How to Use FeatureIDE

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Content

- What is Feature-Oriented Software Development?

- What functionality does FeatureIDE provide?

- How to start working with FeatureIDE?

Feature-Oriented Programming (FOP)

- Introduced 1997 by Christian Prehofer
- Based on Object-Oriented Programming
- Features realize functionalities
- Features are cross-cutting to objects
- Features modularize fragments from certain classes
- Fragment contains some methods/fields of a class belonging to one functionality
- Goals: code traceability, software customization

```
package util;
class Calc {
  void add() {
    e0 = e1 + e0;
    e1 = e2;
  }
}
```
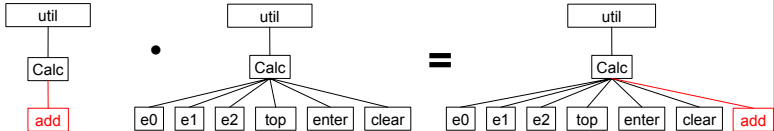
feature: Add

·

```
package util;
class Calc {
  int e0 = 0, e1 = 0,
      e2 = 0;
  void enter(int val) {
    e2 = e1; e1 = e0;
    e0 = val;
  }
  void clear() {
    e0 = e1 = e2 = 0;
  }
  String top() {
    return String.
      valueOf(e0);
  }
}
```

feature: CalcBase

feature: CalcAdd

=

```
package util;
class Calc {
  int e0 = 0, e1 = 0,
      e2 = 0;
  void enter(int val) {
    e2 = e1; e1 = e0;
    e0 = val;
  }
  void clear() {
    e0 = e1 = e2 = 0;
  }
  String top() {
    //...
  }
  void add() {
    e0 = e1 + e0;
    e1 = e2;
  }
}
```
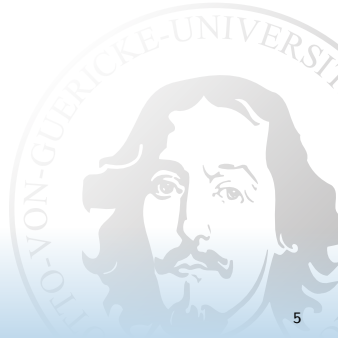


```
util
  Calc
    add
```

·

```
util
  Calc
    e0  e1  e2  top  enter  clear
```

=

```
util
  Calc
    e0  e1  e2  top  enter  clear  add
```

http://wwwiti.cs.uni-magdeburg.de/iti_db/lehre/epmd/2009/slides/06_FOP.pdf

Configuration
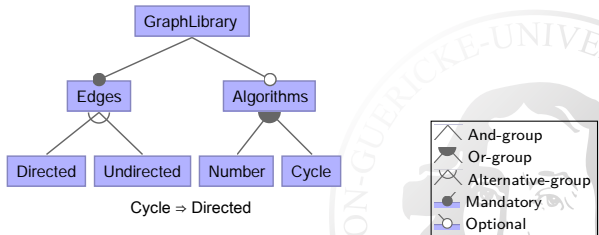
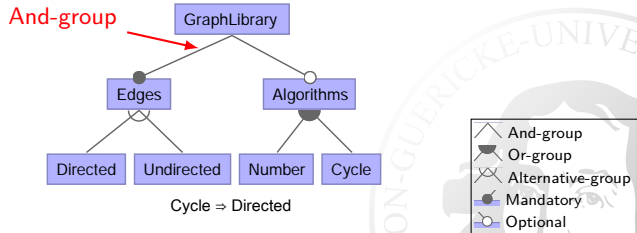- Selection of features for a program variant
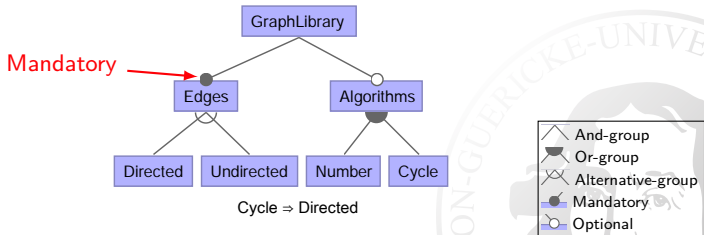- Not all combinations are useful

Feature Model

- Specifies valid combinations of features
- Graphically represented by a feature diagram
- Created for a particular domain
- Describes a software product line (SPL)

