Semantic and Visual Encoding of Diagrams (SaVED)

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Background

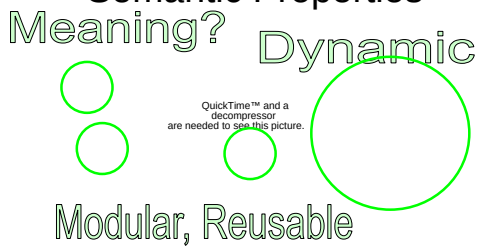
- Diagrams as geometric models
  - Hydrostatics, astronomy, geography
- Derive geometric properties from their models
- Diagram construction is a dynamic process
  - View a snapshot of that process
  - Manually perform the entire construction

Our Contributions

- **We observe**
  - several properties of diagrams from Greek Mathematical texts.
- **We develop**
  - a programming language that explicitly encodes these properties
- **We produce**
  - a corpus of diagrams for Archimedes, Floating Bodies, Book I
- **We interact**
  - with diagrams in uniquely-digital ways

Properties of Ancient Greek Mathematical Diagrams

Semantic Properties



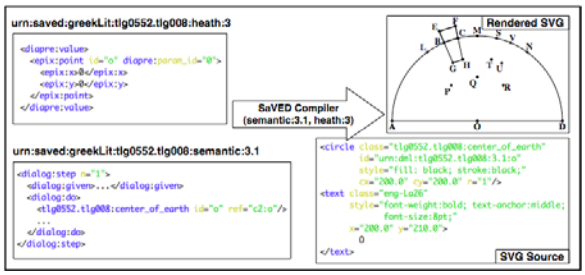
Presentational Properties

A Programming Language for Diagrams

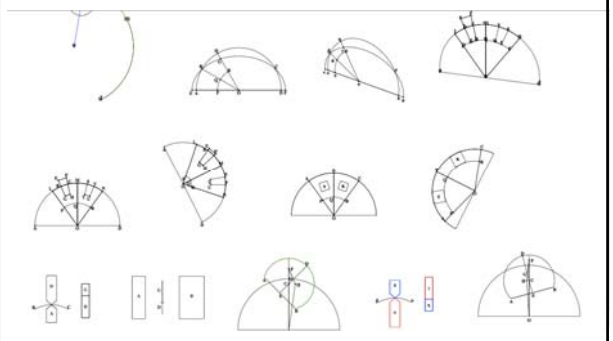
SaVED Markup

- Dynamic meaning
  - type casting
- Previously-defined objects
  - Variable declaration and assignment
- Previously-defined constructions
  - Subroutines
- Multiple Editions
  - Logical and presentational layer

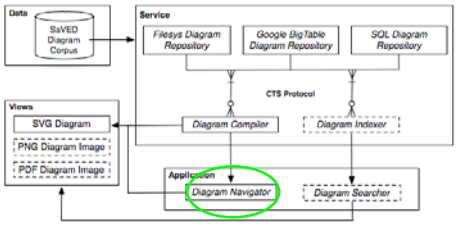
Compilation



A Machine-Actionable Corpus of Diagrams



Uniquely-Digital Diagram Interfaces



Conclusions

- **We observed** several logical and presentational properties of diagrams
- **We developed** SaVED, a programming language that explicitly encodes these properties
- **We produced** an archival-quality corpus of diagrams for the Archimedes Palimpsest Project
- **We can interact** with diagrams in uniquely-digital ways: dynamic navigation, search and dependency graphs

Thank You!
Questions?

http://www.cs.dartmouth.edu/reports/abstracts/TR2009-654/
http://www.episteme.ws/