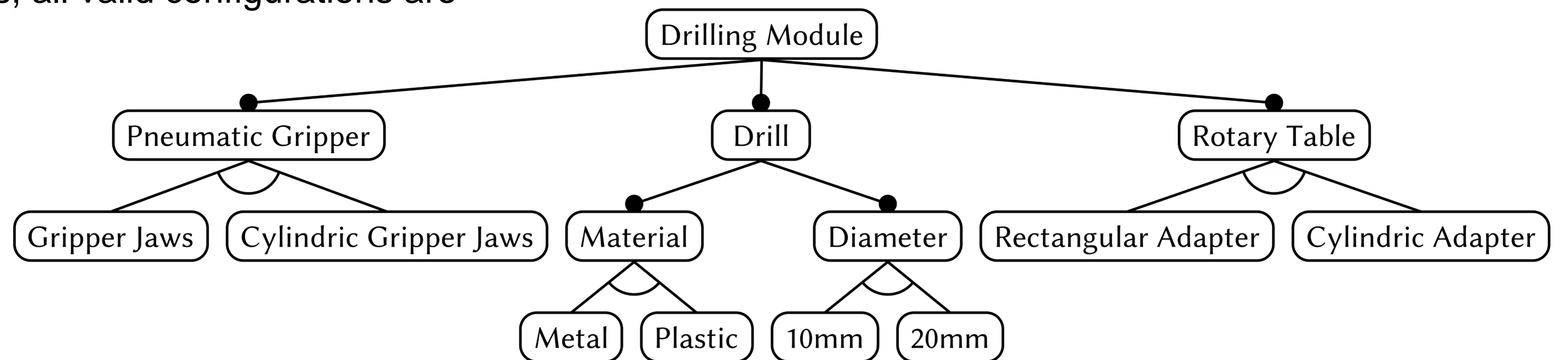
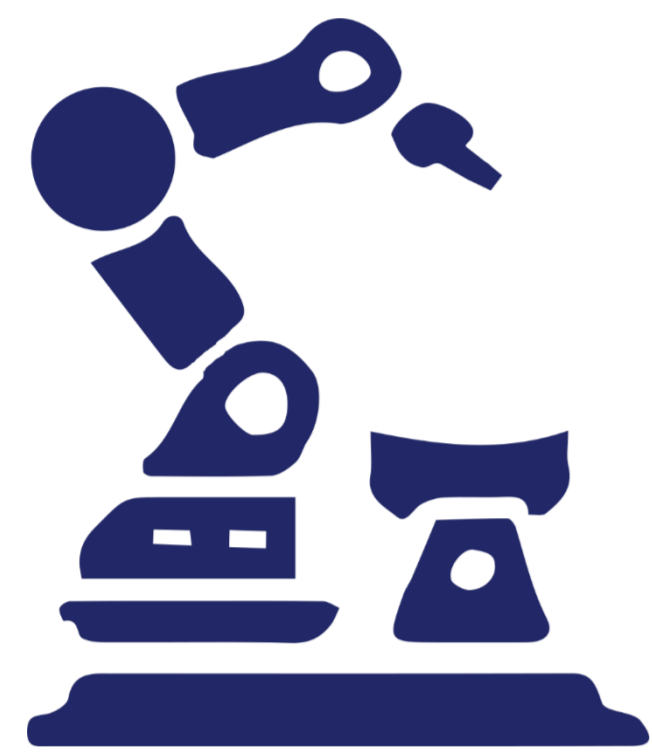


# Heterogeneous Variability Modeling

## Variability Modeling

### Features & Variability Models

- Configuration options of customizable systems are called **features**
- Features and their relations are captured by **variability models**
- Configurations are sets of selected features
- With variability models, all valid configurations are expressed



### Configuring & Analyzing Variability Models

- Deriving valid configurations strongly depends on the relations expressed in the variability model
- With sophisticated analyses, design flaws, such as not selectable features, can be detected

## Variability Modeling for Collaborative Embedded Systems



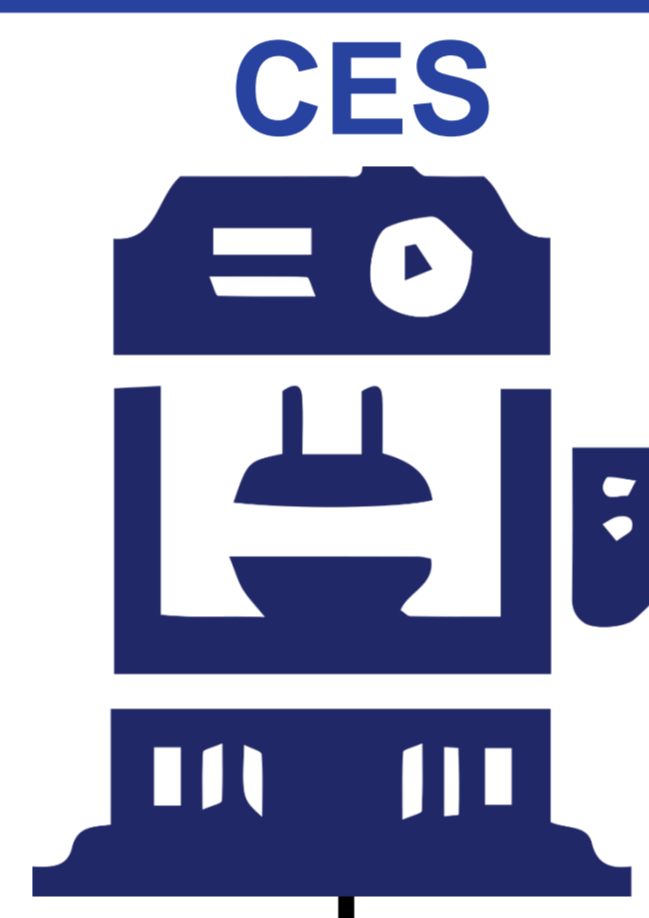
Feature Model

**Notation-Specific**  
Configuration & Analyses



Orthogonal Variability Model

**Notation-Specific**  
Configuration & Analyses



Spreadsheet

**Notation-Specific**  
Configuration & Analyses

### Diverse Variability Modeling Notations

- Different collaborative embedded systems (CESs) are potentially developed by different companies / departments
- Myriads of variability modeling notations exist with different mechanisms to capture features and the semantics of their relations
- In a collaborative embedded system group (CSG), multiple CESs by different manufacturers potentially use different variability modeling languages
  - Composing the variability model of a CSG requires to integrate all CES variability models
  - Configuring and analyzing CSG variability models requires to cope with different variability modeling languages

## Results

### Variability Modeling Adapters

- Generic and flexible adapter infrastructure
- Covers all specifics of common variability modeling notations in one interface
- Must be implemented **once** per variability modeling notation
- Adapters delegate configuration and analyses requests to concrete modeling notations and translates results back
  - Uniform interface to configure and analyse arbitrary variability models
  - Extensible for new model types
  - CSGs can be configured without the need to know notations of underlying variability models