Cycle ⇒ Directed

△	And-group
▽	Or-group
⋈	Alternative-group
●—	Mandatory
○—	Optional

Feature Model

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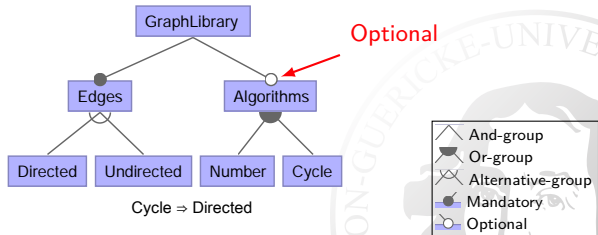- Describes a software product line (SPL)
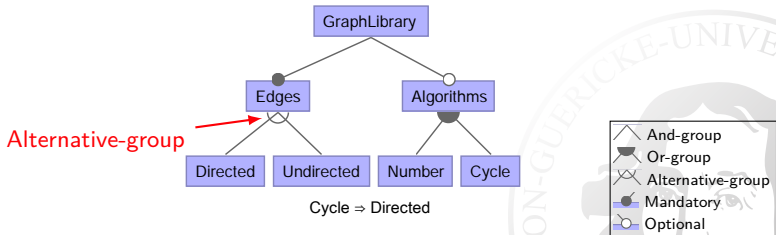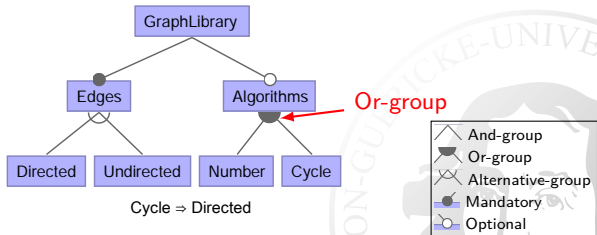
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Mandatory

GraphLibrary

Edges   Algorithms

Directed   Undirected   Number   Cycle

Cycle ⇒ Directed

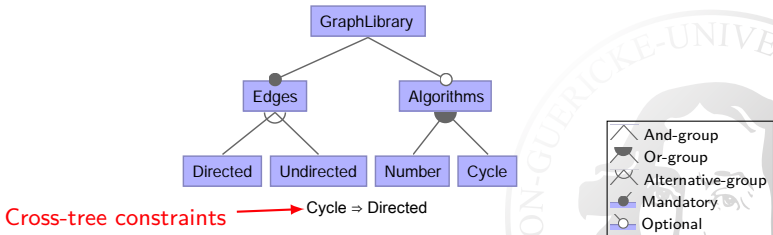And-group
Or-group
Alternative-group
Mandatory
Optional

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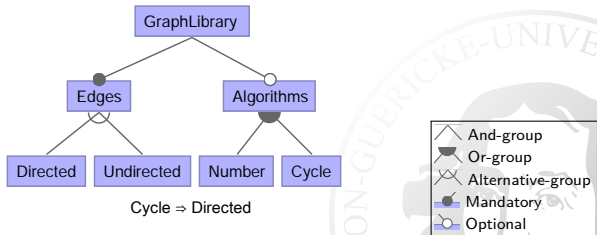
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Cycle ⇒ Directed

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Cross-tree constraints → Cycle ⇒ Directed

And-group
Or-group
Alternative-group
Mandatory
Optional

Feature Model

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Cycle ⇒ Directed

Legend:
- △ And-group
- ▽ Or-group
- ✕ Alternative-group
- ● Mandatory
- ○ Optional

Composition Engines

Command-line tools used to compose files within FeatureIDE:

- AHEAD (jampack): .jak (Java 1.4)
  http://userweb.cs.utexas.edu/~schwartz/ATS.html

- FeatureC++: .cpp (C++)
  http://www.fosd.de/fcpp

- FeatureHouse: .java (Java 1.5), .cs (C), .c/.h (C), .hs
  (Haskell), .jj (JavaCC), .als (Alloy), .xmi (UML)
  http://www.fosd.de/fh

