Fabrication *a Lavoisier*

An Interactive data driven design system for designing functional objects that can be directly manufactured.

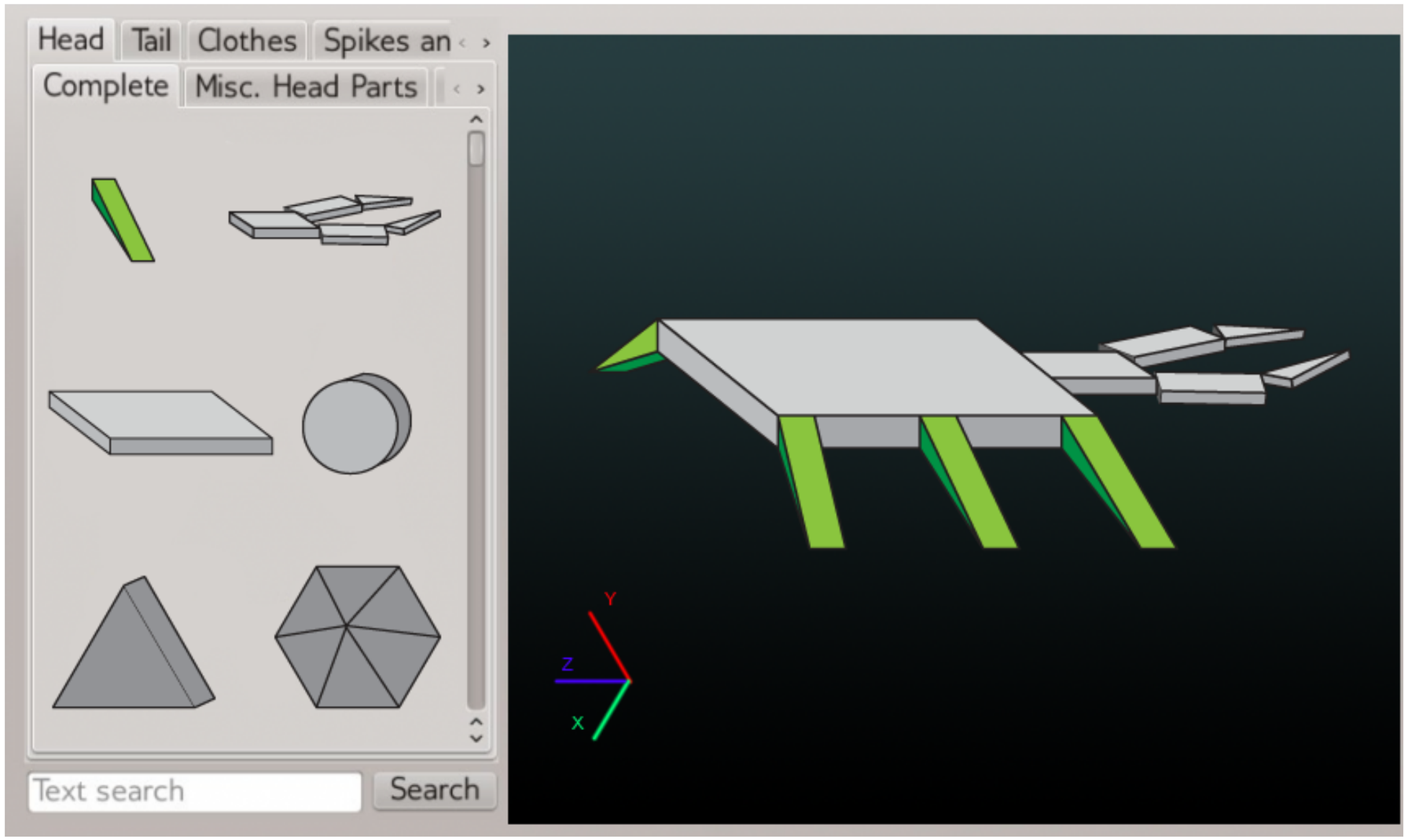
Goals

- Easy to be used by casual users
- Guarantee that object is fabricable and viable
- Instant feedback and suggestions

