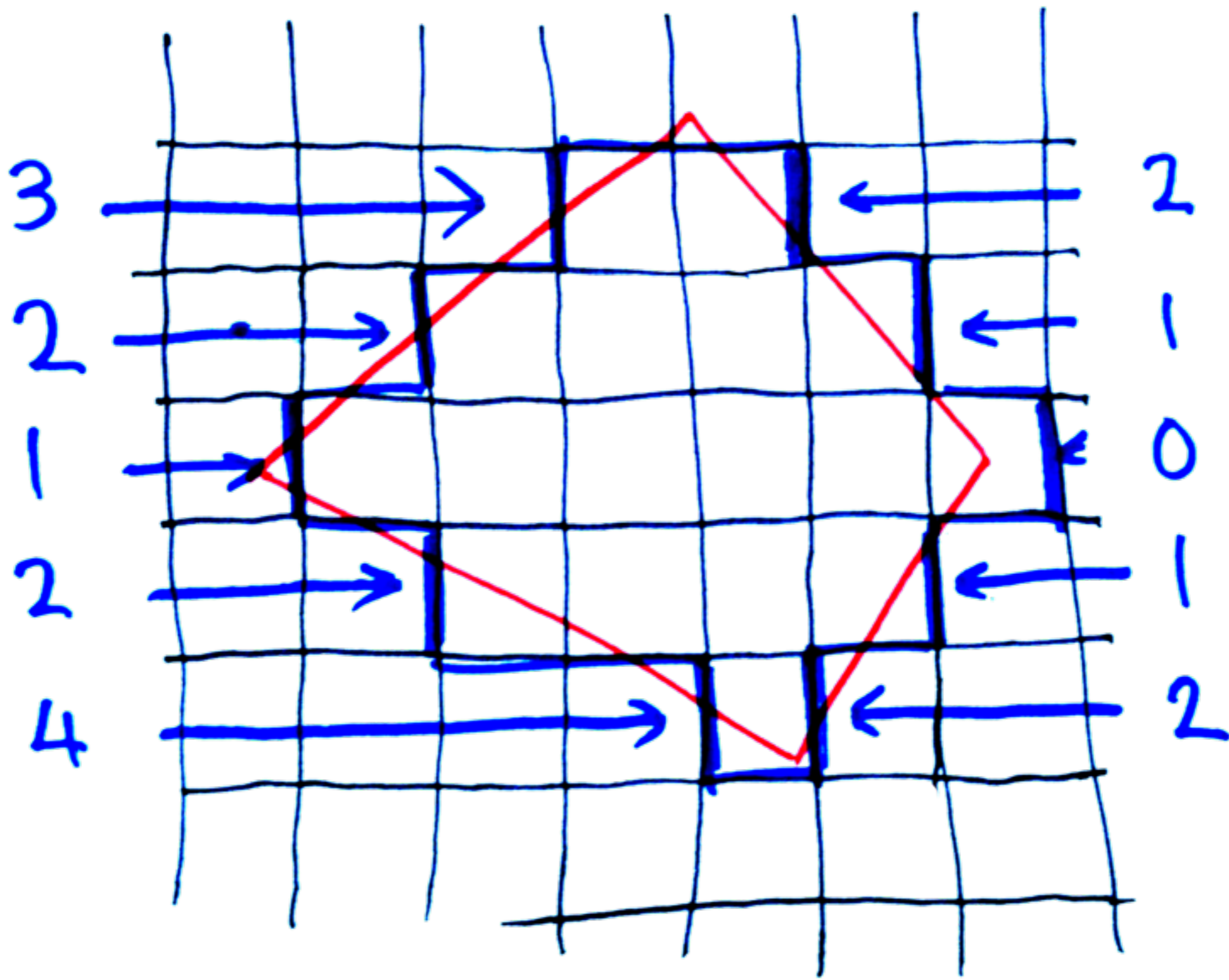
```
type Construction
  = Leaf Transform Primitive
  | Combine Transform Op Construction Construction
```

```
type Transform = ...
```

Voxelisation



Hardware-accelerated voxelisation



A LONGER DEMO

Thoughts on Elm

- New programming language for web applications
- Similar to Haskell
- But there are some inconvenient differences
- Predictable run-time system

data Transformation

= Scale Vec3 Vec3

| Rotate Float Vec3 Vec3

| Translate Vec3

deriving (Generic, FromJSON, ToJSON)

data Transformation

= Scale Vec3 Vec3

| Rotate Float Vec3 Vec3

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deriving (Generic, FromJSON, ToJSON, **Elm**)

Future work

- More usable editor (auto-completion, syntax highlighting...)
- A typed DSL
- More “mouse-support” (for curve control points, for example)
- Could be used for teaching programming: your program builds things in Minecraft!

Thank you