Feature-Oriented Software Development

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- . . .
- . . .
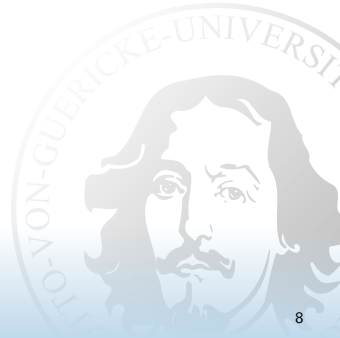
Feature Model Editor 1/4

- ...
- ...
- ...
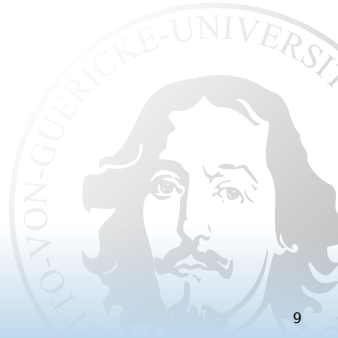
Feature Model Editor 2/4

- ...
- ...
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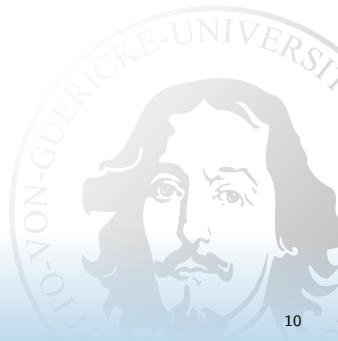
Feature Model Editor 3/4

- ...
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- ...

Feature Model Editor 4/4

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Feature Model Edit View

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Configuration Editor

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- ...

Jak Editor

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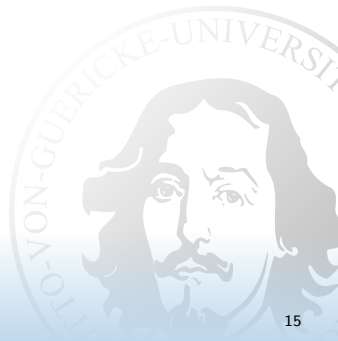- ...
- ...

Collaboration Diagram

- . . .
- . . .
- . . .
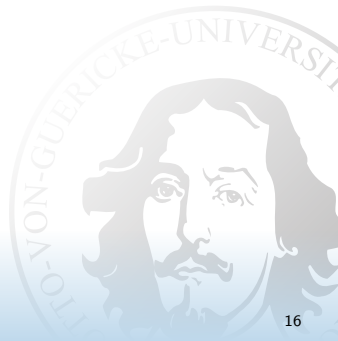
Feature Project Structure
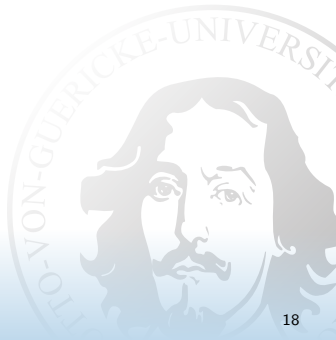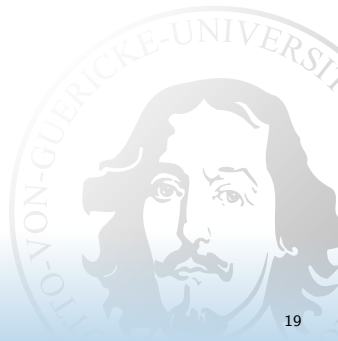
- ...
- ...
- ...
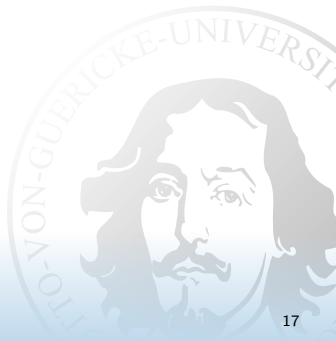
Feature Project Builder

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- ...
- ...

Run Configurations

- ...
- ...
- ...

Creation Wizards

- ...
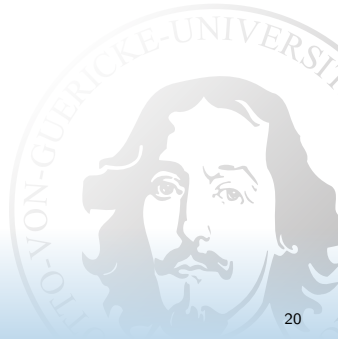- ...
- ...

Installation of FeatureIDE

- ...
- ...
- ...

Cheat Sheet

- ...
- ...
- ...