System Design

- Design UI
- Template Representation
- Evaluation Engine

Design UI


Head
Tail
Clothes
Spikes an
Complete
Misc. Head Parts
Text search
Search
Y
Z
X

Design UI

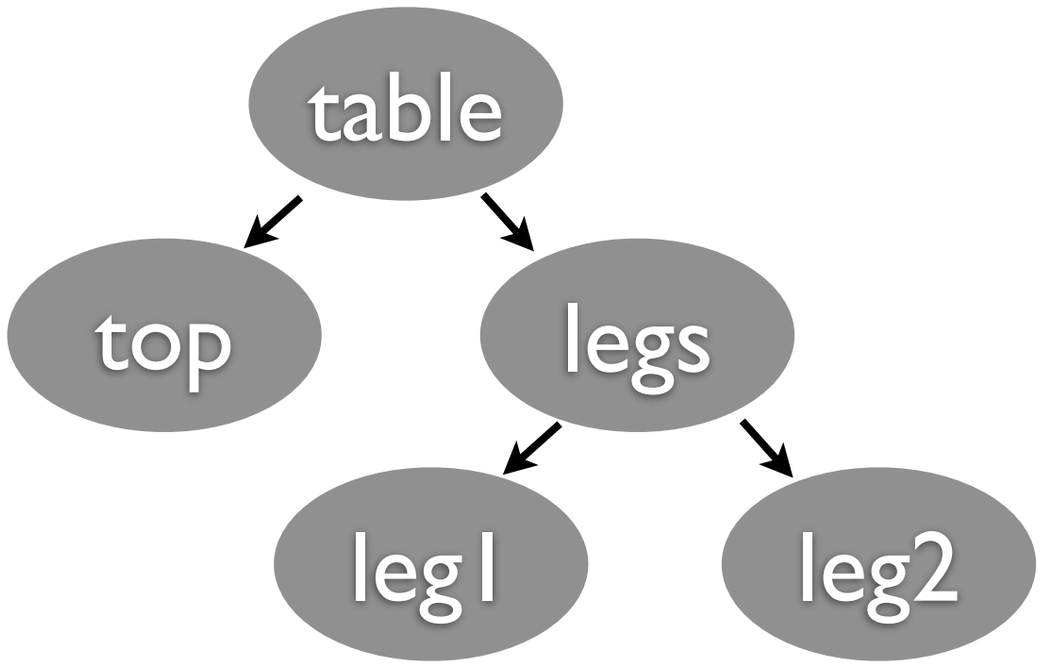
- Allow template visualization
- Suggestions of relevant components
- Operations: replacement, addition, removal
- Adjusts user specifications to guarantee structural feasibility - or gives a warning/ suggestions

