# End-user Programming for CAD Systems via Language Design and Synthesis

Challenge:
- CAD tools face challenges in design editing, reuse, and optimization.
- Critical gap: need to keep track of references to intermediate geometry after edits.
- Impact: Enables faster, optimized solutions for engineers and DIY customization for amateurs.

Solution:
- Novel DSL with reliable semantic foundation based on lineage
- Interfaces for Reasoning about CAD Program and debugging errors
- Applications for Interactive Editing and Reverse-Engineering

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University Of Washington, Stanford
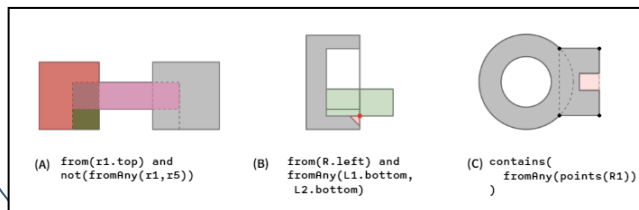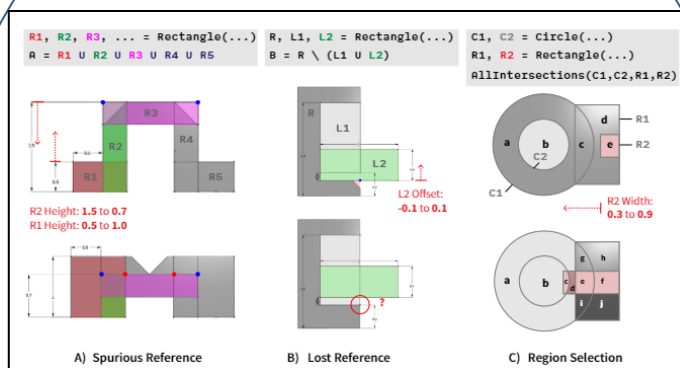
Scientific Impact:
- Novel reference semantics that can express programmer intent.
- Algorithms for automatic reasoning about programs that combine numerical computations with combinatorial computations.
- End-user programming for geometric domains, including interfaces for program interpretation and debugging.

Broader Impact and Broader Participation:
- Support existing CAD workflows and enable novel CAD applications
- Collaborations with the CAD community (Onshape), and dissemination to broader community
- Student mentoring and industrial placement and internship opportunities for students.
- Women in Graphics Outreach Program