Decomposing CAD using FM + Synthesis
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Designing CAD models is hard

Online design repositories like Thingiverse are popular alternatives

+ Shared as meshes
+ CAD package agnostic
+ Cheap
+ Easy

- Immutable
- Incomplete

3D Printing Pipeline = Compiler

PL Fab Foundations

Synthesis = search + oracles
— subtractive
— additive
— primitive matching

Need PL foundations:
— DSLs for CAD and Mesh
— denotational semantics
— evaluation contexts
— compiler correctness proof

Implementation in ~ 25,000 LOC of OCaml

github.com/uwplse/reincarnate-aec

Thingiverse models synthesized

reincarnate.uwplse.org

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