System Design

- Design UI
- Template Representation
- Evaluation Engine

Template Representation

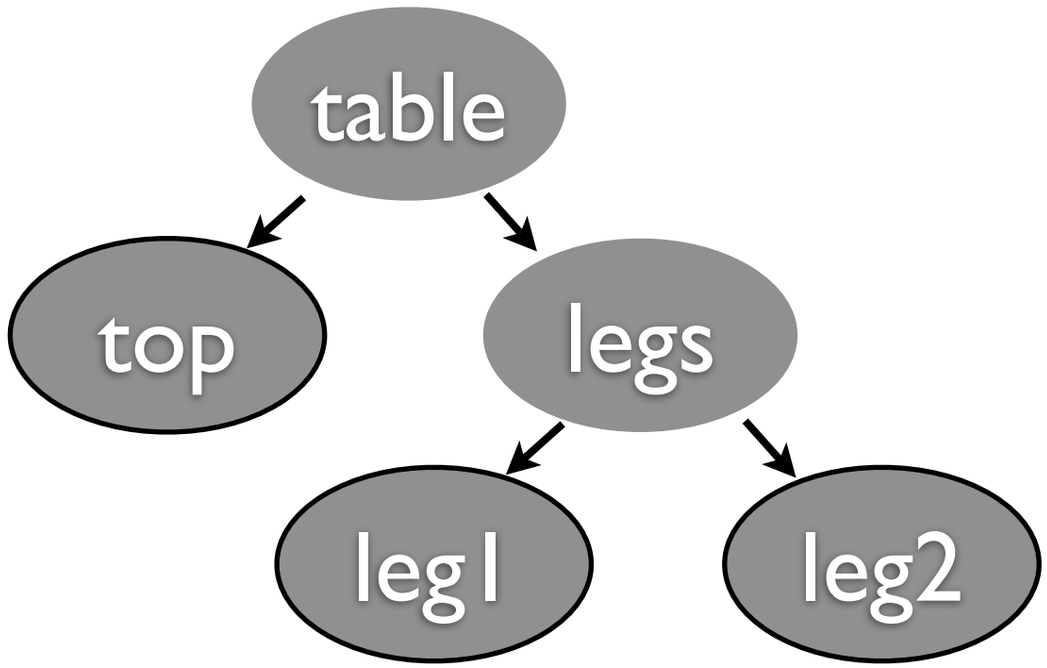
- Hierarchy of Templates



- Templates:
  - DOF (q)
  - constraints on q

Template Representation

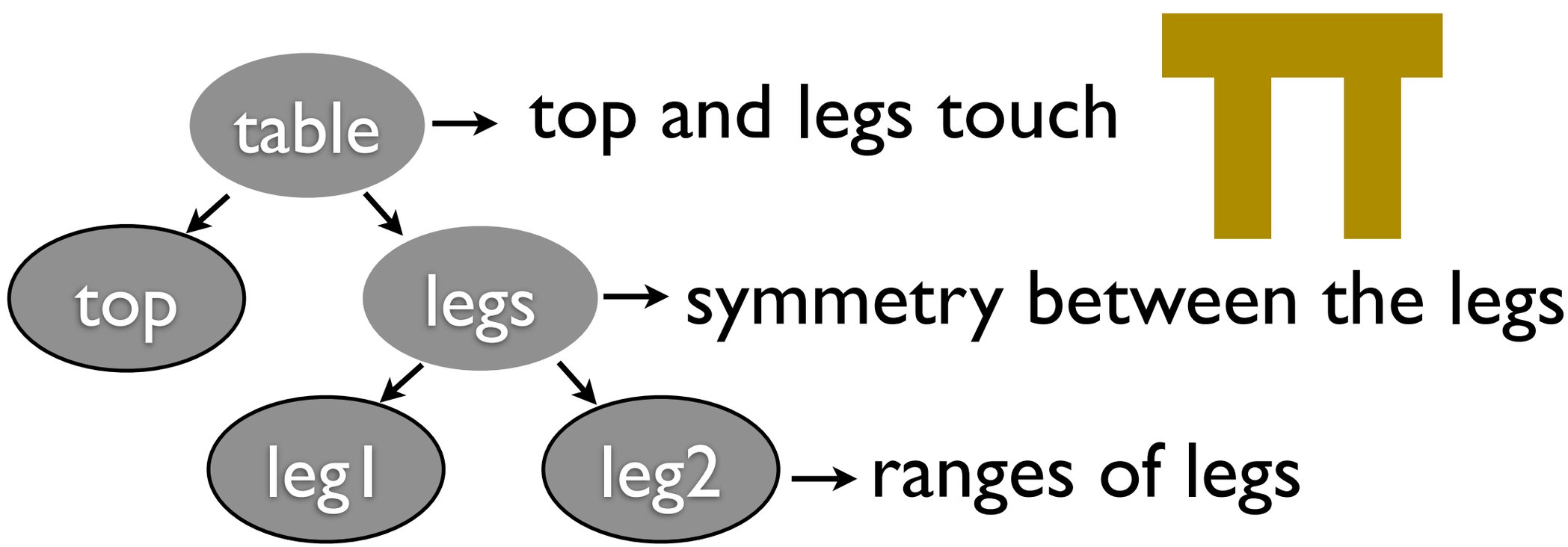
- Hierarchy of Templates



- Templates:
  - DOF (q)
  - constraints on q

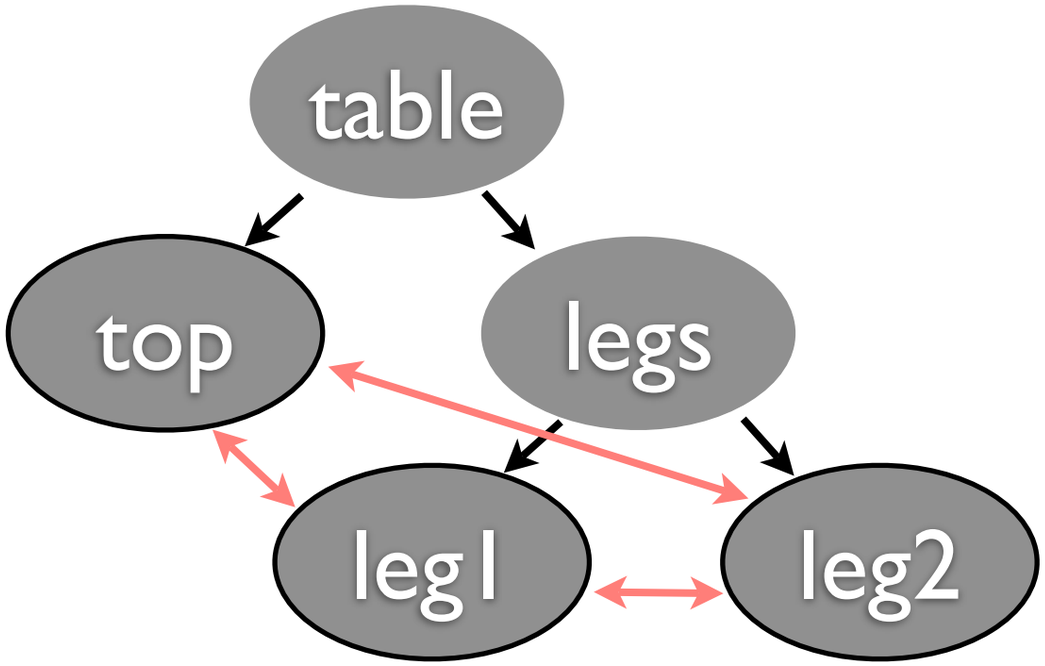
- Elements:
  - fabrication rule
  - geometry
  - mapping function
  - patches

