

Feature-oriented Domain Analysis

Group 2

Feature diagram

- **Feature Diagram (FD):** A family of popular modeling languages used to address the feature interaction problem.
- **Features:** A distinguishable characteristic of a concept.
- **Feature interference problem:** Adding new features may modify the operation of already implemented ones in a undesirable way.
- It is essential that features and their interactions are well documented such that they are useful for both **domain engineering** (customers selecting requirements) and **application engineering** (engineers deploying requirements).
- FDs communicate between domain and application engineers as well as customers and stakeholders

Purpose of feature diagram

- Tool to address the complexity of engineering software products lines
- Describe allowed variabilities between products of the same line/family
- Represent feature dependencies
- Guide the selection of features allowing the construction of a specific product
- Facilitate the reuse and the evolution of software components implementing these features

How can we improve FDs?

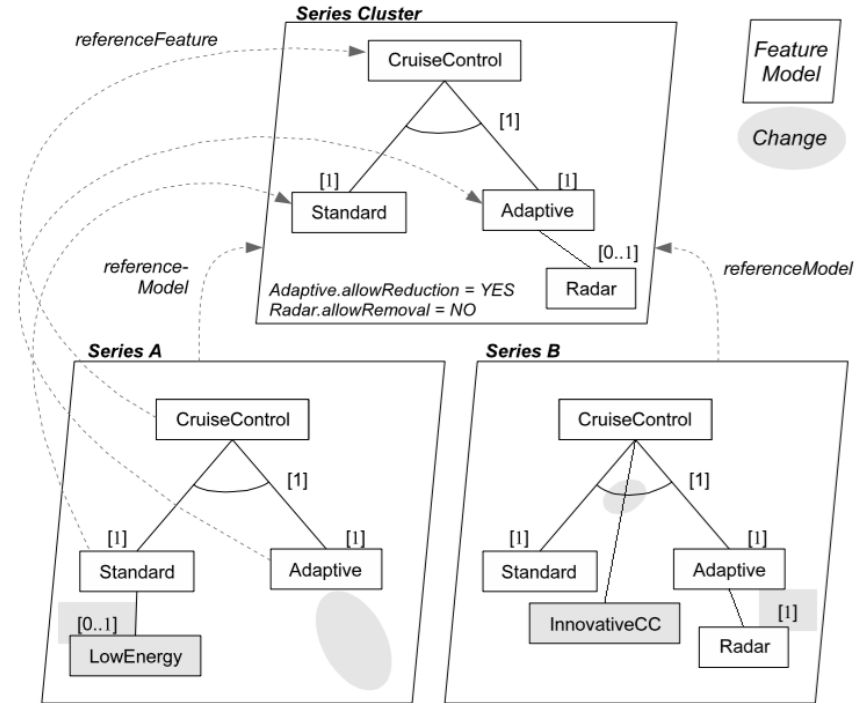
- FD languages can be evaluated with respect to well defined criteria: expressiveness, embeddability, succinctness and ambiguity.
- If we look more finely at using embeddings, we can eliminate redundant constructs. This process produces VFDs (Varied Feature Diagrams), an FD language which is expressively complete, harmfully irredundant, and can embed all other known variants and is thus linearly succinct.

Advanced forms

- Multi-level feature tree with reference feature models
 - Each node in the tree represented by a feature model that is both
 - a reference model (for the lower-level models) and
 - a referring model (with respect to the higher levels)
 - Except for the root (only a reference model) and the leafs (referring models)

Advanced forms

- Hierarchical product line
 - Valid product of a subline is always a valid product of the higher-level product line
- Multi-level feature tree:
 - Use of cardinality
 - Use attributes to define which deviations are allowed



Benefits and limitations

- Benefits:
 - Allow introduction of feature locally
 - without cluttering the global model or when there is no time/reason to discuss for the change to global model
 - Allow propagating local features bottom up
 - strategically introduction of innovations from local level to global level)
- Limitation:
 - Does not allow change to less restrictive attribute in referring model

Use in software product line

- Use as a modeling tool to develop software product line and manage variations
- Model the software features using technique of multi-level feature tree with reference model

Question?