Constraints



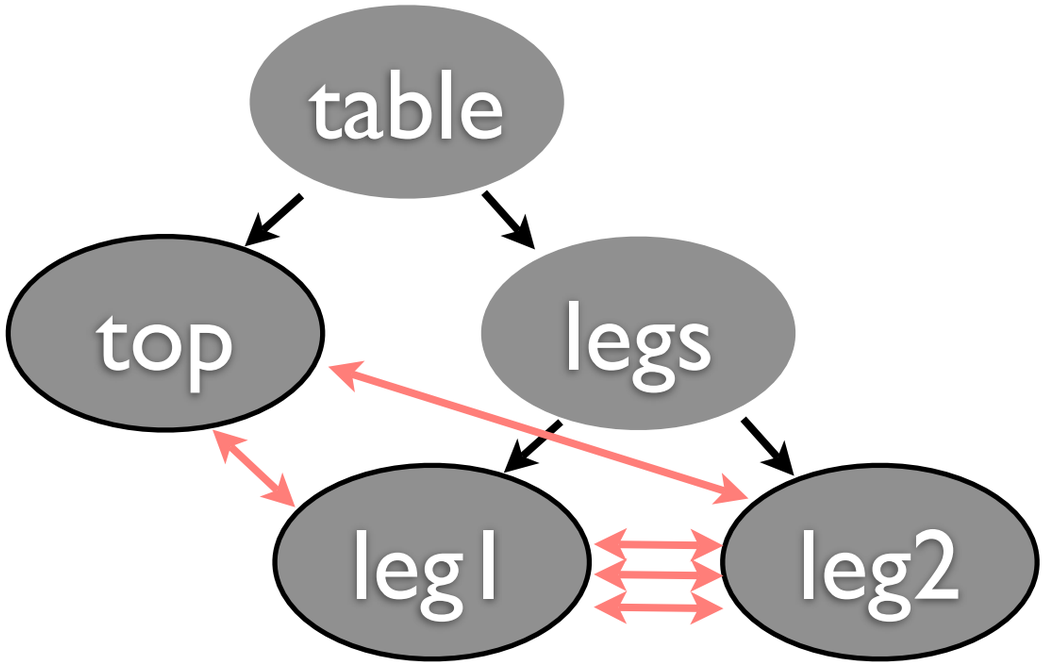
- Every node (template) has a list of constraints

Constraints



- Every node (template) has a list of constraints
- Constraints are represented as a graph

Constraints



- Every node (template) has a list of constraints
- Constraints are represented as a graph

System Design

- Design UI
- Template Representation
- Evaluation Engine

Evaluation Engine

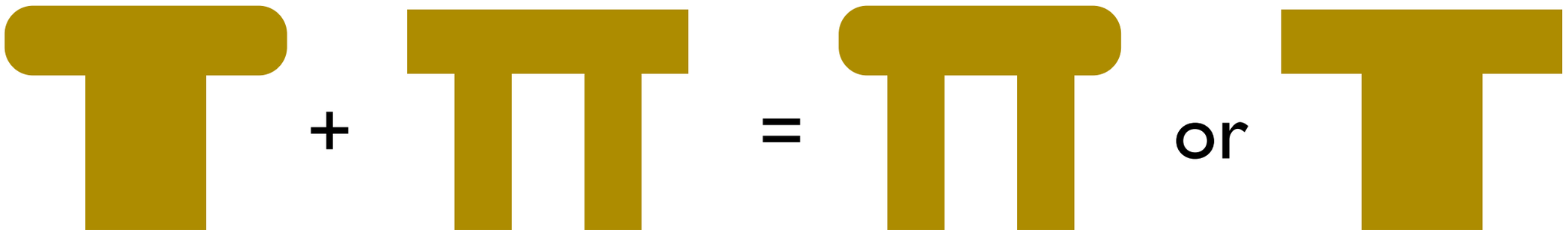
- Operations
  - replacements
  - insertions
  - removal

☑ constraints and connectors!

Steps

- use data driven or grammar based rules to match user operations as best as possible
- stability analysis to validate

Replacements



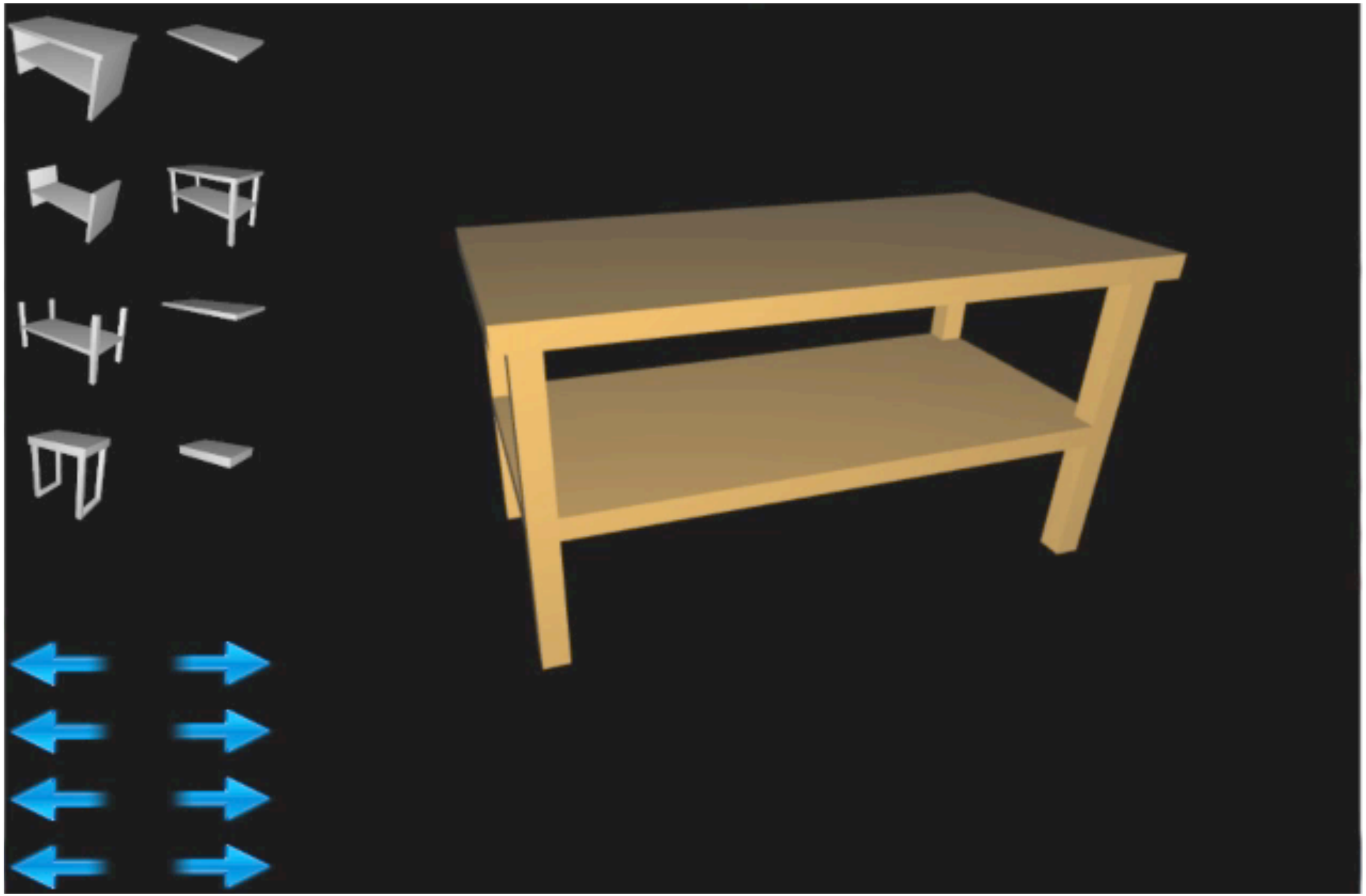
- Two lists of constraints/connectors that need to be merged
  - metric for matches
  - dealing with redundancies/absence

Additions

- Only one lists of constraints/connectors
  - evaluating if constraints can be translated
  - dealing with absence

Example

Example



Current Work

- Improving the UI
- Allowing suggestions
- Coming up with more robust matching rules for constraints and components
- Combining with the simulation packages
- Adding more semantic information to the database (?)